

THE NEO-RICARDIANS : SUPPLY, DEMAND AND EQUILIBRIUM

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(i) Introduction

In the previous chapter we considered a theory which was a special form of neo-classical economics. It is often referred to as the 'aggregate production function' model or 'aggregate neo-classical theory'. As with all forms of neo-classical theory it is a theory of supply and demand. The arguments of the critics were conclusive in showing it to be defective. In this chapter we look at more fundamental matters concerning the status of supply and demand theories in general.

(ii) Supply and demand

'Supply and demand' is a theory, or more accurately a set of theories, about the operation of an economic system. As such they could be incorrect in two possible ways. They could be criticised on grounds of logic or they could be empirically inaccurate. Some of the critics, part of whose work was discussed in Chapter 3, have claimed that all established theories of supply and demand can be shown to be deficient. The reasons given appear to relate both to logical and empirical factors. The main argument which they present can be summarised as follows. The 'core' of traditional theory in all its versions' is 'the idea that in a competitive economy, wages and interest are governed by the demand and supply for "capital" and labour.' Furthermore, 'the basic premise of the traditional theory of distribution in all its formulations' is what Pasinetti (1969) refers to as the 'unobtrusive postulate', namely 'the notion that a fall in r will cheapen the more capital-intensive processes of production' (Caregnani, 1970, pp 247 and 268). The same point is also restated in a slightly different way... "traditional theory - reduced to its core as the explanation of distribution in terms of demand and supply - rests in fact on a single premise. This premise is that any

change of system brought about by a fall of r must increase the ratio of "capital" to labour... "capital" being the value of physical capital in terms of some unit of consumption goods, a value which is thought to measure the consumption given up or postponed in order to bring the physical capital into existence' (Garegnani 1970 p271). This postulate is crucial to traditional theory because it made "capital" appear to be like a scarce resource, and the rate of profits to be like any other general-equilibrium price - an index of scarcity' (Pasinetti 1970 p429 and also Pasinetti 1973). Consequently, with the recognition of 'capital reversal' as a definite possibility, we 'undermine the ground on which rests the explanation of distribution in terms of demand and supply for capital and labour.' (Garegnani 1970, p274).

Garegnani provides an example which clearly indicates the substance of the above assertions. Below we quote the relevant passages in full.

'The relation between r and K - the traditional "demand function" for capital (saving) - was based on two assumptions: (a) that in the situation defined by each level of r , the labour employed is equal to the supply of it at the corresponding level of w ; (b) that the composition of consumption output is that dictated by consumer demand at the prices and incomes defined by the level of r . We shall now grant these assumptions, but we shall restrict the choice of the consumers by supposing, at first, zero net savings (i.e., in each situation, the capital goods are consumed and reproduced in unchanging quantities year by year). From these assumptions, and from what we say about changes in the systems of production and the relative prices of consumption goods, it follows that K may fall or rise, as r falls.

To clear the ground, we must now grant traditional theory two further assumptions in addition to (a) and (b): namely that (c) a tendency to net saving (i.e. a fall in consumption) appearing in the situation defined by a given level of r , brings about a fall of r ; (d) as r and w change, with systems of production and relative outputs changing accordingly, net savings realized in the economy can still be meaningfully defined, and can be measured - however broadly - by the difference between the K of the final and that of the initial situation.

1. Garegnani notes that these assumptions are not reasonable ones.

Let us now imagine that the economy is initially in the situation defined by the level r^* of the rate of interest, with K^* as the amount of capital. Then a tendency to positive net savings appears (i.e. consumption is reduced). We assume that, after a time, the tendency to net saving disappears so that, if a new equilibrium is ever reached, the level of consumption will become that of the situation which corresponds to the new lower equilibrium value of r .

We must now ask whether - as r falls from r^* to some level \bar{r} because of the initial tendency to net saving - a new situation can always be found with an additional quantity of capital ΔK representing the net savings which the community intended to make during the period. The form of the relation between r and K implies that such a new situation cannot always be found: however high r is, and however small ΔK , there may well not exist any lower rate of interest r at which $K = K^* + \Delta K$. Or, to find a situation with an amount K of capital just larger than K^* , we may need a fall of r so drastic (cf. Fig.1) as to make it clear that, in this case too, it is impossible to determine r by the supply and demand of "capital" (saving)...

