CAPACITY UTILISATION, EFFECTIVE DEMAND

AND UNSTEADY GROWTH

by

Maurizio G.G. Caserta

University College London

University of London

A dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the University of London, 1993.

ProQuest Number: 10045556

ProQuest 10045556

Abstract

Regimes of economic growth with abnormally high or abnormally low degrees of capacity utilisation constitute the main analytical subject of this thesis. The theoretical explanation provided for this subject centres upon the interplay between demand and investment. Three strands of theoretical investigation are called into question in connection with this subject: a) Keynes and Harrod; b) the Steindl-Kalecki inspired literature on the capacity utilisation model; c) the Sen inspired approach to economic growth based on a multiplicity of growth regimes. Both Keynes and Harrod studied aspects of the interplay between demand and investment. The Steindl-Kalecki models of growth allow for different from normal degrees of capacity utilisation. Finally the Sen inspired literature is relevant because a regime of growth with abnormal capacity utilisation cannot be credited with long-term status, but more naturally belongs to an approach to growth which admits of a number of growth regimes.

The theoretical innovation which this thesis suggests is the introduction of the concept of the medium term in the theory of economic growth as an independent construct. It is precisely by doing so that the interplay between demand and investment can be given a new role and that specific questions which remain open in those areas of investigation can be solved. All this is achieved by connecting non-normal degrees of utilisation with that part of investment demand which is designed to alter the average scale of capacity, while the capability of the system to grow over time is taken for granted. When such a separation is obtained it becomes clear that the capacity adjustment process gives rise to a process of growth worth studying for its own sake. The equilibrium rate of growth which can then be identified is a medium-term equilibrium with realised expectations.

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INTRODUCTION

1.1. *The starting point*

In a report article on a 1958 conference on the theory of capital Hicks commented on

the two approaches to capital accumulation then prevailing and questioned the conclusion

that one should necessarily be right and the other wrong. The line of division was drawn

between those who regard accumulation as being controlled, to some extent and in some manner, by something like a rate of interest - and those who regard this effect as so unimportant that their theory must run predominantly in other terms.[1]

The basic argument of the latter school, which Hicks named 'accelerationist school' while

he called the former the 'production function school', is that investment is not controlled

exclusively by the interest rate,[2] but rather is more fundamentally explained by the need

to adjust the capital stock to the current or expected level of output. Although this

mechanism would not be rejected by the 'production function' theorists for short-period

purposes, it is proper to the 'accelerationist' view that it operates in the long period, too.

Behind these two mechanisms, *viz.* the interest rate and the stock adjustment

mechanism, lie two different visions of growth. Growth is viewed by the 'production

function' theorists as ultimately determined by exogenous factors, like the availability of

resources, while 'accelerationists' place the emphasis on investment demand as the main

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[1]Hicks (1960), p. 126.

[2]The association of the 'production function school' with the role of the rate of interest in investment is only one among different possible associations. The other notable one is, of course, that between the role of the rate of interest in investment and Keynesian theory. In this context the importance of the rate of interest in explaining investment does not derive from the production function, but from the cost of borrowing. Since monetary factors do not explicitly figure in our story, this alternative association was not taken into consideration.

determinant of growth. Thus, a more satisfactory explanation of the accumulation process should have included, according to Hicks, both the role of effective demand and that of factors of production. The problem was clearly one of making the principle of effective demand compatible with the theory of value and distribution. This state of affairs would correspond to Joan Robinson's 'golden age', when animal spirits make entrepreneurs invest just the amount required to let the economy grow at the natural rate.

Thirtyfive years later it is safe to say that no such theory of accumulation exists. Neoclassical growth theory has failed to incorporate independent investment behaviour into a general model which retains its neoclassical nature, thus reaching the conclusion that no account can be given within the neoclassical context of entrepreneurial investment propensities. Post-Keynesian growth theory, for its part, with the emphasis on effective demand, has had to live with the divergence of the warranted rate from the natural growth rate. One is led to ask, therefore, whether such a theory of accumulation is possible and, indeed, whether there is a real need for it. After all Joan Robinson presented the golden age as a "mythical state of affairs not likely to obtain in any actual economy".[1]

A more fruitful approach would be one that admits of a number of growth regimes, each of which is associated with a different state of the world, defined according to what is acting as the dominant determinant of growth. The main implication of this approach would be the particular use of the equilibrium methodology. Although each particular model would yield an equilibrium solution, an eye would be constantly kept on the changes in the outside world, assumed immutable for the purpose of the model, and also on the changes which might result from the operation of the model itself. Changes from within would thus be accompanied by changes from without the model, the ultimate aim being to mimic history as closely as possible.

