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A Brief History of Social Choice and Welfare Theory



Marc Fleurbaey and Maurice Salles

JEL classification: D6 · D7 · I3

‘Political Economy or Economics is a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing.’ This is the first sentence of Alfred Marshall’s *Principles of economics* (Marshall 1920) essentially outlining that economics as a discipline has to be some welfare theory. When our old masters, for instance Adam Smith, John Stuart Mill, Henry Sidgwick or Léon Walras define economics, they allude to studies related to a beneficial social organization. What is particularly interesting in Marshall’s definition is precisely his use of the word ‘wellbeing.’

Welfare economics is definitely established by the publication of Arthur Pigou’s magisterial volume entitled *The Economics of welfare* (Pigou 1932) even though some previous editions appear as *Wealth and welfare*.

The modern theory of social choice is easily dated. We can identify three sources: Duncan Black’s papers on majority rule (Black 1948a, b, 1958) and Kenneth Arrow’s RAND discussion paper at the end of the 1940s (Arrow 1948), and Arrow’s paper (1950), Georges Guilbaud’s paper (1952) and Arrow’s monograph at the beginning of the 1950s (Arrow 1951, 1963). Among these sources, Arrow’s contributions stand

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out for at least two reasons. First, Arrow's book is obviously in the welfare economics tradition even if voting is not absent (after all, social choice is about the selection of options by a society of individuals, and voting is a standard way to proceed to such a selection). Second, Arrow uses a relation framework (probably borrowed from the Polish logician Alfred Tarski), a framework which will become the standard framework of social choice theory (and, to some extent, part of the standard framework of microeconomic theory).

In the following part of this foreword, we will briefly sketch the history of social choice and welfare theory. Interested readers, for a more detailed survey, may consult the chapter on 'Social choice' by Maurice Salles and the chapter on 'Welfare economics' by Antoinette Baujard in the third volume of the *Handbook on the history of economic analysis* (Faccarello and Kurz (eds.), 2016).

1 History of Social Choice and Welfare Theory: A Brief Sketch

1.1 Precursors

There is surely much to explore in Plato and Aristotle regarding the general organization of social life. However, one must remember that they were both opposed to democracy. On the other hand, Aristotle has long developments on equality and the search of happiness or welfare (eudaemonia). Welfare economics too rarely refers to this concept and to Aristotle's analysis of it.

Precursors of social choice theory are generally associated with voting rather than welfare. Among these precursors, Pliny the Younger's reputation is due to Farquharson (1969). In his Letter 14 of Book VIII (Pliny 1969), Pliny the Younger describes a situation where strategic voting by a group of senators reveals to be beneficial (for the members of the group). Pliny's description is an example of the manipulation by a coalition of a voting procedure (here, plurality rule—also called 'first-past-the-post'), a theoretical question which will be solved (separately) in the 1970s by Allan Gibbard, Prasanta Pattanaik and Mark Satterthwaite.

Other precursors include the Catalan Ramon Lull and the German Nikolaus von Kues, respectively, in the 13th and the 15th century. Lull proposes, among other things, a rule known in the 20th century as the Copeland rule on the basis of binary majority voting and von Kues (also known under the Latin form of Cusanus) proposes a rule which is generally attributed to Borda, Borda's rule, where points are given to options on the basis of their position in the rankings of the voters (with k options, an option ranked first gets $k - 1$ points, an option ranked second gets $k - 2$, etc., and for each option, points are added, which determines a 'social' or 'collective' ranking based on the points obtained by each option. There are other precursors, and we do not doubt that further historical researches will lead to the discovery of heretofore unknown voting theory scholars.

1.2 First Foundation

1.2.1 Voting

Jean-Charles de Borda and Nicolas de Condorcet are rightly considered as the fathers of social choice and voting theory. The reason why they must be distinguished from those we call ‘precursors’ is the scientific aspects of their contributions. Borda’s work on voting is quite limited, just a few pages in a mathematical paper in which he introduces what is now known as Borda’s rule but where he also shows that plurality rule is flawed since it can select an option which is pairwise defeated (using majority rule) by all other options (being then a Condorcet loser according to modern terminology). However, there is, surprisingly, no proof that a Borda winner cannot be a Condorcet loser (Borda 1784).

