Joan Robinson
History versus Equilibrium

HISTORY VERSUS EQUILIBRIUM

Prof. JOAN ROBINSON

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Keynes regarded the triumph of Adam Smith over the Mercantilists and of Ricardo over Malthus as a victory of dogmatism over good sense, and he could not make head or tail of Marx; yet the conceptions of the General Theory have much more in common with the classical school of the first half of the 19th century than with the neoclassical doctrines in which Keynes himself was brought up.

The main preoccupation of the classical economists was with an historical process of accumulation in a capitalist economy and its relation to the distribution of the product of industry between the classes of society, while the neoclassicals concentrated upon conditions of equilibrium in a stationary state.

When Keynes summed up what he felt to be the main difference between his theory and that from which he had had "a long struggle to escape", he pointed to the admission into his argument of the very obvious fact that expectations about the future are necessarily uncertain. The uncertainty that surrounds expectations of the outcome of a plan of investment, of the course of technical progress, of the behaviour of future prices, not to mention the effects of natural and political cataclysms, cannot be reduced to a "calculated risk" by applying the theorems of mathematical probability. Keynes described equilibrium theory as "a pretty, polite technique" "which tries to deal with the present by abstracting from the fact that we know very little about the future".[1]

As soon as the uncertainty of the expectations that guide economic behaviour is admitted, equilibrium drops out of the argument and history takes its place. The post-Keynesian theory reaches back to clasp the hands of Ricardo and Marx, skipping over the sixty years of dominance of neoclassical doctrines from 1870 to the great slump. This accounts for the paradox that post-Keynesian analysis derives equally from two such apparently incompatible sources as Piero Sraffa's interpretation of Ricardo and Michal Kalecki's interpretation of the theory of employment.

I

Equilibrium has been defined in these terms: "Prices and input-output combinations are said to be equilibrium prices and input-output combinations if, when they rule, no economic agent has any inducement to change his method of production, and no input is in excess demand".[2]

This entails that everyone knows exactly and in full detail what consequences would follow any action that he may take. (Indeed, the condition for reaching equilibrium is often stated to be "perfect foresight"). It rules out the holding of stocks or money balances for contingencies, and it rules out any plans, say, for business investment or household saving, with consequences spread over future time in which circumstances are liable to change.

There is another curious feature of the concept. Equilibrium is described as "the end of an economic process"; the story is usually told of a group of individuals each with an "endowment" of ready-made goods or of productive capacity of some specific kind. By trading and retrading in a market, each ends up with a selection of goods that he prefers to those that he started with. If we interpret this as an historical process, it implies that, in the period of past time leading to "today", equilibrium was not established. Why are the conditions that led to a non-equilibrium position "today" not going to be present in the future?

Furthermore, the concept of "stability", based on a mechanical analogy, is inappropriate in economic analysis. For mechanical movements in space, there is no distinction between approaching equilibrium from an arbitrary initial position and a perturbation due to displacement from an equilibrium that has long been established. In economic life, in which decisions are guided by expectations about the future, these two types of movement are totally different.

Some theorists, even among those who reject general equilibrium as useless, praise its logical elegance and completeness. A system of simultaneous equations need not specify any date nor does its solution involve history. But if any proposition drawn from it is applied to an economy inhabited by human beings, it immediately becomes self-contradictory. Human life does not exist outside history and no one has correct foresight of his own future behaviour, let alone of the behaviour of all the other individuals which will impinge upon his. I do not think that it is right to praise the logical elegance of a system which becomes self-contradictory when it is applied to the question that it was designed to answer.

The specification of a self-reproducing or self-expanding system such as that of Sraffa or von Neumann exists in logical time, not in history. Any point on it entails its past just as completely as it entails its future. To confront it with a question such as: 'What would happen if demand changed? is nonsensical. A different composition of output requires a different set of equations. We could work out alternative von Neumann rays for different compositions of the real wage, comparing say, a diet of potatoes with wheat, postulating the same spectrum of technical knowledge, and see which path yields the higher rate of profit. But even this is a somewhat idle exercise, for the path an economy follows necessarily influences its technology. An economy that has developed the technology for growing potatoes does not have the same spectrum of technical knowledge as one which only grows wheat. In a Walrasian model, the stock of inputs in existence at any moment is quite arbitrary — perhaps it dropped from the sky, like Marshall's meteoric stones. But for Sraffa or von Neumann the inputs available today were produced by labour and inputs in the proportions required, with the technology in use, to produce tomorrow's output.

