only through the principle of competition has political economy any pretension to the character of a science. So far as rents, profits, wages, prices, are determined by competition, laws may be assigned for them. Assume competition to be their exclusive regulator, and principles of broad generality and scientific precision may be laid down, according to which they will be regulated (John Stuart Mill, *Principles of Political Economy*, 1848, p. 242).

In all versions of economic theory ‘competition’, variously defined, is a central organising concept. Yet the relationship between different definitions of competition and controversies in the theory of value has not been widely appreciated. It is the purpose of this essay to investigate this relationship.

The substance of recent controversies in the theory of value has been significantly clarified by the distinction drawn by Pierangelo Garegnani (1976) between, on the one hand, what he calls the *method* of economic analysis, and, on the other hand, economic theory *per se*. The traditional method has been to pose the study of the behaviour of a capitalist market economy in terms of the long-period positions and the associated uniform rates of profit, which the persistent forces acting in the economy will tend to establish. This method is independent of the theory which may be used to explain the determination of the long-period position, as may be seen from the fact that essentially the same method was the basis of economic analysis both before and after the great change in economic theory in the late nineteenth century.
In this essay I will attempt to locate the role of the long-period method in the development of both classical and neoclassical theories of value, and hence throw some critical light on the change in method which has taken place with the introduction of the notion of 'intertemporal equilibrium'. This will involve relating the long-period and 'intertemporal' methods to the object which they are both intended to characterise — the operations of a capitalist market economy; and to the process which validates that characterisation — competition.

The economic organisation of industrial capitalism is not immediately perceptible. As a form of economy in which production and distribution proceed by means of a generalised process of exchange (in particular by the sale and purchase of labour) it possesses no obvious direct mechanisms of economic and social co-ordination. Yet, in so far as these operations constitute a system, they must be endowed with some degree of regularity, the causal foundations of which may be revealed by analysis. The first steps in economic investigation which accompanied the beginnings of industrial capitalism consisted of a variety of attempts to identify such regularities, often by means of detailed description and enumeration, as in the works of Sir William Petty, and hence to establish the dominant causes underlying the behaviour of markets. But what was required was not simply the description and classification which necessarily precedes analysis, but abstraction, the transcendence of political arithmetic.

The culmination of the search for a coherent abstract characterisation of markets, and hence the foundation of modern economic analysis, is to be found in chapter 7 of Book I of Adam Smith's Wealth of Nations — 'Of the natural and market price of commodities'. In this chapter Smith presented the first satisfactory formulation of the regularity inherent in price formation. The idea, partially developed earlier by Cantillon, and by Turgot in his discussion of the circulation of money, was that

There is in every society ... an ordinary or average rate of both wages and profits ... When the price of any commodity is neither more nor less than what is sufficient to
pay the rent of land, the wages of labour, and the profits of stock employed... according to their natural rates, the commodity is then sold for what may be called its natural price.

and that

The natural price... is, as it were, the central price, to which the prices of all commodities are continually gravitating. Different accidents may sometimes keep them suspended a good deal above it, and sometimes force them down somewhat below it. But whatever may be the obstacles which hinder them from settling in this centre of repose and continuance, they are constantly tending towards it (Smith, 1961, p. 65).

Thus the natural price, that associated with ordinary or average rates of wages, rents and profits, encapsulates the persistent element in economic behaviour. And that persistence derives from the ubiquitous force of competition; or, as Smith put it, the condition of 'perfect liberty' in which 'the whole of the advantages and disadvantages of the different employments of labour and stock must... be either perfectly equal or continually tending to equality' (p. 111), for the natural price is 'the price of free competition' (p. 68).

The relationship between competition and the establishment of what Petty called 'intrinsic value' had been presented in the works of Petty, Boisguillebert, Cantillon and Harris as the outcome of rival bargaining in price formation, competition being the greater when the number of bargainers was such that none had a direct influence on price (Meek, 1956, pp. 27–31; McNulty, 1967). Similarly, although Quesnay expressed the formation of competitive prices as being, in his ringing phrase, 'independent of men's will... far from being an arbitrary value or a value which is established by agreement between the contracting parties' (in Meek, 1962, p. 90), and in his analysis of the reproduction of surplus laid the foundations for the characterisation of social and economic processes as law-governed (Meek, 1965), he did not relate the organisation of production to the formation of prices in competitive
markets. Consideration of that relationship required the development of a general conception of the role of capital, and with it the notion of a general rate of profit formed by the competitive disposition of capital between alternative investments.

A significant step in this direction was made by Turgot, who both conceived of the process of production as part of the circulation of money:

We see... how the cultivation of the land, manufactures of all kinds, and all the branches of commerce depend upon a mass of capitals, or movable accumulated wealth, which, having been first advanced by the Entrepreneurs in each of these different classes of work, must return to them every year with a regular profit... It is this continual advance and return of capitals which constitutes what ought to be called the circulation of money (Turgot, 1973, p. 148).

and saw that the structure of investments would tend to be that which yielded a uniform rate of profit:

It is obvious that the annual products which can be derived from capitals invested in these different employments are mutually limited by one another, and that all are relative to the existing rate of interest on money (Turgot, 1973, p. 70).

