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GENERAL EQUILIBRIUM THEORY IN THE TWENTY-FIRST CENTURY

Michio Morishima

In trying to predict what the shape of economic theory will be in the twenty-first century, I am going to take as my time period the latter half of the century, and to limit my consideration to the field of General Equilibrium Theory (GET), the area within which I have up to now been conducting research. The purpose of GET is to try to clarify how the social economy works. Models are constructed, and these are then strictly and rigorously subjected to theoretical analysis. In order to do this, it is necessary to start off with a broad vision of the movement of the economy, such as is portrayed, for example, in macroeconomics. GET then elaborates on this at the microeconomic level, with the aim of supplying a microeconomic foundation to the macroeconomic vision. GET owes a great deal to developments in macroeconomic theory; in the latter part of the last century theorists such as Marx and Walras refined Ricardo's economics (I regard the theories of Marx and Walras as old GET), while in the second half of this century Hicks, Patinkin and Malivaud have been inspired by the theories of Keynes, and Arrow–Debreu and Arrow–Hahn have axiomatised Hicks' theory to form new GET.

Given the complexity of society, GET has tended hitherto to deal with a model constructed on the basis of an exaggerated and deformed view of economic society, shedding light on only a few facets of that society. Ricardo and Walras looked at the question of how population and capital must adapt within a given area of land; Marx looked at the exploitation of one class by another, while the focal point of the models conceived by Walras, Hicks and Leontief was the repercussion of prices and outputs from one sector of the economy to another. Böhm-Bawerk's, Wicksell's and Hicks' analyses concerned the time structure of the modern production system – for example what length of roundabout production is the most appropriate, and when machines and capital equipment should be discarded and replaced. All of these views are entirely pertinent, but each by itself is essentially a distortion, seeking out no more than a single facet of reality. We need a comprehensive multiple-facet model; the various theories must not just be advocated by separate schools, but must be brought into synthesis.

In reaching such a synthesis, however, conflicting views will have to be harmonised. We are only too aware how scholars are divided between approval and disapproval of exploitation theory, and there are doubtless a host of other views which are mutually contradictory if we examine them in more detail, and which will need to be rationalised. Unlike physics, economics has unfortunately developed in a direction far removed from its empirical source, and GET in particular, as the core of economic theory, has become a mathematical social

philosophy. In spite of its scientific presentation, the Arrow–Hahn book¹ may remind us of Baruch Spinoza's *Ethica Ordine Geometrico Demonstrata*.

I have discussed myself in a separate essay² how Japanese mathematics (or *wasan*) in the Tokugawa period, though it had attained a high level of sophistication, came to a wretched end due to its total absence of interaction with natural science. It turned into a technique for the setting of puzzles, and the *wasan* scholars were reduced to being the playmates of culture-loving samurai and members of the newly risen merchant class, just like the masters of the tea ceremony, of flower arrangement and of the *haiku*. At the same time, the mathematics itself regressed. The following words by John von Neumann can be read as a warning against decadence of this kind: 'At a great distance from its empirical source, or after much "abstract" inbreeding, a mathematical subject is in danger of degeneration.'³ In fact, GET economists, along with the specialists in von Neumann economics who are just one element of them, have sunk into excessive mental aestheticism. If this bad habit is not corrected, and if what von Neumann said is right, then the twenty-first century will see the degeneration of their subject.

In the models of theorists such as Hicks, Arrow, Debreu and Hahn which are the focal influences in GET, not just households but firms as well are assumed to act as pricetaker. These models are exactly applicable only to agriculture, forestry, fishing and part of the mining sector, industries whose outputs account at the very most for 20% of GDP in most modern industrial economies. In most remaining industries, individual enterprises make decisions on the price of their respective outputs, according to the mark-up theory, either of the version called the full-cost principle or of the version known as the marginal-cost principle. Competition is carried on through devising methods of production or methods of selling which will permit a lower mark-up rate.

Within these industries there used to be a fair number of industries where prices were determined by haggling of the GET type. In the case of taxi fares, for example, negotiation over the price on the street actually disappeared as meters were installed in all the taxicabs. This means that methods of determining prices differ according to the stage of technological development. With technological development, communication of a kind hitherto impossible is available at a low price, and hence becomes accessible to a large number of people. This in turn means that the price of many commodities – such as equities and foreign currency – is determined by methods very different from those postulated under GET. For example, under GET price determination is carried on in a situation of universal knowledge in a perfectly open market which can be entered by anyone, while the banks' foreign exchange dealers conduct price negotiations over the telephone without the intervention of a

¹ K. J. Arrow and F. H. Hahn, *General Competitive Analysis*, Amsterdam: North-Holland (1971).

² M. Morishima, 'The good and bad use of mathematics', in *Economics in Disarray*, P. Wiles and G. Routh ed., Oxford: Basil Blackwell (1984).