...Thus, after following in the footsteps of traditional theory and attempting an analysis of distribution in terms of "demand" and "supply", we are forced to the conclusion that a change, however small, in the "supply" of "demand" conditions of labour or capital (saving) may result in drastic changes of r and w . That analysis would even force us to admit that r may fall to zero, without bringing to equality the quantities supplied and demanded of the two factors.

Now, no such instability of an economy's wage- and interest-rates has ever been observed. The natural conclusion is that, in order to explain

distribution, we must rely on forces other than "supply" and "demand". The traditional theory of distribution was built, and accepted, in the belief that a fall of r - an increase in w - would always raise the proportion of "capital" to labour in the economy: the theory becomes implausible once it is admitted that this principle is not always valid.¹

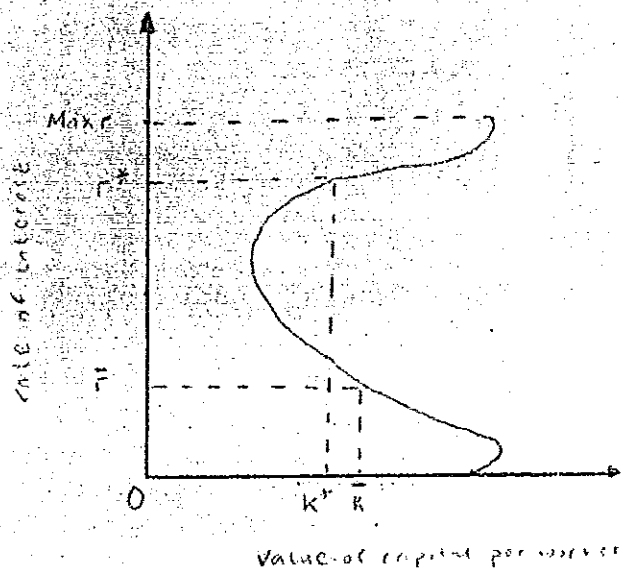


FIGURE 1¹

What are we to make of this argument? Even if we accept it at face value it is clear that it has problems. It is purely hypothetical, it does not relate to the data of any known economy; nor is it framed in terms of qualitative conditions that guarantee the conclusion. At best the argument merely indicates the possibility that there may not be a demand and supply equilibrium. In the light of the considerations dealt with in Chapter 2, this should not come as a surprise.

However, there are a number of reasons why we should not accept the argument at face value. Since it is supposed to be framed against supply and demand theories in general, it ought to apply to general equilibrium

1. The modes underlying this construction was outlined in the previous Chapter, pp

theory. From this perspective it is based on a number of misunderstandings. The first point to take note of is that prices are not 'indexes of scarcity' in the sense implied by Pasinetti. As we saw above pp an increase in the supply of a commodity does not necessarily result in a fall in its equilibrium price; it is quite possible for the equilibrium price to increase.

Furthermore, what is called a demand curve in the above argument should not be confused with what is meant by that term in partial equilibrium theory (which is a special form of general equilibrium theory). Here a demand curve relates to the relation between the price of a commodity and the quantity an agent, or aggregate of agents, plans to purchase on the assumption that all other prices remain constant. The demand curve for capital in the above argument is not of this type. It is simply the locus of points which indicates the changing value of capital in various stationary states, as the rate of interest changes and with it the wage and prices of produced goods. This may or may not be a useful concept but it has no applicability to that structure of supply and demand theory which utilises 'demand curves' as part of its analytical concepts.

Moreover, in constructing a 'demand curve' for 'value capital' the argument applies itself to something which is not a commodity in the general equilibrium framework. Here commodities are entities specified in their own technical units. This applies equally to capital and non-capital goods. Consequently, consumers are not assumed to have preferences relating to the amount of 'value capital' they own. They are instead assumed to achieve a maximal point in their consumption sets where those sets are specified in commodity space and independently of prices. In general equilibrium theory, there is, however, no difficulty in measuring and aggregating capital goods in terms of an equilibrium price set. One can simply add up the values of the individual items of reproducible physical assets. One cannot then use such

aggregates to construct an aggregate production function, save in very special circumstances, but the theory has no need of this for it has no need of the concept of aggregate capital. The only reason why one would in fact explicitly consider the value of aggregate capital in such a framework would be to evaluate the claims of theories which made propositions in terms of such a concept and appealed to general equilibrium theory for rigorous theoretical support.