However, Turgot neither related the determination of the rate of profit to production in general (as Meek (1973, p. 26) pointed out, Turgot accepted the Physiocratic idea that the incomes of the industrial and commercial classes were “paid” by agriculture) nor developed the conceptual framework which linked the formation of prices and of the rate of profit to the over-all organisation of the economy. These were to be Smith’s achievements:

If... the quantity brought to market should at any time fall short of the effectual demand, some of the component parts of its price must rise above their natural rate. If it is rent, the interest of all other landlords will naturally
prompt them to prepare more land for the raising of this commodity; if it is wages or profit, the interest of all other labourers and dealers will soon prompt them to employ more labour and stock in preparing and bringing it to market. The quantity brought thither will soon be sufficient to supply the effectual demand. All the different parts of its price will soon sink to their natural rate, and the whole price to its natural price (Smith, 1961, p. 65).

So in a competitive market there will be a tendency for the actual prices (or ‘market prices’, as Smith called them) to be relatively high when the quantity brought to market is less than the effectual demand (the quantity that would be bought at the natural price) and relatively low when the quantity brought to market exceeds the effectual demand. This working of competition was known as the law of supply and demand. The workings of competition which constitute the ‘law’ do not identify the phenomena which determine natural prices. Thus the law of supply and demand should not be confused with supply and demand theory, i.e. the neoclassical theory of price determination which was to be developed one hundred years later. Nor should Smith’s discussion of the tendencies of concrete market prices be confused with abstract supply and demand functions.

Adam Smith’s conception of ‘perfect liberty’ consists of the mobility of labour and stock between different uses (1961, pp. 112, 132–3); mobility is necessary for the establishment of ‘an ordinary or average rate both of wages and stock’ and hence for the gravitation of market prices towards natural prices. Smith identifies four reasons why market prices may deviate ‘for a long time together’ above the natural price, creating differentials in the rate of profit, all of which involve restriction of mobility (1961, pp. 67–70):

(a) extra-demand can be ‘concealed’, though ‘secrets of this kind . . . can seldom be long kept’;
(b) secret technical advantages;
(c) ‘a monopoly granted either to an individual or to a trading company’;
(d) ‘exclusive privileges of corporations, statutes of apprenticeship, and all those laws which restrain, in particular
employs, the competition to a smaller number than might otherwise go into them'.

For Smith there is some similarity in the forces acting on wages and on profits which derives from his conceiving of the capitalist as being personally involved in the prosecution of a particular trade or business. So the rate of profit, like the rate of wages, may be differentiated between sectors by 'the agreeableness or disagreeableness of the business', even though 'the average and ordinary rates of profit in the different employments of stock should be more nearly upon a level than the pecuniary wages of the different sorts of labour' (1961, p. 124). Landlords, capitalists and workers are all active agents of mobility. In Ricardo's discussion the emphasis shifted towards the distinctive role of capital:

It is, then, the desire, which every capitalist has, of diverting his funds from a less to a more profitable employment, that prevents the market price of commodities from continuing for any length of time either much above, or much below their natural price (Ricardo, 1951, p. 91).

Ricardo used the term 'monopoly price' to refer to commodities 'the value of which is determined by their scarcity alone', such as paintings, rare books and rare wines (pp. 249–51) which 'have acquired a fanciful value', and he argued that for 'Commodities which are monopolised, either by an individual, or by a company ... their price has no necessary connexion with their natural value' (p. 385). His analysis of value and distribution is accordingly confined to 'By far the greatest part of those goods which are the objects of desire ... such commodities only as can be increased in quantity by the exertion of human labour, and on the production of which competition operates without restraint' (p. 12).

For Marx competition is synonymous with the generalisation of capitalist relations of production. Competition is thus related to the rise to dominance of the capitalist mode of production:

While free competition has dissolved the barriers of earlier relations and modes of production, it is necessary to ob-
serve first of all that the things which were a barrier to it were the inherent limits of earlier modes of production, within which they spontaneously developed and moved. These limits became barriers only after the forces of production and the relations of intercourse had developed sufficiently to enable capital as such to emerge as the dominant principle of production. The limits which it tore down were barriers to its motion, its development and realisation. It is by no means the case that it thereby suspended all limits, nor all barriers, but rather only the limits not corresponding to it... Free competition is the real development of capital (Marx, 1973, pp. 649–50).