The growth theorist who has stressed the importance of approaching growth theory from this point of view more than anybody else is Joan Robinson. The following quotation shows which approach she favoured:

An economy may be in equilibrium from a short-period point of view and yet contain within itself incompatibilities that are soon going to knock it out of equilibrium. ... Or it may be in equilibrium also

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[1]Robinson (1956), p. 99.

from a long-period point of view so that the position will reproduce itself, or expand or contract in a smooth, regular manner over the future, provided that no external disturbance occurs. The path that the model then follows appears exactly like the equilibrium path, but is still an historical, causal story that has to be told - the economy follows the path because the expectations and behaviour reactions of its inhabitants are causing it to do so. (Robinson, 1962, p. 26)

A clear difference is therefore established between a model which moves in logical time and one which moves in historical time. While in the former equilibrium relations do not imply any causal mechanism, in the latter it is such a mechanism which gives any sense to the model. In her view, although much can be learned from 'logical time' models, to actual relations one can only apply the 'historical time' kind of models, for such models are based on "the interactions of the behaviour of human beings within the economy".[1] Equilibrium can follow from these interactions, but, unlike 'logical time' models, it is not intended to represent a situation where individual plans of maximizing agents are mutually consistent. Instead, it is an equilibrium where an irreversible set of expectations and behaviours is allowed to work itself out, while nobody, despite being able to do so, wants to change his behaviour. Of course, such expectations and behavious could also spark off a chain of reactions. This is precisely what causal analysis is best suited to handle.

As is well known, a list of possible "historical" models was compiled by Robinson herself.[2] Including the mythical golden age, these growth regimes describe what are in fact potential disequilibrium situations, that is, situations where the inherent conflict might, at some point in time, drive the system out of equilibrium. The main causal factor in these models is desired growth, that is, 'the desire of firms to accumulate'. Their main problem is the relation between desired growth and possible growth. The rate of growth "resulting from the 'animal spirits' of the firms" may not be sustainable when "the rate of growth made possible by physical conditions" does not happen to coincide with it. This is certainly the case when desired growth is higher than possible growth, with the implication that these models cannot be credited with short-period stability. However, the reverse situation is entirely possible. "A steady rate of accumulation of capital may take

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[1]Robinson (1962), p. 26.
[2]See the chapter "Desired and possible growth" in Robinson (1962).

place below full employment." (Robinson, 1962, p. 53) Animal spirits are here allowed to work themselves out, and nothing prevents the maintenance of that rate of growth for some length of time. Equilibrium may be said to prevail. This is what is described as a *limping golden age*.[1] But steady growth below full employment can also be the result of a different causal factor, when a given real wage sets a limit to the possible accumulation rate. Both desired and possible growth are here constrained by an organized labour force opposing any fall in real wages. This is the so-called *bastard golden age*.

It appears therefore that among several causal structures, one can detect a certain number of them which, because of the degree of the stability they show, look like equilibrium models. Such degree of stability will make economic analysis possible and even put the theorist in a position to enunciate contingent 'economic laws'. However, departures from that stable pattern should not be viewed as departures from equilibrium, for this is an essentially non-equilibrium approach. Containment and disruption are parts of the same historical process: one cannot separate equilibrium from disequilibrium analysis. The forces which cause a system to be in equilibrium are not necessarily different from those which drive the system out of equilibrium. As Robinson put it: "the economy follows the path because the expectations and behaviour reactions of its inhabitants are causing it to do so".[2] It is the expectations and behaviour reactions of the same inhabitants which can cause the economy to move away from equilibrium.

When it comes to conducting economic analysis, a strong bias towards 'equilibrium models' is something which is usually difficult to resist. In this respect, this work does not depart from the usual practice. In particular, while Joan Robinson was trying to make unemployment of labour compatible with a steady rate of growth, we will direct attention to a growth regime, repeatedly presented in the literature since its first version (Rowthorn, 1981), where other than full utilisation of capacity is compatible with a steady rate of growth. While a fair amount of work has been done on extracting the

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[1]"The limp may be of various degree of severity. When output is growing less fast than output per head, the level of employment in organized industry is falling as time goes by. When output is rising faster than output per head, employment is increasing. It may be increasing faster than the labour force is growing (so that the system is heading towards full employment) or more slowly so that the ratio of non-employed to employed workers is growing." (Robinson, 1962, pp. 53/54)

[2]See previous quotation.

contingent economic laws of this growth regime, the issues of its underlying nature and of its foundations have remained largely ignored. It is not clear, on the one hand, what is the nature of this regime in terms of a possible taxonomy of growth regimes and, on the other, what notion of human agency is associated with it. This work will make a contribution in both the issues mentioned. On the one hand, the notion of the medium term will be introduced in order to offer a more adequate characterization of the model. On the other, it will be suggested that firm foundations can be found in a strand of thought which draws on Robinson and many other contributions, including Keynes and, in particular, his view on probability and knowledge.

1.2. *Methodological issues*

The emphasis which Joan Robinson has placed on the role of the expectational and behavioural parameters clearly exposes the analysis to the risk of indefiniteness. Among those who have pointed to this risk is Alan Coddington who, in his book on Keynesian Economics, referred to this approach as "fundamentalist Keynesianism". There he argued that uncertainty and subjectivism, which feature prominently in that approach, might lead to the denial of any theory if they are taken to the extreme.