Condorcet, on the other hand, devotes many pages (a book, several papers or pamphlets) to voting. His main contribution is the 1785 *Essai* (Condorcet 1785). This work is essentially devoted to the use of probability theory to solve specific questions such as what is now described as Condorcet jury theorem. But developments on this topic are rather recent and Condorcet is perhaps more famous for what he proposes in the preliminary part of his *Essai* in which one can discover the notions of Condorcet winner and the Condorcet paradox. The Condorcet paradox (or voting paradox) can be presented in a very simple way. Suppose there are three voters and three options a , b and c . Voter 1 ranks the options in the order abc (a first, b second and c third). Voter 2 ranks them in the order bca and voter 3 in the order cab . According to majority rule, x is declared socially preferred to y if the number of voters who prefer x to y is greater than the number of voters who prefer y to x . Then, one can observe that a is declared socially preferred to b , b socially preferred to c and c socially preferred to a . There is no Condorcet winner (an option which is socially preferred to all the other options, using majority rule). Condorcet’s own example in the *Essai* is more complex. Another example provided by Condorcet consists in showing that Borda’s rule can fail to select an existing Condorcet winner.¹

Among the important contributions during the 19th century, we must mention Charles Dodgson (known under his pen name as Lewis Carroll) and Edward Nanson. In particular, Dodgson proposes various rules based on majority rule and Borda’s rule, but he is now better known for a rule which has been studied by computer scientists. When there is no Condorcet winner, Dodgson suggests that we select the option which becomes a Condorcet winner after the smallest number of transpositions in the individual rankings. For instance, in the case of Condorcet paradox presented above, if voter 2 rather than having the ranking bca has a ranking bac , one can observe that a becomes a Condorcet winner after a unique transposition, ca becoming ac . However, in this precise example with its property of symmetry, one can see that similar transpositions would lead to b or c being Condorcet winners after a single transposition.

¹Condorcet never mentions Borda, he mentions instead ‘a famous Geometer’ (un ‘Géomètre célèbre’).

1.2.2 Welfare

In the 19th century, the main contributions to British moral and political philosophy are certainly relative to the development of utilitarianism with the landmark work of Jeremy Bentham, John Stuart Mill and Henry Sidgwick. The fact that Mill and Sidgwick were also economists explains in part why utilitarianism permeates economics with the supposed possibility to measure utility and to make relevant interpersonal comparisons of such utilities. This is the basis of welfare economics à la Marshall or even à la Pigou.

1.3 Second Foundation

1.3.1 Welfare

In 1932, Lionel Robbins attacks these assumptions, in particular the comparability of utility across individuals. Robbins wants to clearly distinguish what is relevant to economics from what is relevant to moral and political philosophy. What remains is essentially ordinal utilities and Pareto criteria, probably an indirect and unintentional homage to the Lausanne school of economics represented by Léon Walras and Vilfredo Pareto! This attack defines, in some sense, the date of death of 'old' welfare economics (perhaps, in Robbins' view the definite death of welfare economics). However, some economists try to rescue a welfare economics based on Paretianism, and in the 1930s, several papers appear on so-called compensation tests (with contributions by, among others, John Hicks, Nicholas Kaldor and Tibor Scitovsky). Another approach is followed by Bergson (1938) with the introduction of the notion of social welfare function, a notion which will be later developed by Samuelson (1947). Social welfare is supposed to be a function of individual utility functions (in Samuelson's version). With the appropriate mathematical framework, Pareto criteria can take the form of the positivity of (first-order) partial derivatives.