If we construct the equations for a single self-reproducing system and then confront it with an unforeseen change, an event taking place at a particular date, we cannot say anything at all before we have introduced a whole fresh system specifying how the economy behaves in short-period disequilibrium.

The most obvious application of post-Keynesian analysis (the behaviour of an economy in conditions of uncertainty) is to Keynes' own problems — investment decisions, the determination of the pattern and level of interest rates, and the evolution of the general price level — but it is equally necessary to apply it to so-called micro economics and the behaviour of markets.

II

In a Walrasian economy there are a number of individuals each with his endowment, and his tastes and his technical expertise. Tastes, incomes and technical conditions determine the price and the volume of each output; from these are derived the hire prices or "rentals" for the services of inputs; from the rental of his input and the quantity that he owns is derived the income of each individual. There must be sufficient substitutability between commodities and versatility of inputs to ensure that there is a position of equilibrium in which each individual has at least a subsistence income. (Anyone who did not, died long ago.)

The weakest link in the circle of simultaneous equations is that which connects prices to incomes. We do not seem to be able to say anything about it except in the form of a census. Mr Jones owns x tons of input type 'A' so that at the equilibrium rental pa (per ton per week) his weekly income is xpa. Mr Smith provides 40 hours of work type 'B' so that his weekly income is wb, and so forth. The approach in terms of a census blurs the distinction between income from work and income from property and leaves no room for the classical problem of the "distribution of the produce of the earth between the classes of the community".

Nevertheless, supporters of the Walrasian system often maintain that it provides a link between demand and distribution that is missing from Sraffa's model.

To deploy this argument, Professor Harry Johnson provides a highly reduced form of general equilibrium.[3] The economy produces only two commodities; resources consist of a number of perfectly similar versatile workers and a particular lump of "putty-capital" that is, a homogeneous physical input that can be squeezed (without cost) into any form required by technology; there is a well-behaved production function in putty and labour time for each commodity. In the context of accumulation, "putty" is a way of getting rid of differences between the future and the past; putty investment, once made, can be undone and squeezed into another form while still representing the same "quantity of capital". But in the context of a static model, it might be defended as a way of representing the indefinite substitutability between physical inputs which is characteristic of the general equilibrium system.

Professor Johnson's assumptions provide the essential characteristics of the Walrasian system, while making it more perspicuous.

First, it brings out clearly the conditions for so-called instability in general equilibrium. For instance, where putty owners have a strong preference for the more putty-intensive commodity, a higher price of that commodity in terms of the other, which yields a larger income to putty owners, must be associated with a higher demand for that commodity, and so a higher demand for putty, whereas the rule of substitution requires that a higher price of putty is associated with a lower demand for it.

In such a case, as Professor Johnson shows, there may be several widely separated price ratios yielding potential positions of equilibrium. (This is analogous to "re-switching" on a pseudo-production function.) In a "well-behaved case" there is one equilibrium position corresponding to one set of equations.

Secondly, it is clear that the relation of prices to demand does not depend only on "consumers' tastes" but also on the census of ownership

of inputs, and on technical conditions which govern the interaction between the prices of the commodities and the rentals of inputs. (This seems to vindicate Marshall's one-at-a-time method of treating supply and demand. The world demand for, say, peanuts can be treated as independent of their conditions of production, but, in general equilibrium, supply and demand cannot be treated as independent of each other.)

With the aid of Professor Johnson's simplified model, we can examine the relations of tastes, rentals and technical conditions with prices and the composition of output, in alternative positions of equilibrium. The argument must be conducted, however, strictly in terms of comparisons of specified positions. We cannot say anything about how any position was reached from some other starting point. Nor can we say what would happen if there was a change in tastes. It is not legitimate to introduce an event into a system of simultaneous equations.