And as capitalism itself develops so does competition:

On the one hand... [capital] creates means by which to overcome obstacles that spring from the nature of production itself, and on the other hand, with the development of the mode of production peculiar to itself, it eliminates all the legal and extra-economic impediments to its freedom of movement in the different spheres of production. Above all it overturns all the legal or traditional barriers that would prevent it from buying this or that kind of labour-power as it sees fit, or from appropriating this or that kind of labour (Marx, 1976, p. 1015).

The concentration of capital (increasing unit size of firm in the process of accumulation) and, in particular, the centralisation of capital (cohesion of existing capitals) destroys and recreates competition. Competition is one of the most powerful 'levers of centralisation', and

The centralisation of capitals, or the process of their attraction, becomes more intense in proportion as the specifically capitalist mode of production develops along with accumulation. In its turn centralisation becomes one of the greatest levers of its development (Marx, 1976, p. 778n).

Like Smith and Ricardo, Marx relates the development of
competition to the establishment of the general rate of profit:

What competition, first in a single sphere, achieves is a single market value and market price derived from the various individual values of commodities. And it is competition of capitals in various spheres, which first brings out the price of production equalising the rates of profit in the different spheres. The latter process requires a higher stage of capitalist production than the previous one (Marx, 1967, p. 180).

It is in his conception of the circuit of capital that Marx best portrays capitalist competition. The image is one of capital as a homogeneous mass of value (money) seeking its maximum return. Profits are created by embodying capital in commodity form in the process of production, the commodity outputs of which must be realised, i.e. returned to the homogeneous money form to be reinvested. Competition is thus characteristic of the capitalist process of accumulation; mobility and change are two aspects of the same phenomenon.

Marx's general conception of capital as a system corroborates Quesnay's notion of the economy operating 'independent of men's will'. This does not mean that there may not be circumstances in which individual capitals exercise some control on particular markets — indeed such limitations may be necessary for the accumulation process to proceed in certain lines. Capital removes only such barriers as limit its accumulation. The market control exercised in some lines of modern industry is not necessarily a limitation but may be a prerequisite of production on an extended scale. Such controls do not contravene the laws of competition, which with the development of capitalism, and in the absence of institutional intervention, operate over an ever-widening field. Aggregate capital flows discipline the actions of individual capitals, and hence endow the system with the regularity manifest in the perpetual tendency, successively contradicted and recreated, towards a general rate of profit and the associated prices.

Competition, identified in its complete sense by Marx, but essentially unchanged from the formulation by Smith, not only established the object of analysis, natural prices and the
general rate of profit, but made meaningful analysis possible, since it allowed the operations of the capitalist economy to be characterised in a manner which permitted theoretical statements of general validity to be made about them.

Theory proceeds by the extraction from reality of those forces which are believed to be dominant and persistent, and the formation of these elements into a formal system, the solution of which is to determine the state or magnitude of the variables under consideration. It is obvious that the solution will not, except by a fluke, correspond to the actual magnitudes of the variables ruling at any one time, for these will be the outcome not simply of the elements grouped under the heading 'dominant and persistent', but also of the multitude of other forces excluded from the analysis as transitory, peculiar or specific (lacking general significance) which may, in any given situation, exert a more or less powerful effect. None the less, the practice of analysis necessarily embodies the assumption that forces comprising the theory are dominant, and that the determined magnitudes will, on average, tend to be established. In any satisfactory analytical scheme these magnitudes must be centres of gravitation, capturing the essential character of the phenomena under consideration.

The importance of Smith's formulation will now be apparent. Satisfactory theory cannot exist in a vacuum. Simple labelling of forces as dominant is not enough. These forces must operate through a process which establishes their dominance and through which the 'law-governed' nature of the system is manifest. That process is competition, which both enforces and expresses the attempts of individual capitals to maximise profits. Thus an important aspect of the behaviour of a capitalist market economy may be characterised at a sufficient level of generality, as the general rate of profit with associated normal prices, to permit the formulation of general causal statements, i.e. to permit analysis. Without this step, which constitutes the establishment of what was called above the method of economic analysis, it would not have been possible to develop any form of general economic theory.

The Classical theory of value and distribution developed as a series of attempts to provide a logically coherent theory
of the rate of profit and hence of natural prices (Garegnani, 1960; forthcoming). Taking as data

(a) the size and composition of social output,
(b) the technique in use (conditions of reproduction), and
(c) the real wage

Ricardo argued that the rate of profit was determined by the ratio of surplus to means of production, where surplus is defined as output less requirements of reproduction, i.e. means of production used up and wages, evaluated with respect to the conditions of reproduction under the least favourable ‘socially necessary’ circumstances which consequentially pay no rent. The problem of value presented itself as the search for a means of expressing the heterogeneous aggregates of surplus and means of production in the numerator and the denominator of the ratio in homogeneous terms. The most consistent approach utilised the labour theory of value. But the deficiencies of this approach threatened to undermine the whole system. The closest that the Classical economists came to a satisfactory solution is that presented by Marx in volume III of Capital, in which he first uses the labour theory of value to determine the magnitude of the ratio of surplus to means of production and then argues that the competitive formation of the general rate of profit contradicts the proposition that commodities exchange at their labour value.