Nevertheless, Garegnani's conclusion concerning the possibility of non-existence of a competitive equilibrium may still appear puzzling. We do well to ask what accounts for it. Since the assumptions that he makes concerning supply are not at variance with those cases of general equilibrium for which existence proofs are available, this indicates that the problem arises on the demand side.¹ This is, indeed, the case. What Garegnani does is really to ask the following question. Given a set of systems which form a continuum in terms of the value of capital with which they are associated, if agents demand a certain amount of value or numeraire capital, is there a point where this demand can be met? Garegnani's answer, quite rightly, is that there may not be. And in terms of the general equilibrium framework we can see why. In that framework, as we have just noted, agents are not assumed to demand 'value capital' let alone a given quantity of it. Consequently, if we assume that they do, we are adding another restriction which obviously must be met in equilibrium. Such an added constraint can obviously undermine the existence of an equilibrium.

This is the more so, when it is realised that this particular restriction is incompatible with the other assumptions of the model. In the existence proofs we dealt with, an important assumption on which they were constructed was that consumers sought to maximise their preferences. This implies that

1. Garegnani's technology is convex and profit maximisation is assumed.

demands are homogeneous of degree zero in prices. In other words, consumers' demands depend only on relative prices, not on numeraire prices¹. Consequently, the assumption that consumers demand a certain quantity of 'numeraire' or 'value' capital is inconsistent with the assumption that consumers maximise utility. It is no wonder that there are problems ensuring the existence of an equilibrium but they are not problems a proponent of supply and demand theories of distribution need worry about.

(iii) An 'alternative' theory

The above indicates that supply and demand theories are not defective on the grounds that capital reversal may occur. They may be defective, but the reasons can have nothing to do with the argument considered in Section 2.

However, it is not impossible to conceive of equilibrium prices being determined in a different framework of analysis. Many critics of supply and demand theories are prone to take such a point of view.²

The point can be illustrated^{by}/considering any one of the systems of production dealt with in the previous chapter. The price equations of such a system are re-written below.

$$L_1 \bar{w} + K_1 p_1 (1 + r) = P_1$$

corn model w/ non-basic

$$L_2 \bar{w} + K_2 p_1 (1 + r) = 1$$

1. It is, of course, this property which allows us to pick whatever numeraire we wish.

2. See Dobb (1973) for a review of such positions.

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l_1 and l_2 are the unit labour requirements. K_1 and K_2 are the unit capital requirements (specified in physical units). w represents the equilibrium wage rate and r the corresponding rate of interest. p_1 is the price of the capital good in terms of the consumption good. l_1, l_2, K_1 and K_2 are known parameters. Consequently, there are three unknowns, w, r and p_1 in two equations. We cannot determine all three unknowns from these two equations. This is sometimes stated by saying that the system can move with 'one degree of freedom'. The system can be 'closed', or fully solved, if we can somehow determine r or w from elsewhere.¹ Once given such a value for w or r we can determine the other two unknowns from these equations. There is no need to make any reference to demand conditions at all.² In Nell's words 'the consumer is cut down to size from the start', (Nell, 1972, p.82).

Sraffa (1960) has provided an analysis showing that this principle can hold in much more complex technologies than that referred to above. He deals with the case where there are many types of circulating capital (Part 1) and where there are many types of fixed capital (Part 2). He also considers the case where there are multiple processes of production so that the methods adopted will change with the value of the wage (Part 3).³

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1. Ricardo's procedure, for example, was to determine the real wage from the Malthusian principle of population. At any w above a subsistence level, population would expand, at any w below it, population would contract. It was assumed that the dynamics of this were sufficiently powerful to keep the real wage very close to the subsistence level. This theory is not accepted as empirically valid these days, but it does illustrate the principle.
 2. For example, if we can determine r (perhaps in the manner discussed in the following Chapter) we can determine the values of w and p_1 from equations (1) and (2) on p and p .
 3. Sraffa's book is difficult. Any potential readers are well advised to consult Meek (1967) and Harcourt (1972) first. The difficulties are not so much analytical as those of knowing what kind of context the analysis is supposed to relate to. Meek and Harcourt give some very clear guidance.