On a two-dimensional diagram, time lies at right angles to the plane on which the diagram is drawn, with the past behind it and the future in front. Suppose that Professor Johnson's economy has been living through history on a path passing through one equilibrium point and that, at some date, a change in tastes occurs. Then the position is no longer one of equilibrium. A change in the pattern of production must involve investment and disinvestment, at least in work-in-progress, and windfall losses and gains on stocks that have become inappropriate. To say how long it will take, or by what path, to find a new equilibrium (if there is one) we have to fill in a whole story about the behaviour of the economy when it is out of equilibrium, including the effect of disappointed expectations on decisions being taken by its inhabitants. The Walrasian system is no more capable of dealing with changes in demand than the system of Sraffa or von Neumann.

The theory of markets was in need of a Keynesian revolution just as much as the theory of employment. Keynes himself threw out some hints and anyone who is acquainted with the conduct, say, of trade in primary commodities, knows that it is dominated by *speculation*, that is by guesses about the future behaviour of demand and of supply. Such markets are made by intermediaries (often on several layers) between original producers and final buyers. Uncertainty tends to make markets unstable, since a rise of price is often a signal for buying in stocks and a fall for selling out.

The prices of manufacturers are less volatile. The large powerful firms deal directly with retailers and set prices according to a more or less long range policy. Even they, however, cannot know the future; they work on estimates. The system of so called "full-cost pricing" means calculating expenses, including amortisation allowances, per unit of output on the basis of an assumed average level of utilization and length of earning life of plant and then adding a margin for the level of net profit that it seems prudent to go for. When actual utilization over the life of plant exceeds the standard, net profit exceeds the caculated level, and conversely.

There is a range of small businesses which operate in markets of an intermediate type. Such producers are subject to a large extent to the vagaries of supply and demand but not to the perpetual oscillations of commodity prices. They are an important part of an economy such as that of India, but in the West they are falling more and more under the control of oligopsonists (large retail chains) which administer prices for them. All this is ruled out from equilibrium theory "which tries to deal with the present by abstracting from the fact that we know very little about the future".

III

Another major characteristic that Keynes had in common with the classics was that they, like him, were concerned with actual contemporary problems and put their arguments in terms of the structure and behaviour of the economy in which they were living, while the neoclassics enunciated what purported to be universal laws, based on human nature — greed, impatience and so forth. The latter rarely say anything at all about the kind of economy to which an argument is to be applied. The suggestion is that the same laws which govern the supposed behaviour of Robinson Crusoe are equally valid for the conduct of Gosplan, or rather for what its conduct *ought* to be, and for analysing the vagaries of Wall Street.

Marshall retained something of the classical tradition. His world is inhabited by businessmen, housewives, workers, trade union leaders, bankers and traders. His moralising tone — "There are many fine natures among domestic servants. . . . . ." sounds comical to modern ears, and he was not above twisting observation to suit his theory — Joint Stock Companies stagnate — but he was studying a recognizable economy in a particular phase of its historical development, in which recognizable classes of the community interact with each other in a particular framework of law and accepted conventions.

Pignou emptied history out of Marshall and reduced the analysis to a two-dimensional scheme. Marshall's argument had created a notorious dilemma. He believed in economies of scale for the individual firm; as a firm grows it acquires experience, invests in new techniques and lowers cost of production per unit of output. But in every market (with a few well known exceptions) there are enough firms competing with each other to keep prices in line with costs. Why does not one firm, that happens to get a start, undersell others, grow, reduce costs further, and finally establish a monopoly? Marshall's argument was that the life of a firm is bound up with that of a family; by the third generation, the vigour of the founder

has been lost and the firm ceases to grow. This is certainly true of many actual case histories but as a universal law it had to be backed up by the remarkably untrue dictum that joint-stock companies stagnate.

Pigou set out to rescue Marshall from his dilemma by introducing the equilibrium size of firm. Every week, a firm is maximizing profits by selling such an output as to make the marginal cost of its product equal to the ruling price; over the long run, competition forces it to operate at the minimum point of a U-shaped curve, where marginal and average cost are both equal to price. There is a rate of interest (somehow connected with the discount of the future of owners of wealth) at which every firm can borrow as much or as little as it likes; when it is in equilibrium, its net profit per annum is just sufficient to cover interest, at the ruling rate, on the value of its capital.

This rigmarole was the only legacy from Marshall that has been incorporated into modern orthodoxy.