³ M. Dore, S. Chakravarty and R. Goodwin, *John von Neumann and Modern Economics*, Oxford: Clarendon Press (1989), p. xiv. Notwithstanding a citation of this kind at the start of this volume, the empirical content of the various pieces contained in it is surprisingly thin and meagre.

third party.⁴ However, this kind of chain of activity, where prices are determined in isolation, ultimately causes the price to converge on an equilibrium price. To obtain this effect each dealer may not negotiate in a selfish fashion over the price, but must keep to the established rules, and it is essential for GET to clarify the nature of the rules which will bring about price stability. Thus the institutional elements of the economy are important. It is not surprising to see that the theory of stability, that mountain of empty theorising accumulated between the mid 1940s and the late 1960s, was a total failure.

And that is not all. As methods of preserving goods are developed, the ways of determining their prices also change. The cut-price sale of strawberries on the street in the evenings, for example, is likely to disappear once we reach the stage where strawberries can be perfectly preserved, and the price of strawberries will be determined, like those of manufactured products, according to the full-cost principle. In so far as these sorts of method of determining prices are dependent on technology, price theory too must inevitably change in accordance with the stage of technological development. Those who might be referred to as neoclassical economists have not up to now made any positive attempt to come to terms with the full-cost principle, and it will become abundantly clear in the twenty-first century that such a conservative attitude is out of tune with the times.⁵ The eyes with which we look at an economy differ depending on the theory that we use, and in the case of economics a theory is never totally self-sufficient and autonomous, but dependent on material conditions (especially on technology).

It is also the case that the world of GET is in fact a dream world, a world which is not totally workable in the context of actual society. The number of actors on the stage in this GET world are far too few. The old general equilibrium theorists were strongly aware of this. Walras, for example, in his *Elements of Pure Economics*, emphasised the existence not only of capitalists, landlords and workers, but of a fourth group as well, namely entrepreneurs, who acted as independent agents. Moreover, in Schumpeter's *Theorie der Wirtschaftlichen Entwicklung* (1911), not only did the author stress the importance of entrepreneurs, but bankers were brought on to the scene for the first time. Entrepreneurs without bankers are like soldiers without weapons; without bankers it is extremely hard for entrepreneurs to discharge their own functions.

This kind of trend showed that GET was progressing in the right direction. With the new GET, however, both entrepreneurs and bankers have virtually ceased to exist. There are no innovations nor founding of new enterprises, and the head of each enterprise earns his profits by operating production possibility sets given to him, i.e. bequeathed to him by his ancestors in the past. This is a reversion to a truly medieval, hereditary economy if ever there was one. I will

⁴ For how the foreign exchange markets actually work, and what sort of rules the dealers have to adhere to, see, for example, M. Morishima, *The Economics of Industrial Society*, Cambridge University Press (1984), pp. 99–132. For the structure of other markets, there is a splendid account in Hicks' *A Market Theory of Money*, Oxford: Clarendon Press (1989).

⁵ My criticism is directed at neoclassical economists, but the Sraffians are far worse in their disregard of empirical content.

grant that such a retrogressive approach is an easy path if one wants to construct a model axiomatically, and it may also be of some use as a temporary means of facilitating the dichotomising method, whereby entrepreneurs and bankers are put to sleep for a while. (I also give due credit to the fact that GET now has monetary theory as one of its elements, even if it is a monetary theory whose entrepreneurs and bankers are either absent or asleep.) Nevertheless, once the existence of equilibrium in this fictional world has been proved, GET theorists go crazy. They pursue their model too far, under the illusion that by clarifying its optimum properties they have also clarified the optimality of the modern capitalist economy, in which entrepreneurs and bankers play such an important role, whereas all they have in fact done is to clarify the optimality of a hereditary economy.

GET, moreover, following the fundamental premise of seventeenth- and eighteenth-century English rationalism, makes the assumption that each agent acts in accordance with the principles of utility maximisation and profit maximisation. As long as the economies with which we are dealing are those of Western countries (especially those of North Europe and North America), there was no particular objection to this in the twentieth century, but during the course of the twenty-first century the countries of Asia, starting with Japan, and of South America, are likely to become the objects of GET analysis. When that happens, if we continue to act upon the same assumptions as we do now, GET will in these countries no longer be able to play the role of an instrument of economic analysis and a theoretical system capable of cultivating a vision of the economy. It will be too far removed from their own reality. It will come, therefore, to be regarded merely as an instrument for training students' power of logic. Peoples possessing a philosophy (or a set of guiding principles) very different from Western European rationalism, have already acquired the skills needed to operate capitalism or highly productive economies which can compete effectively with capitalist ones. In the context of this development it is essential for GET to throw off its adherence to eighteenth-century Western rationalism, to attempt to become more universal, and to consider of its own volition the kind of ethos appropriate to an economic system with a high degree of productivity.