The post-Keynesians are quite happy to make appeals to uncertainty in so far as this enables them to drive a wedge between behaviour and circumstances in some cases; but if the wedge were to become comprehensive, they would be left with no theory at all, all behaviour would appear equally capricious and unintelligible. (Coddington, 1983, p. 61)

What would be required, then, to make this approach analytically useful at all is something which tames its alleged subjectivism. The question is that it is not altogether clear whether such criticism can be levelled against Robinson.

As is well known, Joan Robinson viewed her theory of growth as an extension to the long period of Keynes' *General Theory*. In reconstructing Keynes' contribution to economic theory, she wrote:

On the plane of the theory, the revolution lay in the change from the conception of equilibrium to the conception of history; from the principles of rational choice to the problems of decisions based on guess-work or on convention. ... Keynes drew a sharp distinction between calculable risk and the uncertainty which arises from lack of reliable information. Since the future is essentially uncertain, strictly rational

behaviour is impossible; a great part of economic life is conducted on the basis of accepted conventions. (Robinson, 1979, pp. 170/171)

It is clear therefore that Robinson recognized the role of conventions as crucial to Keynes' approach.[1] But such importance is also stressed with respect to her own work. In her 1962 book she wrote:

To build up a causal model, we must start not from equilibrium relations but from the rules and motives governing human behaviour. We therefore have to specify to what kind of economy the model applies, for various kinds of economies have different sets of rules. (p. 34)

Hence subjectivism is not entirely untamed in Robinson's work. Human behaviour may not be left unexplained and free to change in a capricious way. It is, in fact, somehow constrained within rules and conventions.[2] But such reference to rules and conventions does not turn the analysis into a deterministic one, for a third alternative is available. Between the extreme subjectivism à la Shackle where even short-period analysis becomes problematic, and long-period analysis, like that advocated by neo-Ricardians, where subjective factors are entirely constrained by the social and institutional structure of the economy,[3] a more satisfactory approach is possible. This third alternative, which is obviously not entirely coincidental with Robinson's view, is advocated by Hodgson, who is worth following at some length.

A more plausible view is that there are external influences moulding the purposes and actions of individuals, but that action is not entirely determined by them. The environment is influential but it does not completely determine either what the individual aims to do or what he or she may achieve. There are actions which may be uncaused, but at the same time there are patterns of behaviour that may relate to the cultural or institutional environment within which the person acts. Action, in short, is partially determined, and partially indeterminate; partly predictable but partly unforeseeable. The economic future is still uncertain, in the most radical sense; at the same time, however, economic reality displays a degree of pattern and order. (Hodgson, 1991, p. 177)

Such an approach goes beyond the short period in that an attempt is made to explain human behaviour by reference to conventions and institutions. A short-period analysis

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[1]See also Feiwel (1989), p. 41.

[2]Nell argues (Nell, 1989) that, despite Robinson's approval of this general approach, she never applied it to her growth analysis. In this essay, Nell distinguishes between steady growth and transformational growth. In the former notion, accumulation is viewed as a process of expansion of the productive potential of the economy; in the latter, accumulation is viewed as a process of transformation. Capital, as well as being a set of productive goods, is also a way of organizing production. "Accumulation then implies the transformation of institutions as well as production" (p. 377).

[3]See Carvalho (1984/85), where different post-Keynesian approaches are classified according to the adopted concepts of short and long run.

would start from a given behaviour and work out the effects of that. At the same time it does not slip into the long term, in that such conventions do not constitute an immutable background against which individual behaviour is modelled, for individuals can change those conventions and norms. The same purposeful individual decides whether to retain or to discard the rule. What is to be investigated therefore is what makes individuals retain a given rule of behaviour and what makes them abandon it.

This approach is what Lawson has called 'societal interactionism',[1] which implies that while the notion of intention and deliberation, and the individuals' power to choose, are retained, the knowledge of social practices such as conventions and institutions is precisely what puts individuals in a position to choose. When rules and conventions ensure some degree of continuity and stability in human affairs, meaningful economic analysis becomes possible and 'equilibrium models' can be constructed. However, the institutionalist foundations[2] of these models must be constantly stressed, so that it becomes clear that such a state of stability can come to an end when the existing conventions or social practices are disrupted for whatever reason.

That conventions play a crucial role in Keynes' economics was stressed earlier. What is to be stressed now is that they can be justified on the grounds of Keynes' wider methodological stance as is developed in the *Treatise on Probability*. That this work should be viewed as embodying Keynes' general methodological prescriptions is not a widespread conviction, but one which is gradually gaining ground. Comprehensive works like Carabelli (1988), Fitzgibbons (1988) and O'Donnell (1989) all share the view that Keynes' work on probability is not a technical work in the field of logic, unconnected to his other writings, but one which spells out Keynes' scientific method to which he held more or less consistently throughout his scientific life.