Once the rate of profit or the wage rate is known the relative prices of all the commodities and the remaining distributional variable are determined.

Sraffa makes no explicit claims for his analysis; others are much less restrained. Thus, for example, Roncaglia (1977) states that there are "irreconcilable differences between his conceptual framework and the prevalent theory of value...." (164). Sraffa's analysis is not a "...general equilibrium analysis, he opened a new path by completely dropping the abstract concepts of supply and demand curves" (sic) (170). He is "able to study prices of production with a theoretical scheme independent of the main analytical tools of marginalist theory..." (174). Similar views have been expressed by others ¹.

Essentially what these claims amount to is that a theory of value can be constructed from knowledge of technology and the value of one distributional variable like w or r .² Various economists have considered such a position as this, assuming that the economy is competitive and that producers are profit maximisers.³ The analysis has often been complex but the conclusions are relatively simple.⁴ The position requires that

- 1) there is only one type of primary factor,
- 2) if there is joint production, that it be of special types,
- 3) technology exhibits constant returns to scale. | *sd*

1. See, for example, Nell (1967), Nell (1972), Harcourt (1972) and Garegnari (1970). If the reader consults the two articles by Nell he is well advised to also consider the work of Koopmans (1957 and 1970) and also Dorfman, Samuelson and Solow (1958).

2. In this case distribution theory is in large part separated from value theory which becomes "the study of the relations between the wage, rate of profits and the system of relative prices" (Garegnari, 1970, p.279)

3. It would, of course, be impossible to consider value and distribution questions without assumptions on the structure of the economy and agent behaviour. Since the models employed by the critics involve a uniform equilibrium r and w they are presumably adopting assumptions of competition and maximisation.

4. See Mirrlees (1969) and Bliss (1975).

The rationale for such conditions can be illustrated in the simple example above (p.). If we introduce another type of labour, or introduce a natural resource, into the equations above we have under determinacy. Given the value of a wage rate or the rate of profit, there is no way that we can solve for the other distributional variables and prices from technology alone. Joint production can have a similar effect. Take the most obvious type of example, wool and mutton. If the process producing the consumption good is now a joint production process of this form there is no way that we can determine both prices, the price of the capital good and a distributional variable from knowledge of technology and w or r alone. Finally, without constant returns to scale, the level at which output is produced will affect the input coefficients of the production processes. Consequently we have no predetermined equations into which to substitute a value for w or r to determine the unknowns.

The requirements necessary for the 'alternative' theory to be applicable are, therefore, rather strong ones. Moreover, even when it is applicable it is to somewhat strain the word 'alternative' to regard it as such. It is a 'general equilibrium' approach in that it is a theory of the whole economy, not just one sector, and one in which equilibria, rather than alternative states of the economy, are analysed. If it is to work, the assumptions on technology must be stronger than those normally used in neo-classical theory. Consequently, the technological specifications are specialisations of the production side of the neo-classical model. Therefore, the price relations that emerge when a distributional variable is set at a certain level cannot be 'irreconcilable' with neo-classical general equilibrium theory.

IV. Equilibrium

A third strand of criticism of the supply and demand approach to distribution is concerned with the concept of equilibrium employed in that framework. More specifically it is argued that the 'market clearing' conception of equilibrium inherent in a neo-classical general equilibrium model is not relevant to the study of distribution in a capitalist economy. Instead, it is maintained that in so far as a concept of equilibrium is useful, it is that of a 'long run' equilibrium, involving a 'uniform rate of profit' and that this latter notion is not the same concept as that of a market clearing equilibrium.