Side by side with the Pigovian system, the heritage of Walras has been very much elaborated; in this sphere the specification of the character of the economy is not so much unreal as non-existent. Sometimes it seems that there are no people in the market at all — only prices and quantities of commodities are mentioned. Sometimes every individual has his own endowment both of labour power and of physical inputs, so that society consists of a number of Robinson Crusoes, living side by side and exchanging their products. Sometimes we seem to be in Adam Smith's world where a man (evidently of independent means) appeals to the self-interest of the baker and the brewer to get him his dinner.

But then again, society is represented as a pure cooperative, without distinction of classes or occupations. Society saves, as in Frank Ramsey's famous theorem, and society enjoys the benefit of the increased income that accumulation provides.

The leap from Walras to Pigou is made by means of a pun. For Walras, a "factor of production" is something like a carpenter, a load of bricks, or a meadow. In the system, relayed by Pigou, that Marshall derived from Ricardo, the factors of production are labour, capital and land. Taking the word "factor" in both senses at once, the argument about the prices of items in the available stock of inputs, established by higgling and haggling in a market, is applied to the determination of wages, interest and rent in long run equilibrium.

This pun, presented in mathematical notation, is the basis of so-called micro-economics offered in the fashionable text books.

IV

Keynes pointed out the distinction between interest, which a business has to pay on borrowed finance, and profit, which it hopes to get on an investment. For his strictly short period problem, he did not need a realised rate of profit on capital, only a forward looking, uncertain expectation of profits. This could be formally expressed as the rate of discount that reduces the expected series of future quasi-rents to equality with the capital sum to be invested today; but uncertainty and prospective changes in the value of money make the calculation vague.

Marshall's normal profits and Wicksell's natural rate of interest were supposed to apply to a capitalist economy but their level was never explained. Adam Smith had quite a different story for the pin factory from that of the baker and the brewer; there, the share of profit was higher the lower the wage could be set, but a clear explanation of the determination of the rate of profit eluded him. Only Ricardo laid the basis for a theory of the rate of profit on capital and this was forgotten in the neoclassical era until it was disinterred by Sraffa. The neo-neoclassicals try to substitute the concept of "the rate of return" for a theory of profits.

For Irving Fisher, the rate of return was the increment of income that a man could get from adding an increment to his wealth. Thus, in a modern economy with a gilt-edged rate of interest of 10 per cent, £10 per annum in perpetuity is the rate of return on a saving of £100. In an artisan economy, the return on saving is an addition to the flow of output, say of horse-shoes, produced with a given amount of work by a blacksmith who puts part of his energy into improving his forge. On Frank Ramsey's growth path, the rate of return in terms of utility to society as a whole on further saving varies as wealth accumulates. But the rate of return is connected with the rate of profit in a capitalist economy only by a methodological confusion.

Let us return to the picture of an economy in a static state of Walrasian equilibrium. Now compare it with another economy, with the same tastes and technology, in equilibrium with the same labour force and a larger amount of physical inputs (more of some and no less of any). There is then a larger output of some or all of the commodities being produced.

Professor Johnson could say that the second economy has a larger lump of putty, so that the hire price of putty per unit, taken as a whole, is lower than in the first economy, while the income of a representative worker is higher than in the first economy. The income of a representative putty owner may be less or greater according to the elasticity of substitution between putty and labour. (This follows from the assumptions of general equilibrium; it does not correspond to anything in real life.)

For such a comparison putty may be thought to be an adequate concept. But it does not enable us to say *how much* greater the second set of inputs is as simple quantity (putty is a parable, not to be taken literally) still less, how the additional output in the second position is related to the additional inputs as a simple ratio.

The two lists of inputs and outputs are made up of items in different proportions and there may be some item in the second list that did not appear in the first. All relative prices are different in the two positions. A comparison of wage rates or of the value of stocks of inputs in the two positions would depend entirely on the numeraire chosen, and no one numeraire has more relevance than any other.

This question has been much discussed under the title of the "measurement of capital". But, properly speaking, there is no "capital" in a Walrasian market. There are no capitalists who have invested finance in productive capacity with a view to employing labour and making profits. There is only a list of quantities of various kinds of available inputs.