But this sequential solution is unsatisfactory. The argument of the surplus approach to the theory of value and distribution is that the set of normal prices is determined by the conditions of reproduction and the manner in which the surplus is distributed. But if the surplus is to be distributed as a rate of profit, the value of the means of production used in each line must be known before the surplus may be ‘allocated’ amongst them. Hence the rate of profit and normal prices must be determined simultaneously (Sraffa, 1960, p. 6). Once the problem had been posed in terms of simultaneous determination by Dmitriev and Bortkiewicz, the Classical data were shown to be sufficient for the unique determination of the rate of profit. Piero Sraffa (1960) provides clarification and generalisation of the Classical method, and
shows it to be robust in the face of a change in the data from a given real wage to a given rate of profit.

The Classical system, the surplus theory, provides a logically consistent explanation of the determination of the general rate of profit and hence of natural prices (prices of production). The Classical achievement is thus composed of two independent elements: (a) the characterisation of the object of the theory of value, i.e. the construction of an analytical method; and (b) the provision of a theory for the determination of that object. Underlying the former is the concept of gravitation imposed by competition, and underlying the latter the concept of gravitation inherent in theoretical abstraction. To be a viable alternative any other system of analysis must not simply provide a different theory but also achieve a similar congruence with the traditional method.

The development in the final quarter of the nineteenth century of what was to become known as the neoclassical theory of value and distribution attempted to provide an alternative to the Classical theory embroiled in the logical difficulty of finding a measure of value on which a coherent theory of the rate of profit might be based and sullied by unsavoury associations with radicalism and Marxism. But despite the dramatic change in theory that was to be heralded by the works of Jevons, Menger and Walras, the method of analysis which characterised the object the theory was to explain stayed fundamentally the same; the theory was an alternative explanation of the same phenomena. Marshall relabelled natural prices ‘long-run normal prices’, and declared that, as far as his discussion of value was concerned ‘the present volume is chiefly concerned with the normal relations of wages, profits, prices, etc., for rather long periods’ (1920, p. 315). The same continuity of the method may be found in the work of Walras (1954, pp. 224, 380), Jevons (1970, pp. 86, 135–6), Bohm-Bawerk (1959, p. 380) and Wicksell (1934, p. 97).

Although the conception of long-period normal price is to all intents and purposes identical to Classical natural prices (or prices of production) and is enforced by the same mechanism of competitive mobility, some other, rather different price concepts were introduced. In particular, Marshall
argued that short-period prices might be objects of analysis, at least at the partial-equilibrium level. The short-period price is thus quite different from the Classical category of market price, the latter being a descriptive rather than an analytical category. The short-period position is characterised by a number of 'auxiliary constraints' (Samuelson, 1967, pp. 36–9), such as the structure of fixed capacity, or location of the labour force, which limit the full impact of competitive mobility. The short-period 'equilibrium' determined by the addition of these auxiliary constraints to the normal data of neoclassical theory must in some sense be a central point with respect to actual prices which will be affected by all those transitory elements not included in the catalogue of auxiliary constraints. But the short-period positions are, in turn, related to their centres of gravity, the long-period positions. Thus, within the period in which the basic circumstances of the economy are broadly unchanged, the short-period positions are not centres of gravitation, but are positions from which the economy will tend to move. The very conception of the 'short period' is arbitrary — some means of production move at one speed, some at another, some yet another. This might be a helpful starting-point for a specific, partial analysis, in which the ceteris paribus assumption holds other forces in their long-period configuration, but it is hardly the basis on which to erect a general theory of value. None the less, the short period will come to play an important part in the development of neoclassical theory, a topic to which we will return.

The proposition that prices are determined by supply and demand was common from the early days of economic debate. Ricardo, for example, had cause to complain that

the opinion that the price of commodities depends solely on the proportion of supply to demand, or demand to supply, has become almost an axiom in political economy, and has been the source of much error in the science (Ricardo, 1951, p. 382).

Typically, supporters of the 'supply and demand position' attempted to generalise from the law of supply and demand
— that competition will tend to establish natural prices — to an explanation of the levels of natural prices themselves. They had no theory as such of the levels of prices, and resorted simply to asserting that prices were equal to the sum of wages, profits and rents, an empty truism. It was just these facile propositions that Marx dismissed as ‘vulgar’ (Marx, 1976, p. 146n).

The task of replacing ‘vulgar’ truisms with a theory of supply and demand presented a fundamental theoretical difficulty. In his notes on Senior's Political Economy, John Stuart Mill specified the problem clearly:

It seems to me necessarily, when we mean to speak of the ratio between the demand for a commodity and the supply of it, that the two quantities should be, in the mathematical sense, homogeneous — that both of them should be estimated in numbers of the same unit (Mill, 1945, p. 143).