In the *Treatise on Probability* Keynes distinguished his approach to probability not only from the frequency theory, which held that probability was a property of events,

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[1]Lawson, 1985.
[2]Hodgson, in the above-mentioned essay, dissatisfied with the available alternative theoretical foundations for post-Keynesian theory (the Sraffian, the behaviouralist and the Shacklean), suggests as a feasible alternative to turn to institutional theory of the old type. (See the essay 'Institutional Economic Theory: the Old versus the New' in Hodgson, 1991.)

while he thought that one could only speak of probabilities of propositions, but also from the theory of subjective probability. He held that, although the evidence on which individuals base their probability relations depends on subjective factors, the probability relation itself, which implies that a rational belief of a certain degree is attached to a given proposition, is objective in character.

What we know and what probability we can attribute to our rational beliefs is, therefore, subjective in the sense of being relative to the individual. But given the body of premisses which our subjective powers and circumstances supply to us, and given the kinds of logical relations, upon which arguments can be based and which we have the capacity to perceive, the conclusions, which is rational for us to draw, stand to these premisses in an objective and wholly logical relation. Our logic is concerned with drawing conclusions by a series of steps of certain specified kinds from a *limited* body of premisses. (CW, VIII, p. 19)

Such nature of the probability relation became very soon the source of some controversy. Ramsey in his essay "Truth and Probability" (1931) criticized Keynes precisely on this point, arguing that

the relations which justify probable beliefs are probability relations, and it is nonsense to speak of them as being justified by logical relations which we are, and must always be, incapable of comprehending. (p. 164)

Carabelli argues, however, that "Keynes did not usually adopt the term 'logical' in the sense of formal logic, but in the sense of ordinary language logic" (Carabelli, 1988, p. 23).

The important implication of this is that, since conventions and norms fall within the realm of ordinary language logic, it becomes possible to ground the institutionalist approach on a more comprehensive theory of knowledge. A convention usually consists in a rule of behaviour which has informational content. By observing any such behaviour one may be able to extract the knowledge required in order to get by. One could thus set up an argument, i.e. a probability relation, on the ground that other individuals, by behaving in that particular way, show support for that argument. Even if direct relevant evidence on which to ground particular conclusions is unavailable, individuals may still be (and usually feel they are) in a position to attach a rational belief of a certain degree to a particular proposition, just because it appears to be a generally accepted argument. A convention may also consist in a rule of arguing: it may be generally believed, for example, that the future will conform to the present, unless relevant evidence to the

contrary exists. So when it comes to predicting the future value of some economic variable, one could simply argue that it will be exactly like the present value.

Such arguments, although not conclusive, can all be said to be made according to some logic. As Carabelli argues[1], such logic does not derive its legitimacy from other conventional logical primitives. In Keynes it is the probability relation to be primitive. This point is made right at the beginning of the *Treatise on Probability*.

We cannot analyse the probability-relation in terms of simpler ideas. As soon as we have passed from the logic of implication and the categories of truth and falsehood to the logic of probability and the categories of knowledge, ignorance, and rational belief, we are paying attention to a new logical relation in which, although it is logical, we were not previously interested, and which cannot be explained or defined in terms of our previous notions. (CW, VIII, p. 8)

The fact that a particular argument is logically sound (according to Keynes' notion of logic) does not mean, of course, that one has always a compelling argument against any conclusion different from the generally accepted one. This would be possible if reference were constantly made to a set of logical primitives to sustain the legitimacy of any given proposition. So what gives legitimacy to any alleged 'logical' argument? A tentative answer could be the following.

Any society develops its own ways of thinking and of organizing thought and as an orderly organization survives precisely because of them. If there were no accepted 'fundamental logic', there would be no society to speak of. If individuals decide not to live in isolation, it is part and parcel of their decision to absorb that fundamental logic. Parts of this logic can be obviously found to be faulty. But it is certainly the case that checks against observed reality or against a superior principle of knowledge cannot be carried out on a continuous basis. It could also happen that when these checks become possible they are no longer relevant as a guide to future behaviour. It follows that before an accepted piece of knowledge is discarded, it is that piece of knowledge that individuals use and mould their behaviour on. It is also that piece of knowledge that they expect other individuals to use and act on. Perhaps it is because of the following reason that this fundamental logic can be said to be primitive. It is because the propositions to which it

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[1]See Carabelli (1988), p. 29.

gives rise are more in the nature of hypotheses, and hypotheses are generated independently of theories.

With these ideas on knowledge and behaviour in mind it is now possible to move on to the subject matter proper to this thesis.

1.3. *The capacity utilisation model.*

When in his 1939 Essay Harrod states that

the warranted rate of growth is taken to be that rate of growth which, if it occurs, will leave all parties satisfied that they have produced neither more nor less than the right amount (p. 16),

a problem arises as to whether all parties are satisfied with the current rate of growth or with the currently available capacity. The right amount of production is that which equates saving and investment, and there is no obvious reason why it should also imply normal capacity utilisation. Thus a degree of over- or under-utilisation of capacity may be associated with the warranted rate of growth. This points to the possibility that, whenever both aspects of investment, its demand-generating and its capacity-creating aspects, are taken into consideration (as one must in a growth context), a failure of coordination between the two aspects results. The central question of this work is whether one can make sense of this situation without dismissing it as intrinsically unreasonable. Is this problem of coordination so difficult to resolve that the parties involved come to accept a different level of coordination? In order to answer this question one has to look at the conditions required for a full coordination of the two sides of investment, and if these conditions turn out to be too stringent, see whether a different level of coordination is conceivable.