Kenneth Arrow's 1951 monograph belongs to the descent of this literature. This assertion is exemplified by a few facts. First, Arrow uses the same phrase, viz. 'social welfare function'. Second, he devotes several pages of his short book to the compensation principles. However, his social welfare function is different from the Bergson–Samuelson variety. The Bergson–Samuelson function is a function of given individual utility functions which are themselves functions whose domain is the set of social states (some subset of a finite-dimensional Euclidean space). The utility functions can be considered as representing preference orderings so that these orderings are fixed. In Arrow's framework, each individual has any possible preference ordering over the set of social states, and accordingly, these individual orderings are not fixed: The variables are the lists of possible individual orderings (generally called profiles of individual orderings). The values taken by the social welfare function are social preference orderings. In the second edition of the monograph (Arrow 1963), the social welfare function is supposed to satisfy four conditions. First, individual

preference orderings are not restricted. This means that if, for instance, the individual orderings are complete preorders of the social states (complete rankings with the possibility of ties, also called weak orderings), with three social states, then there are 13 possibilities. Second, in case of unanimous preferences of a social state a over a social state b , then the social state a must be socially preferred to social state b (Pareto criterion). Third, there is no individual whose (strict) preference becomes, whatever are the other individuals' preferences, the social strict preference (such an individual would be called a 'dictator'). Fourth, if in two lists (profiles) of individual preference orderings two social states x and y are pairwise preference-identical—for instance individual 1 prefers x to y in both profiles, individual 2 is indifferent between x and y in both profiles, etc.—then the two values taken by the social welfare function must be pairwise preference-identical—for instance x is socially preferred to y for both profiles. This fourth condition is called by Arrow 'independence of irrelevant alternatives'. Arrow proves that if there are at least two individuals (the number of individuals being finite) and three social states, there is no social welfare function satisfying the four conditions.

1.3.2 Social Choice, Voting, Mathematical Politics

Rather than 1951, 1948 is certainly the birth date of modern social choice. The two papers by Black mentioned above where majority and special majority rules are studied and the property of single-peakedness is introduced appear in 1948. However, if 1948 is the right date, it is primordial due to Arrow's RAND discussion paper P-41 in which one can find most of the theoretical results of the 1951 monograph and even some elements on binary relations and choice functions which will later appear in (1959) in *Economica*. What makes Arrow the father of modern social choice is not only the statement and proof of his impossibility theorem, but also the introduction of a mathematical framework based on relations (inspired by Tarski) to replace the usual instruments of mathematical analysis which, at the time, were used by mathematically inclined economists. The RAND discussion paper already includes an analysis of single-peakedness and majority decisions on the basis of a relational framework in contrast with what Black did.

If we call 'aggregation functions' functions whose domain are lists of individual preference orderings over social states and whose range is a set of (social) binary relations over these social states, we can emphasize the difference between the Arrowian and the Bergson–Samuelson versions. In Arrow's framework, the domain is a set of profiles. In Bergson–Samuelson's framework, there is a unique profile. According to Samuelson, the Arrowian analysis belongs to a scientific domain which could be called 'mathematical politics' but does not belong to economics. A dichotomous view due to Sen (1977) could be a (partial) solution to the question. A first interpretation of the aggregation problem consists in considering that the social relations are the results of amalgamating the data expressed by individuals (profiles of opinions, preferences, etc.) under a procedure or rule adopted by the society with the ultimate purpose to take decisions (this is the mathematical politics/voting view). A

second interpretation is that the social relation reflects a specific individual's judgments about the goodness of the social states on the basis of the well-beings of all the individuals. This second interpretation is certainly related to what Bergson, Samuelson and others (such as John Harsanyi and Ian Little) were mostly concerned with. However, we think that the uniqueness of profile is not a necessary ingredient of this second interpretation.