Senior, and others, failed to provide a unified treatment of supply (or cost) to balance against a ‘utility’-based portrayal of demand (as presented, for example, by Say, quoted in Walras, 1954, p. 202). Costs were a heterogeneous amalgam of real wages, rents and profits which were related by Senior to primary abstinence alone (Senior, quoted in Cannan, 1929, p. 196). The requisite homogeneity was achieved by Jevons, Menger and Walras by deriving individual offers and demands from the balance of utility and disutility at the margin of constrained choice. All costs might be reduced to disutility. Over-all demand and offer functions (and the consequential supply functions in production models) are found by simply summing individual functions (see, for example, Walras, 1954, p. 94, Debreu, 1959, ch. 5). The equilibrium price of a good (or prices – the equilibrium is typically not unique) is then that which establishes consistency between over-all demands and over-all offers.

The data of the neoclassical theory are thus the information necessary to establish the model of price formation as the outcome of the competitive resolution of individual utility maximisation subject to the constraints of technology and
endowment, namely (see Debreu, 1959, pp. 75, 79):

(a) preferences (utility functions),
(b) technology,
(c) size of endowments, and
(d) distribution of endowments.

With suitable assumptions on the form of preferences and of technology a solution may be shown to exist. But even given these assumptions, the analysis is not unproblematic, for it is also assumed that each agent acts independently of all others, that all are price-takers. This assumption allows us to derive the characteristics of economy-wide demand functions (or, more generally, excess-demand correspondences) from the assumed characteristics of individual agents (preferences, endowments).

If the assumption of price-taking behaviour is dropped, the demand functions must be replaced by reaction functions as individual agents determine their actions in the light of the actions of others. Many attempts have been made to construct general-equilibrium models in which price-taking is not assumed, beginning with the work of Negishi (1961), but it has recently been shown by Roberts and Sonnenschein (1977) that all these models rest on mathematical assumptions which have no economic rationale.

Despite these important contributions, the problem of such mixed Cournot–Chamberlin–Walras equilibria is not yet adequately resolved, since each of the above mentioned theorems employs assumptions made directly on the constructs to be used in the proofs, and the properties thus assumed are not derived from hypotheses on the fundamental data of preferences, endowments and technology. This is, of course, in sharp contrast with the theorems for the purely competitive case, in which, for example, all the properties of the excess-demand correspondence used in the proofs are derived from conditions on the individual agents' characteristics . . . the properties of reaction curves used in the existing theories of imperfectly competitive equilibrium have not been derived from the technological
conditions and the behavior these theories claim to address (Roberts and Sonnenschein, 1977, pp. 101, 104).\textsuperscript{10}

Thus the assumption of price-taking behaviour is required in the construction of the neoclassical theory of value. But the bare assumption would appear unreasonable if it were not related to some behavioural aspect of the market economy. The consequence has already been suggested in the discussion of Roberts and Sonnenschein — there is assumed to be perfect competition. The content of this assumption was investigated by Cournot and Edgeworth, both of whom argued that price-taking behaviour would rule in an economy composed of an infinite number of agents (the euphemism 'large economy' is popular today). In recent years game-theoretic investigations have validated the Cournot–Edgeworth argument. The basic result, expressed in terms of the limit theorem on the core of the competitive economy, is summarised by Aumann (1964, p. 39):

The notion of perfect competition is fundamental in the treatment of economic equilibrium. The essential idea or notion is that the economy under consideration has a 'very large' number of participants, and that the influence of each individual participant is 'negligible'... the influence of an individual participant on the economy cannot be mathematically negligible, as long as there are only finitely many participants. Thus a mathematical model appropriate to the intuitive notion of perfect competition must contain infinitely many participants.

Aumann also demonstrates that each of the infinity of participants must be infinitesimally small.

Thus the conception of competition found in the works of, say, Walras, Wicksell, Marshall and the early Hicks (1932) is an amalgam of two distinct propositions. First, there is the characterisation of capitalist competition inherited from the Classical economists, in which mobility, information, etc., are the key elements. Second, there is the infinity of infinitesimally small agents which generates the price-taking behaviour required by neoclassical theory. Knight's well-known list of
the conditions for perfect competition is an excellent example of such an amalgam (1971, pp. 77–9). The two propositions derive from quite different sources. The first is part of the general conceptualisation of competitive capitalism in the traditional method and is independent of any theory of value. The second derives from the logical requirements of the neoclassical theory of value, a theory the very substance of which is the determination of prices by the market resolution of individual actions. The second is therefore a theory-generated concept. Hence the anonymity of the individual agent required by neoclassical theory is not synonymous with Marx’s conception of a system operating ‘independent of men’s will’, as Hahn has claimed (1973, p. 33). The universality of competition in advanced capitalism is associated by Marx with the process of the concentration of capital which intensifies accumulation and competition. The freedom achieved by capital as it attains higher forms is manifest in joint-stock companies and sophisticated financial management — the institutionalisation of mobility. As Clifton has argued (1977, p. 150):

it is interaction among firms within the corporate sector, not the neoclassical world of ‘small firms’, that best approximates the assumption of a uniform rate of profit in the general theory of price.