It must be stressed that this is not a typical short-term problem where variations in investment result in a different degree of utilisation of existing capacity. The problem is one of whether a given rate of investment gives rise to an increase in productive capacity compatible with the increase in demand resulting from that constant rate of investment. The importance of this problem is emphasized by Domar who, in his book of *Essays in the Theory of Economic Growth* (1957), points to the recognition of the dual character of

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investment as the necessary step for the understanding of the failure to maintain full employment.

...if we just reflect that an increment in capacity is related (however roughly) to investment, while an increase in aggregate demand is connected with the rate of growth of investment, and that therefore a continuous growth in income, and most probably of investment, is required to keep the economy on an even keel, the nature of the capitalist system and the difficulty of its maintaining full employment year after year will become easier to understand. (Domar, 1957, p. 34)

Elsewhere in the book Domar writes:

to ignore the dual character of investment process is quite unnecessary, since the recognition of both attributes on Keynes's own level of abstraction can be easily made by means of a simple (differential) equation, the solution of which yields the rate of growth of investment and/or of national income that is required to keep the two effects of investment in balance. This rate is shown to be the product of the propensity to save and the average productivity of investment. (ib., pp. 6/7)

Thus the problem is clearly stated and a solution provided.

Two comments must be made here. First, Domar assumes that investment and capacity are only roughly related. The reason for this is that factors other than capital are also important in determining the change in productive capacity: natural resources, the labour force and the state of technique. Following Harrod, throughout this work only the relation between investment in capital and capacity is considered. Consequently, capital utilisation and capacity utilisation can be viewed as synonymous once an appropriate measure for capacity has been devised. Second, although Domar recognizes that no guarantee exists that investment grow at a rate compatible with a capacity-demand balance, he does not attempt to accommodate a Keynesian investment function into a coherent growth model. Indeed, Domar solves the duality problem by doing away with one of the two aspects of investment, namely, as an autonomous income-generating instrument.

Unlike Domar, Harrod gives a not unambiguous account of the problem, but he does not ignore the demand aspect of investment. That this is the case appears from different passages in the 'Essay', where Harrod says that the desired amount of capital per unit increment of output does not depend only on the technology, but on other conditions, too, like the state of confidence, the rate of interest, etc. Thus if the parameter C, in Harrod's fundamental equation, is not an exclusively technological parameter, the

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warranted rate of growth as determined by $\frac{s}{C}$ (where s is the propensity to save) will

imply a rate of utilisation of capacity different from the technologically determined one.

Let us suppose, for instance, that the parameter C decreases because of a lower

degree of confidence. This means that for a given increase in demand, investment will be

smaller. But since the propensity to save has not changed, the rate of growth required to

bring saving and investment to equality is clearly higher. The way the higher rate of

growth is established is through a higher degree of capacity utilisation. Along this path

what investors will be satisfied with is investment as related to demand and, hence, to

capacity utilisation. However they cannot be satisfied with the current degree of capacity

utilisation which will turn out to be higher than expected.[1] That this is not ruled out is

also shown by the following passage;

> In other words, it matters not whether we regard the increment of capital as required to support the increment of total output in the same period or in the one immediately succeeding it. (Harrod, 1939, p. 20)

In the former case, we have that the capacity for the current level of demand is not yet

available, with the result that emphasis can be placed not on the desired capacity-output

ratio, but rather on the relation between investment and output or utilisation. The question

is now whether this can be treated as a warranted rate or not. In Robinson (1962) there is

one answer to this question:

> The existence of a warranted rate of growth means that the relationship between technical conditions, the propensity to consume and the eagerness of firms to achieve a normal degree of utilisation, is such that there is a particular degree of over-utilisation of plant which will cause such an amount of investment to be undertaken as will generate such a level of effective demand as will keep the stock of plant over-utilised to just that extent as it grows. (p. 84)

It is possible to elaborate on Robinson's statement and try to explain why non-normal

utilisation and steady growth may not be incompatible. One could argue that investors

need only be satisfied with the rate of growth they are carrying out, regardless of whether

capacity is being utilised at its normal level or not. The balance between the two sides of

investment would be simply ignored; what matters would be investment only as a

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[1]It might surprise that a lower degree of confidence leads investors to face a problem of higher demand and utilisation. In fact, here we are comparing positions of equilibrium and are not addressing the question of how the system moves after a change in the degree of confidence.