A major work, somewhat neglected because written in French, is by Guilbaud and appears in 1952. In this long paper, Guilbaud recalls the importance of Condorcet and, among many developments regarding new ways to formally analyze the aggregation problem, provides what is surely the first combinatorial analysis of the Condorcet paradox, giving in a footnote a formula for the limit when the number of individuals tends to infinity, a formula which remained rather enigmatic until Peter Fishburn, William Gehrlein, Dominique Lepelley and others introduced probability models to calculate the number of occurrences of various pathologies of voting rules. Guilbaud also studies structures such as simple games, proper simple games, lattices and even suggests the possibility of fuzzy preferences. Furthermore, he proposes an analysis of judgment aggregation, a subject which will be further developed many years later by, among others, Franz Dietrich, Christian List and Philip Pettit.

1.3.3 Utilitarianism Revisited, Social Justice, Moral Philosophy

Harsanyi in (1953; 1955) reconsiders summation-based social welfare functions by introducing assumptions on individual utility functions and on the social utility function borrowed from an analysis which had been devised to deal with risky situations within game theory. Harsanyi assumes that the individual and social utility functions are von Neumann–Morgenstern utility functions. Accordingly, he has to transform the space of social states in an appropriate way. With the help of some kind of Paretian property, he is able to show that the social utility can be represented as a weighted sum of individual utilities. In his 1953 note, he proposes a kind of probabilistic veil of ignorance. This concept of veil of ignorance, generally associated with John Rawls, will be the object of discussion among moral philosophers and welfare economists starting with Rawls' *Philosophical Review* paper of (1963).

Harsanyi's analysis of utilitarianism was made precise later, in particular thanks to contributions by John Weymark and Philippe Mongin.

It was largely unnoticed by economists that some philosophers in the 1950s, as exemplified by Rawls's 'Justice as fairness' (Rawls 1958), were interested in social choice theory and welfare economics. Rawls refers to Arrow, Little, Hicks and Scitovsky.

1.4 Social Choice Theory Around 1970

In the years following the publication of Arrow's book, social choice studies hardly develop. This phenomenon is not exceptional. After, in some sense, 'revolutionary' publications time has to pass to permit these landmark publications to permeate the research world. For instance, this somehow happened to game theory as well. During many years after *Games and economic behavior* appeared, just a few papers, mainly mathematical papers, were written and appeared mostly in mathematical journals or special books such as the books in the well-known Princeton University Press series 'Annals of Mathematics Studies'. Regarding social choice, we must mention papers by Kenneth May on the characterization of majority rule and the relation between social and individual choice and by Julian Blau in which a formal (but benign) mistake in Arrow's proof is corrected (this will lead Arrow to modify the properties of his social welfare functions and to provide a new proof in the added chapter of the second edition of his book). There are also important papers by Ken-Ichi Inada. From 1964, there has been an upsurge of fundamental publications. These mainly concern the existence of solutions for the aggregation of preferences with majority rule, either the existence of Condorcet winners and/or properties of rationality of the social binary relation when individual preferences are restricted. Contributors include Sen, Inada, Pattanaik, Fishburn, Wulf Gaertner and, for other aggregation procedures such as simple games, Michael Dummett and Farquharson (with an earlier publication in 1961), Maurice Salles, Kenjiro Nakamura and Mamoru Kaneko, among others.

Arrow's theorem holds for aggregation functions where the assumed collective rationality property of the social preference is transitivity. Impossibility results are shown in the case of quasi-transitivity (transitivity of the strict component of the social preference) and acyclicity of this strict component by Allan Gibbard, and Andreu Mas-Colell and Hugo Sonnenschein, and in the case of semi-orders or interval orders by Douglas Blair, Blau, Georges Bordes, Jerry Kelly and Kotaro Suzumura, among others.

Structural properties of specific coalitions are discovered (for instance, filters by Bernard Monjardet). The necessity of the finiteness of the set of individuals is demonstrated by Fishburn and further studied by Alan Kirman and Dieter Sondermann.

In 1970, Sen, with a short paper (Sen 1970b) triggers a kind of revolution: the non-welfaristic approach to social choice and normative economics. He demonstrates the impossibility to have a rational social preference (in this case the acyclicity property) with the Pareto criterion (unanimity principle) and the fact that at least two individuals have each the power to impose their strict preference over two options, this power being interpreted as being over a personal sphere and, as such, as a freedom of choice property.