The development of competition in this sense is an integral part of the development of the capitalist mode of production. Capital is always searching out its highest reward at all stages of capitalist development. The fact that it is typically the modern corporation rather than the independent capitalist that pursues this search today does not at all imply a lessening of competition in the capitalist economy. Nor does the fact that the freedom of movement of such large units of capital severely restricts the operating space of small business imply a decline of competition historically. In contrast to the vision of neoclassical theory, free capital mobility is not synonymous with the ability of small firms to move freely throughout the economy; it is merely the freedom of capital, however organised, so to move. Whatever the isolated cases of monopoly that occur
at all stages of capitalist development and among all size classes of firms, it seems clear that the large firms which dominate the economic process as a whole cannot in general be so characterised, for that process is a highly competitive one.

Once again, these propositions have nothing whatever to do with any theory, Classical or neoclassical, of the determination of prices or of the rate of profit. They are thus in no way equivalent to the neoclassical assumption of a continuum of agents.

Despite the addition of the infinity of agents to the definition of competition, the object of economic analysis which both Classical and neoclassical economists attempted to analyse and explain was the same, at least as far as prices are concerned: that is, the normal prices and general rate of profit of the long-period method. Since in neoclassical theory prices and quantities are determined simultaneously, the attainment of the profit-maximising combination of outputs is part of the theory of the profit rate, in contrast to the surplus approach in which the theory of value and distribution is separable from the theory of output and the process by which the rate of profit is established. In neoclassical theory the attempts of individual agents to maximise profits is part of the behavioural content of the theory, but in so far as the theory is directed towards the determination of long-period positions this does not inhibit the sought-for congruence between theory and method.

However, the long-period method, which has been the common ground of economic debate for two hundred years, has in the last few decades been increasingly challenged, and, in the more rigorous versions of neoclassical theory, been superseded, by varieties of short-period equilibria which do not display a uniform rate of profit on the supply price of capital.

The idea that short-period positions are susceptible to general analysis was first to assume importance in the inter-war period. Much analysis was at that time devoted to attempts to analyse systems in which prices, outputs and the price level are not those of the long-period position. A
significant part of this work was conducted by Swedish economists who, starting from Wicksell's concept of the disequilibrium 'cumulative process' (Wicksell, 1935, pp. 190–208), constructed a theory whereby the cumulative process was woven into a dynamic theory of prices and outputs. The essence of Wicksell's cumulative process was the variation in the general price level due to a difference between the money rate of interest and the natural rate of interest — the latter being the real rate of return on capital associated with full employment of labour and capital in long-period equilibrium. This 'short-period' analysis led inexorably to a general analysis of equilibrium over time, in which expectations of future prices played a dominant role (see Lindahl, 1939, parts 1 and 2). For

short-period general equilibrium cannot be determined independently of the changes it will undergo over time . . . [This was taken into account] in either of two ways: by introducing price expectations in the short-period equilibria, as was done by Hicks for his 'temporary equilibria' in Value and Capital, or, alternatively, by expanding the analysis into a theory of general intertemporal equilibrium based on the hypothesis of complete futures markets (Garegnani, 1976, pp. 57–8).

The decisive innovation was made by Hayek (1928) and Lindahl (1929), who divorced the short period from any relationship with the long period with respect to which it had been expressed, and defined an intertemporal equilibrium as market-clearing equilibrium in a temporal sequence of markets (see Milgate, 1979). The conceptual framework of intertemporal equilibrium is now familiar through the works of Malinvaud, Arrow and Debreu (Arrow and Debreu, 1954; Debreu, 1951, 1959, Malinvaud, 1953, 1961). The salient features are the specification of commodities by their location in time as well as by their qualitative characteristics, and the definition of equilibrium as the set of market-clearing prices determined either simultaneously or sequentially in markets from time 1 to time T. Whatever form the analysis takes, whether the temporary equilibria of Hicks (1946) or the full
equilibrium of Debreu (1959), there will not in general be a uniform rate of return on the value of capital in all sectors in each elementary time period. This aspect of the intertemporal method has been regarded by one writer as a notable virtue of the system, and an indication of its 'generality' (Bliss, 1975).