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component of aggregate demand. Alternatively, it could be assumed that the expected degree of capacity utilisation is no longer exogenously determined, with the result that the divergence between the current and the expected or normal degree of capacity utilisation would no longer be inescapable. What this basically amounts to is a recognition on the part of individual investors that the dual role of investment poses serious problems and that a balance between the income-generating and the capacity-creating aspects of investment is generally impossible to achieve. In more practical terms, it implies that investors realise that however fast they increase capacity, demand will grow faster, or that however much they slow down accumulation, demand will grow slower. From that realisation may come the conviction that the degree of capacity utilisation is an entirely endogenous variable. Both explanations allow us to envisage particular applications of the principle of effective demand beyond the short period, and thus growth regimes where the desired relation between investment and output has pride of place over that between capacity and output.

Keynes' remark on long-term expectations is well known: "it is of the nature of long-term expectations that they cannot be checked at short intervals in the light of realised results" (CW, VII, p. 51). The first explanation can be viewed as resulting from taking this remark to the extreme. If investors believe that realised results are of no relevance whatsoever to decide whether to carry on with the same investment policy or not, they may want nevertheless to resort to some other indicator to provide a guide for investment decisions. The degree of capacity utilisation might be chosen, for example. In this case investment demand will be defined in terms of that degree, so that whenever capacity utilisation stays constant over time, the rate of investment demand will be constant, too. Since capacity utilisation depends on investment through the multiplier, one has a framework where Keynes' remarks of a longer-run flavour, like the idea that the economic system is not violently unstable,[1] can find their appropriate place.

The second explanation does not do away altogether with the need to check long-term expectations. While in the first case normal utilisation ceases to be a condition of

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[1] CW, VII, p. 249.

equilibrium and becomes just a benchmark, in this case normal or expected utilisation is allowed to change so that it can retain its role as a condition of equilibrium. While there the principle of effective demand is stretched so that it can work in the longer period[1], too, here it can be redifined as the principle of effective demand per unit of capacity. In the same way as demand affects production in the short period, so in the longer period demand factors affect the degree of capacity utilisation. By forming expectations on the level of effective demand per unit of capacity, investors will be in a position to decide whether to invest or not, and, more importantly, to check whether their expectations are correct or not. It follows that only if expectations are fulfilled, will investors carry on with the same rate of accumulation. This would not be true in the first case, where fulfilment or disappointment of expectations plays no role at all.

Steady growth might result, then, even if different-from-normal degrees of capacity utilisation prevail. The exact meaning of this proposition is as yet probably unclear. However, through the development of the ideas just sketched a clearer understanding of the nature of this growth regime will become possible. Whether such development can be associated with Harrod's dynamic theory is a question which will not be taken on here. It would not be impossible, though, to interpret some of Harrod's theoretical propositions in the light of the developments offered here. Another strand of thought has been chosen, instead, as the natural background for the discussion on capacity utilisation and growth. In fact, Harrod's supposed attempt to model a growth regime where a fully operational Keynesian effective demand has pride of place has not remained isolated.

It was Steindl[2] who, first and foremost, stressed the possibility that growth could be associated with constantly lower-than-normal rates of capacity utilisation. The main reason for that, in his view, was the downward rigidity of profit margins typical of

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[1]The question of the difference between the concept of the long period and that of the long run has not been addressed here. While long-run analysis concerns processes which take place in real time, long-period analysis concerns economic processes which would take place if particular assumptions were made or particular restrictions removed, and if enough time was allowed for the forces underlying those processes to display their effects. (See Carvalho, 1990, for an interesting discussion of this issue). This thesis is definitely about the tension between these two types of processes. However, that tension has not been presented here in terms of the distinction between long-run and long-period values. There might be cases, therefore, where the terminology used does not reflect exactly this dichotomy.
[2]Steindl (1952).

oligopolistic market structures, for rigid profit margins would prevent consumption from making up for investment in case of a fall in investment demand. The situation is further aggravated by the fact that a larger amount of unplanned excess capacity discourages investment. Whether such a cumulative process converges to a limit or not remains open to question in Steindl's analysis. If it does not, the process may involve a continuing decline in the rate of growth.[1] It seems, however, that the existence of such a limit is of no great relevance in Steindl's analysis, for what he is particularly interested in is the movement of the system through time, which he investigates by looking at a succession of short periods.

So while he singles out rigidity of profit margins as the main cause of the imbalance between the income-generating and the capacity-creating aspects of investment, he is not prepared to build a simple growth model where the macroeconomic outcome is consistent with its behavioural assumptions. Investors, in his view, aim at a particular degree of excess capacity and, whenever current excess capacity deviates from the planned degree, adjust their investment decisions in the expectation of restoring that level. In a competitive setting, this would be achieved by means of flexible profit margins, which, in the case of a fall in demand, would be reduced and, hence, drive marginal firms out of the market. In an oligopolistic setting, the attempt to restore planned capacity may be constantly frustrated by a rigid profit function, which implies that a lower level of demand is shared by the same number of firms, with the result that the further negative effects on investment cannot be avoided.