Another major result due (separately) to Gibbard, Satterthwaite and Pattanaik concerns the impossibility to have procedures which are immune to strategic behavior (except, of course, dictatorship). In popular parlance, this is often called the phe-

nomenon of ‘useful voting’. We can note that this is the question which Pliny the Younger was dealing with. This result, conjectured by Dummett and Farquharson (1961), was proven by Gibbard (1973), Pattanaik (1973) and Satterthwaite (1975).

One of the most important historical achievements of the period is the publication of a few books by Yasusuke Murakami (1968) outlining the relation between social choice and logic, Sen (1970a and, expanded edition, 2017), Pattanaik (1971) and Fishburn (1973). The book *Collective choice and social welfare* by Sen has to be distinguished for many reasons but mainly because it is at the same time a research monograph and a kind of textbook (and, as such, was crucial in the destiny of the authors of this foreword!). It also elegantly links formal and philosophical aspects of social choice theory.

1.5 The Recent (Say, Approximately Post 1975) Development of Social Choice and Welfare Theory

1.5.1 Arrovian Aggregation Theory

We consider here the legacy of Arrow’s aggregation analysis leading to the impossibility theorem. Particularly noteworthy is the approach using topological ingredients. This approach is introduced in several papers by Graciela Chichilnisky from 1980 with further contributions by, among others, Geoffrey Heal, Nick Baigent, Luc Lauwers, Yuliy Baryshnikov, Charles Horvath and Shmuel Weinberger (with earlier contributions by Beno Eckmann). A basic characteristic of these contributions is the replacement of the condition of independence of irrelevant alternatives by a continuity property. This makes this kind of analysis more suitable for welfare theory than for voting since, typically, assuming continuity with, say, majority rule would not permit dramatic changes of the social outcomes (unless discontinuities are possible).

Arrovian aggregation when preferences are fuzzy is developed from 1980 by Richard Barrett, Pattanaik, Salles, Bhaskar Dutta, Ashley Piggins, Conal Duddy, Juan Perote-Penã and others (among whom a remarkable group of mathematicians in Cameroon—Nicolas Andjiga, Louis-Aimé Fono and others).

In direct descent from the Arrow–Black tradition of restricting individual preferences, one must outline a domain of interest for microeconomists: social choice in economic environments. A remarkable and detailed survey is by Le Breton and Weymark (2011).

1.5.2 Positive Political Theory and Voting Theory

The so-called economic environment has its counterpart in political science and can be called ‘political environment.’ The space of options has a rather similar structure, but the individual preferences in the political environment are very often

so-called Euclidean preferences: There is an optimal point (where utility/preference is maximized) and moving away from this point makes the utility decrease. Among the major contributors, we must mention, among others, William Riker, Charles Plott, Richard McKelvey, David Austen-Smith, Jeffrey Banks, Norman Schofield and John Ferejohn.

Regarding voting, we can classify this large area according to several characteristics. We can consider a simple game structure in which powerful coalitions are defined a priori. A number of solution concepts are introduced in this area, such as the core (which, of course, was already studied in a microeconomic framework or as a kind of mathematical concept), the Banks set, the uncovered set (due to Nicholas Miller), the stability set (due to Ariel Rubinstein). Major contributions are due to Nakamura, Bezael Peleg and Hans Peters,² and regarding the mathematical structure to Alan Taylor and William Zwicker, and to Moshé Machover and Simon Terrington. In particular, Nakamura (1979) introduces a number based on the structural properties of the voting games which plays a basic role in results regarding the non-emptiness of the solution concepts when this number is compared with the number of options or, in the case where the space of options is an appropriate subset of an Euclidean space of finite dimension, with this dimension (as shown by Joseph Greenberg (1979) for quota-games). Game-theoretic aspects are linked to the rather ancient analysis of voting power. Modern indices of power are due to, among others, Lionel Penrose, John Banzhaf, Lloyd Shapley and Martin Shubik [an excellent book on voting power is by Dan Felsenthal and Machover (1998)].