It goes without saying that as long as people's work ethics are different, the industrial organisation constructed upon them will be different as well. GET needs to maintain a relationship of close cooperation with both sociology and social psychology, and we need to look very deeply into the sociological aspects of the GET system. The bureaucratic operation of enterprises and industries should be paid more attention in GET analysis, and at the same time even research into family relationships is likely to become a research topic within GET, as the twenty-first century will see the flourishing of small, family-based enterprises in the wake of robotisation. It would be difficult to find anything differing more between North and South Europe, and between Oriental and Occidental countries, than family relationships. Here, too, is something that cannot be easily determined by principles of utility maximisation and profit maximisation.

The question of convergence between the economies of Western Europe and those of Eastern Europe has been much discussed, and in the twenty-first century the issue of convergence between the eastern and western hemispheres is likely to become a research topic as well. That means, in essence, a convergence of cultures. Should the various disciplines which concern themselves with trends in society come in this way to be more aware of the differences between cultures and to look at the issue of convergence of different cultures, then GET, too, must go along with this trend, overcome the limitations of Western European rationalism, and look closely at the differing kinds of ethos which may be compatible with capitalism or with the operation of a modern social economy.

The issue of the appropriateness of various kinds of ethos to modern technology was one which deeply concerned Max Weber. It was at the beginning of this century that he first posed this question, at a time, perhaps, when the issue was somewhat premature. It was a time when the Christian cultural area, in particular the countries with a strong protestant tradition, had almost total command over modern technology, and of the countries outside this area only Japan had entered into this privileged company. Even in the case of Japan, it was not clear whether or not the country was well established as a group member.

For that reason the issue was discussed in the context of inadequate empirical materials. It was extremely difficult, therefore, to reach any sort of scientific verdict on the argument, and the result was inevitably that the debate advanced in a very ideological fashion. Now in the twenty-first century we will have at our disposal the results of substantial empirical observations, and be able to discuss objectively how economic systems change according to the different ethos. Not just that, we shall be able to discuss on the basis of empirical evidence the reverse relationship, namely how technology influences an ethos, whether it brings about convergence of ethos, and stimulates a degree of uniformity. If it is to be able to examine this sort of range of questions, then GET must become truly multi-disciplinary by being more closely tied to sociology and other disciplines.

Of the two pillars of economics – mathematical analysis and social scientific analysis – it is the latter which will become relatively more important in the twenty-first century, and it must become so, at least as far as GET is concerned. What must be emphasised, however, is that there is no question of my making this prediction on the basis of any ‘anti-mathematics’ sentiment. In June 1900 Walras wrote: ‘The twentieth century, which is not far off, will feel the need... of entrusting the social sciences to men of general culture who are accustomed to thinking *both* inductively and deductively and who are familiar with reason *as well as* experience’⁶ (my italics). What I am saying here is very much the same thing. However, whereas in his time mathematics lagged behind in becoming widely used, and he was urging mathematicalisation, in the contemporary world it has gone too far, leading theorists to have an

⁶ Leon Walras, *Elements of Pure Economics*, London: George Allen and Unwin (1954), p. 48.

inadequate concern for actuality. I, therefore, am arguing for rather the opposite. No pillars can serve together to support a building, but should one become too big and too strong the other will become correspondingly weak, and the building will collapse. Clearly, a strong and healthy construction cannot be founded upon such a basis.

Whether or not my prediction comes true will depend upon the good sense of all GET theorists in the future, but various encouraging things have occurred which make me feel optimistic. One such factor is the appearance during the 1980s of works such as A. M. Okun's *Prices and Quantities*⁷ and Hicks' *Market Theory*, mentioned above, works which could well serve as a starting point for the kind of GET which I have in mind. I know of course that one section of GET scholars may regard with hostility those who make statements such as I have made above, on the grounds of their loyalty to mathematics. Scholars of this group expend their energies on competing with each other in demonstrations of intellectual and theoretical ability, and regard as their inferiors those who contend the need to observe the real world. This phenomenon is a palpable symptom of scientific degeneration.

However, should there by any chance appear a group of brave souls who are prepared to forgo the easy pleasure of demonstrating their mathematical abilities and to hone the skill of building a model on the basis of empirical observation, the history of theory will move off in a completely different direction. The new empirical model itself must come first; its axiomatisation and mathematical refinement must be the second stage.

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⁷ A. M. Okun, *Prices and Quantities*, Oxford: Basil Blackwell (1981). My own *Industrial Society*, referred to previously, also describes this kind of schema. A recent addition to this stream is R. M. Solow, *The Labour Market as a Social Institution*, Oxford, Basil Blackwell (1990).