In a Pigovian stationary state, there is a stock of capital, of which the value, say, in terms of wage units, depends upon technical conditions and the rate of interest. Instead of an arbitary list of objects, there is a flow of investment going on which is just sufficient to keep the balanced stock of equipment intact as it wears out and to renew supplies of raw materials used up in production. The flow of net output constitutes the income of the economy, which is all being consumed.

The Austrian theory, developed by Wicksell, attempted to "measure capital" in such a case by the "average period of production". As Wicksell found, this is not exact; but even if it were, it would be no help in detecting the "rate of return".

We may imagine that we make a comparison between two equilibrium positions, with an identical labour force, one with a higher net output than the other. But it does not follow that the second has "more capital" or a longer average period of production that the first. If we compare them at a common rate of interest, there is no guarantee that the one with the higher net output has the higher value of capital. They are simply two equilibrium positions using different techniques, each with the stock of means of production appropriate to its own technique, and each with its own past history, that led to its present position.

The long wrangle about "measuring capital" has been a great deal of fuss over a secondary question. The real source of trouble is the confusion between comparisons of equilibrium positions and the history of a process of accumulation.

We might suppose that we can take a number of still photographs of economies each in stationary equilibrium; let us suppose that the "measurement" problem can be solved by calculating all values in terms of labour time, and that it happens that the economies can be arranged in a series in which a larger value of capital per man employed is associated with a higher net output per man of a homogeneous consumption good, as on Professor Samuelson's "Surrogate production function". This is an allowable thought experiment. But it is not allowable to flip the stills through a projector to obtain a moving picture of a process of accumulation.

Before we can discuss accumulation, we must go back to the beginning and deal with the questions which Walras and Pigou left unanswered. In what kind of economy is accumulation taking place? Is it Frank Ramsey's classless cooperative, a collection of peasants and artisans, or a modern capitalist nation? Is it a property-owning democracy in which the rate of saving depends on the decisions of households? If so, by what means is saving converted into additions to the stock of inputs? Or if investment depends on the decisions of industrial firms, how do they get command of finance, and what expectations of profits are guiding their plans? Is there a mechanism in the system to ensure growth with continuous full employment? And if an increasing value of capital per man leads to a prospective fall in the rate of profit, do the firms go meekly crawling down a pre-existing production function or do they introduce new techniques that raise output per unit of investment as well as output per man?

The data for periods of continuous growth in the industrial capitalist countries generally seem to conform pretty well to Kaldor's stylised facts — a fairly constant ratio both of the value of capital and of the wage bill to the value of output. This entails that the overall ex-post rate of profit on capital was fairly constant. With rising real wages and a constant rate of profit, it follows that each point of observation must have been drawn from a different technology. Even as a thought-experiment, it is meaningless to postulate the existence in a growing economy of a surrogate production function or a pseudo production function, well or ill-behaved, on which a number of equilibrium positions, with different techniques, co-exist at a moment of time.

Certainly, for a developing country, the choice of technique is an important problem. The choice is not concerned with the ratio of "capital" to labour or to output. It is concerned with the allocation of investible resources. The increment of future productivity of labour due to creating an addition to the stock of inputs might be called the return to investment (though it is not easy to express it as a rate) but it has nothing whatever to do with the rate of profit or the rate of interest on the pre-existing total stock of capital, or of wealth, inherited from the past.

The problem of the "measurement of capital" is a minor element in the criticism of the neo-classical doctrines. The major point is that what they pretend to offer as an alternative or rival to the post-Keynesian theory of accumulation is nothing but an error in methodology — a confusion between comparisons of imagined equilibrium positions and a process of accumulation going on through history.

V

The lack of a comprehensible treatment of historical time, and failure to specify the rules of the game in the type of economy under discussion, make the theoretical apparatus offered in neo-neoclassical text-books useless for the analysis of contemporary problems, both in the micro and macro spheres.

NOTES

1. "The General Theory of Employment", *Quarterly Journal of Economics,* Feb. 1937 reprinted in *Collected Writings of John Maynard Keynes, Vol. XIV.*

2. F. H. Hahn, *The Share of Wages in the National Income* (Weidenfeld and Nicolson, London 1972).

3. H. G. Johnson, *The Two Sector Model of General Equilibrium,* Allen and Unwin, London 1971.