Powerful coalitions may be studied from another viewpoint. The question of coalition formation has been tackled by Demange and Wooders (2005) and is related to network theory, a topic which has known a spectacular development in the last few years.

We can consider specific voting procedures. Such procedures are, for instance, scoring rules such as plurality rule or Borda's rule. Borda's rule is prominent in the works of Dummett (1984, 1997) and Donald Saari who proposes an entirely new way to deal with voting theory with his 'geometry of voting' (1994, 2007). In our view, Donald Saari is one of the main contributors to voting theory in this post 1975 period.

Among other rules which have been proposed to replace procedures used in various countries, one must indicate 'approval voting' which has been studied by Steven Brams and Fishburn, and 'majority judgment' which has been devised and extensively studied by Michel Balinski and Rida Laraki (2010).

Already mentioned, an important domain stemming from the work of Fishburn and Gehrlein is the computation of the probability of pathological cases for specific voting procedures (Gehrlein and Lepelley 2017). Furthermore, Felsenthal and Hannu Nurmi provide several studies of voting rules detailing their pathologies and good properties [for instance, Felsenthal and Nurmi (2018)].

²See Peleg (1984), Taylor and Zwicker (1999), Peleg and Peters (2010).

1.5.3 Computational Social Choice

When we consider voting rules such as Dodgson's rule or Kemeny's rule, the problem is not to know whether there exists a solution (say, a winner), but to determine this solution (who won?). John Bartholdi, Craig Tovey and Michael Trick remark: 'we think Lewis Carroll [Dodgson's pen name] would have appreciated the idea that a candidate's mandate might have expired before it was ever recognized!' (Bartholdi et al. 1989). Although the foundational papers on this topic appear around 1990, it is only very recently that a whole domain takes off. It is exemplified by the publication of the *Handbook of computational social choice* in 2016 (Brandt et al. 2016). This handbook presents many chapters where the determinacy problem is crucial, be it in voting or in other areas where one has to determine a solution or to analyze the possibility for individuals to make a decision about how to proceed, as, for instance, the decision to undertake a strategic move.

As a by-product, a number of computer scientists have developed an interest in social choice theory in general, and many publications which are independent of the computational complexity problem have them as authors.

1.5.4 Logic and Social Choice, Judgment Aggregation

Another by-product is the consequence of the fruitful relations between formal logic and computer science. We mentioned that Arrow's analysis based on relations owes much to Tarski's theory of relations. So, at the origin, social choice was linked to logic. Later, Murakami used three-valued logic to formalize preferences. We have now some versions of Arrow's theorem based on formal/mathematical logic by Ulle Endriss, Umberto Grandi, Wesley Holliday and Eric Pacuit among others (see, for instance, Holliday and Pacuit 2020). There were precursors among whom Willard von Orman Quine himself, Rubinstein (1984) who demonstrated that, given appropriate assumptions, the multi-profile and single-profile impossibility theorems were essentially equivalent.³

Judgment aggregation has also known a major development under the impetus of scholars such as, among others, Dietrich, List, Pettit, Clemens Puppe, Klaus Nehring, Philippe Mongin, Elad Dokow and Ron Holzman. Their contributions can be attached to the formal logic domain since they sometimes deal with the aggregation of logic connectives (and their papers have definitely a formal logic flavor).

1.5.5 Strategy-Proofness and Implementation

Stemming from the papers by Gibbard, Pattanaik and Satterthwaite, many contributions to the area of strategic voting appear in the post-1975 period. The main

³Some recent textbooks on logic devote a chapter to social choice, for instance Hansson and Hendricks (2018) and de Swart (2018).

contributor to this area is Salvador Barberà. The classical proofs in the original works were based on the finiteness of the set of options. Important papers, including a paper by Barberà and Peleg (1990), deal with economic environments where one cannot assume finiteness.