It is interesting that Steindl, in his 1979 article, should say that Harrod's growth model is very similar to his 'maturity theorem', as both explain recession by pointing to the fact that the economy's saving ratio rather inflexibly adjusts to low growth rates, with the result that low rates of capacity utilisation usually follow. There remains the problem, however, of what competitive structure Harrod had in mind, and what use he was making of the equilibrium method.[2]

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[1]See Steindl (1952), p. 225. See also Steindl (1979) where his 'maturity theorem' is briefly summarized.
[2]For these questions see Kregel (1980).

Mark-up pricing and the equilibrium method are undoubtedly adopted by a number of models which can be grouped under the heading of 'capacity utilisation models'. As mentioned earlier, Rowthorn offered its first version in 1981. Others have then used the same framework to account for demand-led growth. The most prominent feature of these models is that the degree of capacity utilisation is endogenously determined and serves as the main macroeconomic equilibrating mechanism. The problem is that in most of them the behavioural assumptions are similar to Steindl's, i.e. firms aim at a particular degree of excess capacity. But while Steindl stressed the conflict between the macroeconomic outcome and the microeconomic assumptions - in fact, it played a crucial role in explaining the tendency of the economy - in the capacity utilisation models this conflict is somehow removed, and not properly resolved. And this is obviously crucial in a model which claims internal consistency.

There are two ways in which this conflict can be handled: either by allowing it to explode and then working out its consequences, or by looking for the conditions, if they exist, that justify its containment. In fact, these two procedures are not incompatible. As mentioned earlier, containment and disruption are parts of the same historical process, so any comprehensive investigation must include both. Here emphasis will be placed on containment, but whenever possible attention will be paid to the fact that more often than not containment is just preparation for change. Since the focus is on containment, equilibrium positions will be studied. This implies that the macroeconomic outcome is not incompatible with the behavioural assumptions of the model. It will be argued that the capacity utilisation models originate from a model which can be described as medium-term in character. It will also be argued that they can find proper foundations in the institutionalist approach. It will be shown that the two above-mentioned extensions of the principle of effective demand offer an interesting solution even when we move from Harrod to Steindl and his followers.

1.4. *The medium term*

The foregoing discussion has presented rather intricate material, mainly because it concerns issues which are not short-term issues, but, at the same time, they are not long-term issues either. The way to unravel this material is to introduce the role of the medium term and of medium-term expectations. In fact, this thesis can be said to be an essay on the meaningfulness of the medium term.

In an illuminating article, Kregel (1976) showed how Keynes wrestled with the intractability of time and how he eventually managed to tame it. By fixing long-term expectations Keynes could illustrate the operation of the principle of effective demand in the short period. However, he managed not to rule out altogether that short-term occurrances, like the disappointment of short-term expectations, could affect long-term expectations. It is possible to show that Keynes' methodology can be extended to growth theory. In particular, by fixing long-term expectations, one could illustrate the operation of the principle of effective demand in the medium term, without having to assume that long-term expectations are totally independent of disappointment of medium-term expectations. But what do we mean by medium-term expectations?

In Keynes' analysis, long-term expectations concerned the long-period profitability of investment as reflected in the schedule of the marginal efficiency of capital. Since realisation of long-term expectations is not an issue in Keynes' analysis, there was no need to distinguish between long-term and medium-term expectations. In this context such distinction is crucial. Long-term expectations proper concern the profitability of investment in conditions of normality, i.e. once capacity has completely adjusted to demand. Medium-term expectations concern the profitability of investment as a signal that current capacity is inappropriate. When capacity is adjusted to demand these profits will be obviously equal to zero.[1] If there is a shortage of capacity, super-normal profits will signal that more capacity is required; if there is excess capacity, lower than normal profits will signal that some capacity must be phased out. If adjustment is not instantaneous non-normal profits can be reproduced through time. It will become possible then to associate

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[1]This does not necessarily imply that overall profits are equal to zero.

to the time-run during which adjustment is carried out but not completed a theoretical construction representing a situation where capacity is not fixed, but it is not completely adjusted to demand either. Such construction is the medium term. Correspondingly, the medium run is the above-mentioned time-run.

As is well known, Kregel's argument is that Keynes had in mind three different models of the economy, one of static equilibrium, one of stationary equilibrium and one of shifting equilibrium. The model of static equilibrium was designed to show that the operation of the principle of effective demand had nothing to do with disappointment of expectations. Here long-term expectations are fixed and short-term expectations are realised. In the model of stationary equilibrium, short-term expectations are allowed to be disappointed, but the process of re-establishing equilibrium will not be disrupted by a change in long-term expectations. Finally, such disruptions are not ruled out in the model of shifting equilibrium. Here, Keynes' model "will describe an actual path of the economy over time chasing an ever changing equilibrium - it need never catch it" (Kregel, 1976, p. 217).