Eatwell has summarised this position as follows: The notion of equilibrium in neo-classical general equilibrium theory...."is essentially a notion of market clearing prices, defined by an instantaneous inter-temporal equilibrium; consumption and production sets being constrained by an arbitrary initial endowment. As a result, whilst the price paid for any commodity is the same whatever may be its use (a long run concept), the rate of return on produced means of production is not equalised (a short-run phenomenon). But this implies an extraordinary hybrid notion of equilibrium, for, typically, the extent of the organisation of production required to equalise the price of non-produced inputs is the same as that required to equalise the rate of profit earned on produced inputs.....The prices defining such an equilibrium are not equivalent, in any way, to long-run prices." (Eatwell, 1976, pp.95-96). We are also told that 'The strength of the concept of long-run equilibrium derives from the belief that, even though the future is uncertain, the present disturbed by random events, and the forces of competition distorted by institutional, monopolistic and social factors, there is, in a rough and ready sense, a tendency for capitalistic competition to equalise the rate of profit in all sectors of the economy (and with it the prices paid for non-produced means of production). A

long-run equilibrium, so defined, may thus serve as a guide to some of the fundamental distributional characteristics of the system;..... The characteristics of the long-run equilibrium thus reflect fundamental characteristics of capitalism, in particular the tendency toward equalisation of the general rate of profit as capitalists attempt to maximise the return on their financial wealth." (Eatwell, 1976, p.95)

Garegnani (1976) states that such a 'long period equilibrium' is essentially the concept which classical economists were concerned with. He also argues that neo-classical economists ceased to utilise this concept because of the difficulties which supply and demand theory has in generating a uniform rate of profits. As he puts it, the notion of long period equilibrium is compatible with "treating each kind of 'capital good proper' as a separate factor in given supply. With a capital endowment conceived in these terms, the forces of demand and supply can only reach a short-period equilibrium, i.e. an equilibrium where the price of the services of the capital goods will not generally be compatible with a uniform rate of profit on the (actual or potential) supply price of the respective capital goods." (Garegnani, 1976, p.34).

Harcourt puts the point figuratively when he writes that neo-classical economists 'forget' that what they call rates of interest or profit 'is a completely different animal' from the classical rate of profits. (Harcourt, 1973, p.). This point is also stated by many other writers. For example, Robinson has repeatedly claimed that Walrasian general equilibrium theory does not incorporate a notion of a uniform rate of profit. Nor indeed has the neo-classical school ever "succeeded in getting out a theory of profits". (Robinson, 1973, p.61)

In evaluating these claims let us first consider the allegation that neo-classical general equilibrium theory has no theory of profits. The charge is quite obviously nonsense. General equilibrium theory

involves existence proofs. An existence proof shows that an equilibrium exists on specified assumptions. This means that there exists at least one price set which will clear all markets. Rates of interest are given by this equilibrium inter-temporal price set. Consequently a theory of interest exists and it is possible to calculate how such rates of interest will change with changes in the assumed conditions, initial endowments, technology and preferences.

Now consider Eatwell's statement that in a neo-classical equilibrium "...the rate of return on produced ~~assets~~ of production is not equalised..." If this means that the rate of return to a scarce capital asset, calculated on the equilibrium price of that asset is not equal, over the same time period, for all such assets, then it is wrong. It is obviously incorrect because it contradicts the assumption of maximising behaviour which is utilised in existence proofs. If it means that the rate of return on investments, over the same time period, is not equalised, then it is again incorrect. Assuming appropriate differentiability conditions they will all be equalised to the money rate of interest. The rates of return on different investments must be equal when expressed in terms of the same commodity. Again this simply follows from maximisation behaviour.

Garegnani makes a point which is somewhat different. He notes that in an intertemporal equilibrium, with a given initial endowment 'the price of the services of the capital goods will not generally be compatible with a uniform rate of profit on the (actual or potential) supply price of the respective capital goods.' This is correct but irrelevant as a criticism of neo-classical theory. As an extreme example consider the following case. There is a physical capital good x , the economy is initially endowed with a number of these goods. They can also be produced with other inputs. x can only be used together with other inputs

to produce another good y . An equilibrium exists involving a positive money rate of interest in all periods, a positive price for all other inputs but zero price for y in all periods.¹ Will the rate of profit calculated on the actual or potential supply price of good x be equal to the rate of interest? Obviously not. It will instead equal zero. So what? Eatwall tells us that capitalist competition and profit maximisation will equalise the rate of profit in all sectors of the economy. How does it do so in this case?