The so-called Gibbard–Satterthwaite theorem can be interpreted in terms of implementation: The only mechanism that can truthfully implement a social choice function in dominant strategy is dictatorship. This might appear as a rather ad hoc way to transform a negative result (the impossibility to have a social choice function/voting rule which is individually strategy-proof (often said non-manipulable) and non-dictatorial) into a positive result. Of course, the many developments by, among others, Peleg, Peters, Matthew Jackson, Hervé Moulin deal with other frameworks (other ways to aggregate individual data and other solution concepts—such as, for instance, Nash equilibria). In the pursuit of this research, an important concept is devised by Peleg and Moulin, the concept of effectivity function. This concept is also central in some developments about rights and freedom.

1.5.6 Rights and Freedom

A rather large literature descends from Sen's impossibility theorem. However, some scholars were rather unsatisfied by the treatment of rights and freedom via an aggregation procedure. Two routes were followed. A first approach is due to Peter Gärdenfors (1981). Gärdenfors essentially uses effectivity functions, a concept that was forged after Gärdenfors' paper appeared. A second approach is via game forms and is a major element of an important paper by Gaertner et al. (1992).

The analysis of freedom in terms of choice is also a major research topic. The seminal paper where the cardinality of choice sets plays a crucial role is due to Pattanaik and Xu (1990).

1.5.7 Bargaining Theory, Allocation Rules, Cost Sharing, Matchings

This is a rather heterogenous title, but this grouping may be justified by the fact that the formal methods are similar and the contributors are often the same persons. Another justification is that these areas stem from the works of three mathematicians/game theorists who were graduate students at Princeton University: John Nash, David Gale and Lloyd Shapley.

The theory of fair allocation rules [which is strongly linked to welfare theory as seen in Fleurbaey and François Maniquet (2011)] is well documented with books by Kolm (1972, 1988), H. Peyton Young (1994), Moulin (2003) and Julius Barbanel (2005), and the domain is surveyed in papers by William Thomson [see, in particular, Thomson (2011)], a major contributor to the area.

1.5.8 Welfare Economics, Interpersonal Comparability, Inequality, Poverty

Periodically, the death of welfare economics is announced. Atkinson (2009) speaks of ‘strange disappearance’. A rather recent and supposedly fatal blow to the concept of Bergson–Samuelson social welfare function is the discovery of a single-profile Arrovian impossibility theorem. However, many including us deny this. The single-profile approach entails the use of properties such as neutrality with a strong welfareistic flavor. Furthermore, we think that, on the contrary, welfare economics is still alive and rapidly developing again under various guises. We already mentioned the theory of fair allocation. But we should also include renewed analyses of utilitarianism (Bayesian aggregation à la Mongin and Richard Bradley (see Bradley 2017), utilitarianism à la Blackorby et al. (2005), or the numerous and important contributions of Peter Hammond). The problems related to the measurement questions such as interpersonal comparability are the object of an impressive literature with Sen and, among others, Claude d’Aspremont, Louis Gevers (see d’Aspremont and Gevers 2002), and from the philosophical side Derek Parfit (1984), John Broome (1991) and Ruth Chang (1998).

The measurement aspects of inequality and poverty are also topics which are within welfare economics with the major contributions of Atkinson, Kolm, François Bourguignon, Le Breton, Alain Trannoy, Patrick Moyes, Udo Ebert, Peter Lambert, K.-Y. Tsui, Bhaskar Dutta, Satya Chakravarty, James Foster, Martin Ravallion and Claudio Zoli among others.⁴

The approach using capabilities (largely due to Sen and Martha Nussbaum) has known an important and rather independent development, but we think that it belongs to welfare economics. The works on this capabilities and human development approach have essentially focused on specific ‘functionings’ but we certainly need a formal and general analysis along the lines initially developed by Sen.