Since the pioneering work of Wald on the existence of competitive equilibrium it has been recognised that a necessary condition for the existence of competitive equilibrium in neoclassical general-equilibrium models is that the price of any producible commodity may, in equilibrium, be equal to, or less than, its cost of production, and that in general there will be some producible commodities for which the inequality will hold. With respect to producible means of production, capital goods, the presence of the inequality means that the rate of return will not be uniform on all capital goods. This would occur, for example, when the stock of a capital good being large relative to demand, the market-clearing price for that good is less than its reproduction cost — a typical short-run scenario. If the constraint that all producible means of production should yield a uniform return in each elementary time period were imposed on Debreu's (1959) model of intertemporal equilibrium, the model would not solve, it would be overdetermined (Hahn, 1975). The overdetermination could be avoided by relaxing the condition that the endowment of producible means of production be expressed as a vector, and instead following Wicksell's (1934) lead by expressing the endowment of capital as a single amount of value — but the logical deficiencies of this approach are now well known (Symposium, 1966, Garegnani, 1970). Thus it may be argued, as Garegnani (1976) has done, that the abandonment by neoclassical theorists of the analysis of long-period positions, and their concentration on short-period positions, was a consequence of their inability to present a logically consistent analysis of the determination of the general rate of profit.

How are these short-period positions to be interpreted? Their short-period character derives from the necessity of specifying the stock of producible means of production as a vector, with the result that the capital stock will not in general be appropriate to the structure of demand. Of course,
if the model is one in which perfect foresight is assumed, and a sufficiently large number of time periods are taken into account, then 'eventually' the capital stock will be adjusted. But the equilibrium is not defined simply by 'later' time periods but by the market-clearing price vector in $n \times T$ dimensional space, i.e. for all commodities at all times.

Since the theory requires profit maximisation as a basic behavioural postulate, the short period is a position from which, given the possibility of mobility, the economy would tend to move away. Any transitory or specific event will not merely induce temporary deviation from a position towards which the system will tend to return, or around which it will tend to oscillate; instead transitory events will establish new short-period sequences. Since the equilibrium cannot be a centre of gravitation, any analysis of specific or transitory events must be treated within the specification of an 'equilibrium', rather than as factors causing deviation from a central position – hence the proliferation of general-equilibrium models which incorporate just those elements (inflexibilities, lack of information, or similar imperfections) previously dealt with as disturbances of greater or lesser import.

But leaving imperfections aside, the short-period equilibrium cannot be, on the behavioural assumptions by which it has been itself determined, a centre of gravitation. And yet Debreu's equilibrium, and even Hicks's temporary equilibrium, are defined as 'competitive'. Clearly, the specification of what is meant by 'competition' has been changed from that which underlay the characterisation of natural prices or long-run equilibria. Means of production are assumed to be mobile between alternative uses, and yet there is not a uniform rate of profit. The notion of mobility has become a hybridisation of long-run mobility for non-reproducible means of production, and a fixed composition, short-run capital stock (Garegnani, 1960, p. 116). The fact, so clearly argued by Ricardo and by Marx, that changes in the structure of production, and hence the mobility of land and labour between alternative uses, are brought about by flows of capital, by changing the machines with which labour works and land is tilled, is either forgotten or ignored.
But while the definition of mobility is confused, the role of price-taking behaviour is to the fore. Indeed, it might be said that the issue of mobility has been virtually purged from the amalgam constructed by Walras, Marshall and Wicksell, and only the infinity of agents remains as the essential characteristic of a competitive economy. The forces which underlay the characterisation of the long-period method independently of any theory have been replaced by price-taking behaviour, a concept generated by a specific theory. The issue of mobility in a capitalist economy has been obscured and distorted. The resulting conception of equilibrium is an intellectual mutant, serving only the interest of a particular theory, and quite divorced from the phenomena that that theory purports to explain — the persistent behaviour of a capitalist market economy. The duality of the centre of gravitation enforced by competition and the centre of gravitation implicit in theoretical abstraction is now lost; and in consequence the system has become analytically incoherent. The price magnitudes determined in the solution of neoclassical general-equilibrium models should be centres of gravitation. Instead, they define points from which the economy would always tend away. Since the old definition of competition would expose this deficiency, the meaning of the term 'competitive' has been redefined in terms of price-taking behaviour to make it consistent with changed method. So a theory-generated concept, perfect competition, is allied with a theory-determined object — a question chosen to fit the theory.

The argument of this essay has been intended to show that something has gone badly wrong with economic analysis. The careful specification, and separation, of method and theory developed by Smith, and essentially preserved by the early neoclassics, has been abandoned in the interest of the preservation of a theory which proved inadequate for the task it was originally set. This suggests a need for a reappraisal of the notion of competition and its role in economic theory. In particular, since the surplus approach has now been shown, by Sraffa and others, to be immune from the logical ills which were previously believed to afflict it, a return to that system would appear to be imperative. In the surplus approach
the difficulties, and peculiarities, encountered by neoclassical economists do not arise, and in consequence it provides a much firmer foundation for all aspects of economic theory, and not only for the theory of value.

