Chapter 13

# Political Economy and the Work of Kenneth Arrow

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Additional information is available at the end of the chapter

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**Abstract**

This chapter contrasts two domains of human activity: LOGOS, the principle of enlightenment rationality and MYTHOS, the search for meaning through religion. LOGOS has created our modern world, and we have many successes as a result: the general equilibrium result for economics, general relativity, and quantum mechanics (but as yet no combined theory of the two). Even Newtonian mechanics has led to the notion of chaos. The Hilbert program to show the consistency and completeness of Mathematics has been invalidated by Godel's Theorem, while the attempt to extend the economics general equilibrium theorem fails because of Arrow's Impossibility Theorem. Darwinian evolutionary theory is another success of Logos, but even here, there are many difficulties, particularly how genes work Logos has allowed us to create our industrial society, but has also led us to climate change, without indicating how we can avoid the collapse of civilization. Here we suggest that we may be able to use Mythos, our collective beliefs in what we should do, to help us make a wise choice about the future. The greatest failure of Logos is that we have no understanding of the nature of consciousness. If we can develop such a theory, then perhaps we can construct a theoretical political economy. Without this, it appears likely that climate change could induce a Malthusian trap for us unless we pay heed to Pope Francis's call for us to "Care for Our Common Home." Since this presents us with a common goal, it is possible that we can make a wise choice over our future.

## 1. Introduction

The foundations of western science in the most general sense of the term were perhaps handed down by Thomas Hobbes (1588–1679) in his Leviathan of 1651 [78] and by Isaac Newton (1642–1727) in his Philosophiae naturalis principia mathematica of 1687. Newton's work, particularly the Optiks, as well as his underlying philosophy of science, was transmitted throughout Europe by Voltaire's (1694–1778) book on the Elements of Newton's Philosophy (published in 1738).

The human sciences, and especially political economy and moral philosophy, were developed further in France by Condillac's (1715–1780) Essay on the Origin of Human Knowledge (1746) and Turgot's (1727–1781) Reflections on the Formation and Distribution of Wealth (1766), and in Scotland by David Hume's (1711–1776) Essays Moral and Political (1742) and Adam Smith's (1723–1790) Wealth of Nations of 1776. At roughly the same time, Condorcet (1743–1794) published his Essay on the Application of Analysis to the Probability of Decisions (1785) and the Esquisse d'un tableau historique des progres de l'esprit humain (1794). The former essay had little widespread impact at the time (although Thomas Jefferson, a friend of Condorcet, while in Paris almost certainly read it). The latter essay was used by Thomas Malthus (1766–1834) as the point of departure for his pessimistic book, the Essay on the Principle of Population [106], where he argued against what he saw as Condorcet's excessively optimistic, "Smithian," viewpoint.

Since then, of course, political economy developed apace in the work of Ricardo, Pareto, Walras and Marshall, culminating in the mathematical existence theorems for a competitive equilibrium (von Nuemann, 1935 (1946); Wald, 1935; [7]; McKenzie, 1954).

In contrast to the theoretical efforts on the economic side of political economy, almost no work on formalizing Condorcet's insights, in his Essay of 1785 on the political side of political economy, was attempted until the late 1940s, when Duncan Black and Kenneth Arrow published seminal papers on this topic.

In 1948, Duncan Black published his paper "On the Rationale of Group Decision Making," [20] specifically addressed to the question of existence of a voting equilibrium. He followed this in 1958 with his monograph on The Theory of Committees and Elections. The monograph emphasized the importance of Condorcet's work in voting theory but paid much less attention to the so-called Condorcet Jury Theorem. In contrast, recent research has suggested that this latter theorem gives a justification for majority rule as a "truth seeking" device.

Arrow's paper on "A Difficulty in the Concept of Social Welfare," [6] derives, I believe, from quite a different tradition of formal political economy, namely the work in welfare economics of Bergson (1938), Hicks (1939) and Lange (1942). (It should perhaps be emphasized that both welfare economics and political economy, viewed in the larger sense, became the arena for sometimes vigorous arguments in the 1930s and 1940s in the work of Schumpeter, Hayek, Popper and von Mises, etc.).

Arrow's famous paper of 1950 shows essentially that any social welfare function (that maps families of weak individual orderings to a weak social order) is either imposed or dictatorial. To obtain what Arrow termed this "possibility theorem," he assumed that the social welfare function had universal domain and satisfied a property of positive association of preferences. Reading this paper and a related one by Arrow on "Welfare Economics" [6], I infer that Arrow's realization of the applicability of the social choice paradox to welfare economics came about from his deep understanding of Scitovsky's "Note on Welfare Properties in Economics" (1942). A typical assumption in economics is that a move from a restricted trade situation, x, say, to a "free-trade" situation y is "welfare preferred." Even though not all

individuals may prefer y to x, nonetheless winners in y may compensate losers in y, so that the post-compensation outcome y*, say, is unanimously preferred to x. If this holds, then y is said to be "welfare preferred" to x, even when compensation is not implemented. Scitovsky observed that "welfare preferred" can be badly behaved, since y may be preferred to x, and x to y.

As Arrow commented in his paper, the negative result of the "possibility theorem" was "strongly reminiscent of the intransitivity of the concept of domination in the theory of multiperson games" as presented in von Neumann and Morgenstern (1947). Since intransitivity of domination occurs most obviously in constant sum voting games, I also infer that Arrow means that the "possibility theorem" was derived from the fact that all welfare judgments are implicitly based on transfers of wealth. In his 1950 paper, (on Social Welfare), Arrow also emphasizes that he views the theorem as relevant to a situation where individuals make value judgments rather than to the more typical economic context where agents make choices based on their tastes. Since all political choices are based, to some degree or other, on the aggregation of values, I further infer that the "possibility theorem" addresses not just the traditional questions of welfare economics, but the larger issue of the interaction between the political and economic realms. In other words, the relevance of the theorem is not simply to do with the Condorcetian question of voting cycles, or intransitivies, but concerns the larger questions of political economy that were discussed earlier by Schumpeter, Hayek, Popper, and so on in the period before World War II.

The formal exercise of proof of existence of an economic equilibrium (obtained between 1935 and 1954) leaves unanswered many questions. For example, can the existence proof be extended from the domain of private commodities to include public goods? More particularly, can democratic procedures be devised to ensure that preference information be aggregated in an "efficient" fashion so that social choice is welfare maximizing. Arrow's possibility theorem suggests that democracy itself may be flawed: indeed it suggests that democratic institutions may (as Madison foresaw in Federalist X) be perverted or turbulent. Thus, difficult questions of institutional design need to be addressed. Third, since Arrow's theorem required an ordering of social states, it implicitly brings into question the nature of the stability of price equilibria (even when they exist). The example of Scarf (1954) indicates that the dynamical system defined by tatonnement may be structurally unstable. This raises the possibility that both economic and political systems may be chaotic.

Since 1950, these issues have been discussed at varying levels of intensity. All of them come back in one sense or another to an interpretation of Arrow's Theorem. In the rest of this essay, I shall attempt to outline my sense of the current state of the debate, and the relationship with Arrow's Theorem, along the following lines:

1. Extension of equilibrium theories in economics to the larger realm of political economy (neo-Smithian theories);
2. Democratic institutions and the compatibility of economics and politics (neo-Condorcetian theories);

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