1.5.9 Distributive Justice

Major contributors to the distributive justice area are economists who are also recognized as philosophers such as Sen, Kolm, Broome or John Roemer. Philosophers such as Patrick Suppes, Donald Davidson, Gibbard, Robert Nozick, Nussbaum, Dummett, Daniel Hausman, Ronald Dworkin, Rawls, Bernard Williams, Gerald Cohen made crucial incursions into social choice and welfare theory, and it often seems impossible to assert whether the contributors to the social choice and welfare theory literature are more philosophers than economists or the reverse. What seems important is the recent publication of volumes by Roemer (1996), Kolm (1972, 1988, 1997, 2005),

⁴Many important recent studies in inequality and poverty such as those of, for instance, Thomas Piketty and Esther Duflo pertain to positive rather than normative economics even if, for such topics, this dichotomous partition can be problematic because the frontier between the positive and the normative is rather fuzzy.

Sen (2009), Fleurbaey (1996), Samuel Freeman (2018), Cohen (2008) where the word ‘justice’ is the main term of the title. This fact makes us think that academic research on social justice and what can be called ‘social ethics’ is not out of fashion as it could have appeared one or two decades ago. One can imagine that welfare economics as a sub-domain of social justice will know a new renaissance.

1.5.10 Experimental and Behavioral (welfare) Economics

The first paper ever published in the journal *Social Choice and Welfare* is an experimental paper on social justice (Menahem Yaari and Maya Bar-Hillel 1984). Although we hardly had other publications of this type in any journals during many years, there has been a change, and we can now observe many such papers either in *Social Choice and Welfare* or elsewhere, as exemplified by the references in the book by Erik Schokkaert and Gaertner (2012).

Regarding behavioral economics, there certainly is a problem to reconcile a so-called positive approach with the normative economics approach pervading social choice and welfare theory, but, as shown in a special issue of *Social Choice and Welfare*, Ben McQuillin and Robert Sugden seem to be optimistic.

2 The Conversations

Several interviews were conducted from the 1980s and appeared in *Social Choice and Welfare*. Arrow was interviewed by Jerry Kelly, and their conversation appeared in 1987, just a few years after the creation of this journal. This was followed by conversations with Sen, Harsanyi, Little, Dummett, Kolm, Samuelson and Suzumura.

Given the positive feedback from the readers and the intrinsic interest of these conversations regarding the history of thought (economic or else), the decision was taken to pursue this enterprise and to devote special volumes to it in the Springer series entitled ‘Choice and Welfare.’ At this time, we intend to devote two volumes to this project.

This volume, the first one, is organized in two parts and within each part by the alphabetic order of the scholars who were interviewed.

The first part includes four ‘chapters’ with conversations with scholars who can be considered as the founding fathers of the modern theory of social choice and welfare: Kenneth Arrow, John Harsanyi, Paul Samuelson and Amartya Sen. We can observe that these four are Nobel laureates, and for Arrow and Sen, the prize was, at least in part, linked to their work in social choice.

In the second part, we gathered scholars whose main contributions appeared after 1970 (this does not mean that they did not publish important contributions before 1970—this is the case, for instance, of Peter Fishburn and Prasanta Pattanaik). Furthermore, the chosen date of 1970 must be taken as rather vague: It can be 1969

or 1971! Incidentally, some of them were quite young in 1970, and it is difficult to imagine that they could have written significant scientific papers at such an early age.

There are eleven scholars in this second part of the book: Salvador Barberà, John Broome, Gabrielle Demange, David Donaldson, Peter Fishburn, Allan Gibbard, Peter Hammond, Prasanta Pattanaik, John Roemer, William Thomson and John Weymark.

We already have plans for the second volume which will include conversations already published in *Social Choice and Welfare* as previously indicated (Little, Dummett, Kolm and Suzumura) and new conversations which are actively organized at this time.

We have a deep regret. We initially planned interviews of Jan de V. Graaff and of Patrick Suppes (Patrick Suppes had even been contacted and had kindly accepted). Unfortunately, we were unable to carry out our plans regarding these two great minds.

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