NOTES TO CHAPTER 6

1. The term 'long-period positions' refers both to the Classical conception of positions of the economy associated with natural prices or prices of production and to neoclassical long-run equilibria. The relationship of these two conceptions will be discussed below.

2. The same problem of the relationship between method and theory arises in the analysis of output. In neoclassical theory, where the theory of value is the theory of output, the issues are likewise identical. In Classical analysis, and more importantly in the interpretation of the Keynesian theory of output, the relationship between theory and method poses a number of difficult questions (see Garegnani, 1978, 1979). Unfortunately, these cannot be dealt with in the space of this essay, which is focused on theories of value and distribution alone.

3. The argument of this essay will be concentrated on the relationship between different characterisations of competition and the formation of a general rate of profit. Competition plays another, related role, the enforcement of minimum-cost production. The link between competition and 'efficiency', defined in this sense, is common to all systems of analysis. It is certainly not a peculiarity of neoclassical theory, in which 'efficiency' is defined in a manner which includes minimum-cost production, but also refers to the allocation and utilisation of total resources.

4. Smith remarked, 'I have no great faith in political arithmetic' (1961, p. 501).

5. Ricardo would demonstrate that Smith's characterisation of natural price as the sum of wages, profits and rents was incorrect. Natural prices are determined by the conditions of production on the least favourable 'socially necessary' land which pays no rent. None the less, associated with a set of natural prices and a rate of profit there will be a set of appropriate rents (see Stalla, 1960, ch. 11).

6. McNulty (1967) and Hayek (1948) draw a distinction between competition as a market structure and competition as behavioural activity. It is that distinction which must be made between the concept of perfect competition developed by nineteenth- and twentieth-century theorists and the concept of competition earlier employed by Adam Smith and his predecessors (McNulty, 1967,
The investigation of the characteristics of the position which is the outcome of a competitive process is portrayed as 'the tautological method which is appropriate and indispensable for the analysis of individual action [which] seems in this instance to have been illegitimately extended to problems in which we have to deal with a social process' (Hayek, 1943, p. 93). This argument has missed the point that the social process of competition plays the vital organising role of characterising the social object of analysis. As we shall see below, McNulty and Hayek have some justification in separating the process of competition from the specification of perfect competition; but they then fail to relate that process to anything. In particular, they fail to identify its vital role in the analysis of value and distribution.

7. The ‘long run’ thus refers less to a period of time than to a method of analysis. In dealing with historical changes of population, of technology or of tastes, Marshall uses the term ‘secular’ (1920, p. 315).

8. The separation of the question of existence from that of stability of equilibrium has become a necessary part of neoclassical general-equilibrium theory since the realisation that, in general, no equilibrium could be demonstrated to be stable. The relationship between stability analysis and the argument of this paper is discussed below, note 11. Hahn has argued that ‘the view that an equilibrium notion is only useful to economists insofar as it involves the falsifiable claim that all actual economic process converges to an equilibrium state’ is not correct (1973, p. 9). His argument rests on the role of equilibrium as a solution to a given system, as an organising concept by means of which to characterise a solution. Hahn is making two mistakes. First, he has failed to notice that any abstraction embodies the implicit assumption of gravitation. Second, he is locating the problem of gravitation in the context of the theory alone, ignoring the method. On this latter characteristic of neoclassical general-equilibrium theorists, more will be said below.

9. The crucial ad hoc assumption is that the optimal choices by each firm should define a convex-valued correspondence. Roberts and Sonnenschein comment that even in the context of relatively simple models 'any conditions sufficient to guarantee the convex-valued reaction curves needed to apply Kakutani’s theorem would appear to be very restrictive. If we attempt to enrich the model by introducing costly production, multi-product firms, several firms producing a given commodity, etc., one must suspect that any conditions sufficient for existence which would be obtained would be so restrictive as to leave the theorems essentially without interest' (1977, pp. 110–11).
10. See also Arrow and Hahn (1971, p. 166).
11. It should be made clear that this proposition is quite different from
that confronted by orthodox stability analysis. Even if the func-
tions determining the equilibrium were such as to display math-
ematical stability (commodities were gross substitutes), the equi-
librium would not be a centre of gravitation since those functions
are based on data – notably arbitrary stocks of capital goods –
which profit-maximising behaviour would tend to change. The
issue of stability in neoclassical analysis is not as easy to disentangle
from existence as many of its practitioners have implied. Since the
determination of prices depends on functional relationships between
prices and quantities, the interactions between prices and quantities
are an essential part of the economic rationale of the theory. In
Classical theory, on the other hand, the determination of prices
and the determination of outputs are separable. Thus the variation
in outputs which accompanies the gravitation of market prices to
natural prices involves a gravitation towards given quantities, the
effectual demands, given, that is, by forces which are separable
from those which determine natural prices (see Garegnani, 1976,
p. 29).

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