It is, therefore, quite clear that given an initial endowment of certain reproducible assets there is no need for those assets to earn a uniform rate of profit on their supply prices. In other words there is no reason why the ratios of net rentals of different capital goods should equal the ratio of their supply prices. Capitalist competition and profit maximisation is a force ensuring this. Competitive profit maximisation ensures that any scarce asset earns a rate of return equal to the money rate of interest but precisely because of this the equilibrium price of that asset may be below its reproduction cost.

It is, however, incorrect to state that 'the capital endowment of the economy can be a datum compatible with long period equilibrium only if it is expressed as a value magnitude', (Garegnani, 1976, p.35). There is no need to utilise the concept of aggregate capital to generate this result. 'If general equilibrium analysis takes the special case of an economy with constant returns to scale and linear Engel curves, then it is easy to show that for a special set of initial conditions there will be a uniform rate of profit', (Hahn, 1975, p.360). This also indicates how the neo-Ricardians generate an equilibrium with a 'uniform rate of profit'. They simply assume that the structure of the capital stock is fully adjusted to demands where the term 'fully adjusted' means that each capital good earns an equal rate of return

1. ~~Say, because y is an output of certain production processes where it is jointly produced with other commodities on a sufficient scale, so that supply exceeds the demand at any positive price, in all time periods.~~

on its value, which equals its reproduction cost. In short, they get a long period equilibrium by assuming it a priori. They do not show what they need to show, that an economy outside such an equilibrium will converge to such a position over time.

These points can be reaffirmed by considering the price set of an intertemporal competitive equilibrium. We need not ask how this occurred, whether it is unique, if the economy will stay there, or whatever. We can just consider its characteristics. As we noted in Chapter 2 (pp) such a price set is characterised by a multiplicity of rates of interest. Even for one period, own rates of interest of different commodities need not be equal. Nor need the own rate of interest of any individual commodity be a constant in each unit period. The only meaning that the term the rate of interest can have is the money rate of interest, or the own rate of interest of that good which acts as numeraire. This is a somewhat arbitrary choice. But even when chosen, the own rate of interest of money for different unit periods can be different. It is possible for own rates of interest of all goods to be equal in any period and for these to be the same for all unit periods. This can be the case in a stationary state or steady state (see above p. and below p.) In such a situation the same composition of goods is produced in each time period and the growth rate of these goods is a constant (equal to zero in the stationary case). Here we meet the concept of the 'long run equilibrium' referred to by Eatwell etc. On each item of capital equipment with a finite life a return is earned on its reproduction cost equal to the money rate of interest. This money rate of interest is the 'uniform rate of profit'.

Finally, these considerations show that the concept of a 'uniform rate of profit' is not a 'completely different animal' from rates of interest in the neo-classical framework. The concept of a 'uniform rate of profit' and the 'long run equilibrium' in which it is embedded can be regarded as

special cases of the neo-classical concepts. As such it is not clear how such a special case can serve 'as a guide to some of the fundamental distributional characteristics' of the capitalist system any better than the more general neo-classical version from which it can be derived.

5. CONCLUSION

The remarks made in the previous three sections in no way imply that neo-classical general equilibrium theory is regarded as an adequate theory for understanding competitive, let alone non-competitive, forms of capitalism. What they do imply is that this neo-classical theory is a powerful instrument for assessing claims made about a world which falls within the ambit of its assumptions. All the arguments considered in the above three sections meet this requirement. And while economists continue to develop economic theory within such a context it is likely to remain so. Hahn, in particular, has stressed this role of general equilibrium theory and has done so with great clarity, (Hahn, 1973 and 1971). The point may be re-expressed in an analogy. Any competitor who met Rocky Marciano, within the rules of his game, came off very badly indeed. However, this did not mean that Rocky was the greatest outside the confines of the boxing ring. Neo-classical general equilibrium theory is very like Marciano.

*imply leave
the framework?*

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