As mentioned earlier, realisation of long-term expectations was not an issue in Keynes' analysis. Chick explains why:

Equilibrium relating to the investment decision would imply, by analogy, that long-term expectations are met. This does not figure in our story, for three reasons. One is that even if the relevant expectations were precise, they would take a long time to be confirmed or falsified. To consider them would require extending the analysis beyond the short run. The second is that the expectations cannot be judged before the new plant and equipment are working, by which time the firm can do little to reverse its decision. ... The third is that the success of an investment has little bearing on the calculation of whether to repeat it later on; too many factors will have changed in the interim. (Chick, 1983, p. 22)

Traditionally, equilibrium growth theory has been associated with realisation of long-term expectations. Such a context, therefore, may not be seen as providing an entirely satisfactory framework for a proper treatment of Keynesian themes. There is a middle ground, however, where Keynesian themes and growth theory may not be at odds. The medium term, instead of the long term, can become the focus of the analysis. Then, Keynes' procedure, as reconstructed by Kregel, can be applied in an analogous way.

To the static model would correspond a model where, given long-term expectations, medium-term expectations are always realised. Investors will find that they are investing

or disinvesting exactly what is required by the current signal of inappropriate capacity. This means that investment decisions are producing a degree of capacity utilisation and a rate of profit which are precisely the degree of capacity utilisation and the rate of profit which justify that amount of investment.[1] Expected and current utilisation thus coincide and so do expected and current medium-term profits. No check is however carried out for long-term profits and their corresponding degree of capacity utilisation (normal degree).

When investors observe, through the variation of the chosen signal, that the degree to which capacity is not adjusted to demand varies, they will change their investment decisions until a position of equilibrium is reached. At this point the degree to which capacity is not adjusted to demand is precisely the degree which justifies that investment. The process through which equilibrium is reached is based on a variable degree of capacity utilisation. Provided the sensitivity of savings to capacity utilisation is lower than the corresponding sensitivity of investment, and provided the relevant functions do not shift in either direction, a stable equilibrium will be established. This situation corresponds to Keynes' stationary equilibrium: long-term expectations are fixed, but medium-term expectations are allowed to be disappointed.[2]

Finally, disappointment of medium-term expectations can have an effect on long-term expectations, a situation which corresponds to Keynes' shifting equilibrium model. The fact that the degree to which capacity is not adjusted to demand turns out to be different from expected might have an effect on the expected profitability of investment in conditions of normality. The consequences of this possibility might be as bad as those envisaged by Kregel with respect to Keynes' shifting equilibrium model. There the shifting in long-term expectations, causing the aggregate demand function to shift, might prevent the system from ever attaining the point of effective demand. Here the shifting in long-term investment, causing the investment function to shift, might prevent the system from ever attaining a path of steady growth.

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[1]This is precisely how Joan Robinson describes, in the previous quotation, Harrod's warranted growth rate.
[2]The technical aspects of this analysis will be dealt with in greater detail later.

Once a correspondence has been established between Keynes' procedure, as applied to the short term and as applied to the medium term, it is impossible to escape the following questions: What is the advantage of introducing the notion of the medium term in the theory of growth and why is Keynes' procedure suitable for this kind of analysis?

In most of Keynes' analysis the problem of the long-term tendency of the economy is not addressed. Long-term expectations are exogenous and realised results offer no guide as to how long-term expectations should be determined. Although in the shifting equilibrium model long-term expectations are no longer fixed, there is no assumption as to how long-term expectations should change following a disappointment in short-term expectations. There is no way, then, one can formulate a theory of capital accumulation on these assumptions. In order to have a theory of capital accumulation one needs to have some means of evaluating investment projects incorporated into the model.

Variations in demand or utilisation as a means of evaluating investment projects play a major role in Harrod's knife-edge story.[1] There, decisions on the amount of investment heavily depend on the current level of output or degree of capacity utilisation. However, no equilibrium rate of growth can be restored once the previous equilibrium is lost. Thus despite the explicit consideration of a mechanism whereby investment decisions can be revised, a satisfactory theory of capital accumulation cannot be offered in this case either.

Keynes and Harrod represent therefore two extreme examples in the treatment of the relation between investment and demand. On the one hand there is Keynes' treatment, where investment only very loosely depends on current demand, on the other there is Harrod's[2] where investment depends too strongly on current demand. It is interesting to ask then, given the inadequacy of both approaches, whether, somewhere in between, a growth model based on the relation between investment and demand cannot be devised. It is argued here that it is precisely by introducing the notion of the medium term in the analysis that such a growth model can be obtained.

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[1]Whether Harrod's dynamic theory can be associated with the image of a knife-edge is the source of some controversy. Harrod himself denied that such an association is at all legitimate. (see Harrod, 1973, p. 32) For a discussion on a possible dichotomy in Harrod's dynamic theory, see Kregel (1980).

[2]Again reference is made here to that particular version of Harrod's dynamic theory which has become known as the knife-edge model.

The advantage of the medium term lies in the possibility of separating long-term investment from medium-term investment. While long-term investment is designed to provide for the growth of the system, medium-term investment is designed to create the correct initial conditions, that is, to alter the scale of the system when it is inappropriate. To each of these two notions would be associated the two corresponding notions of long-term and medium-term profits and expectations. The first result of such separation is that now investment depends only partly on current demand. It is also possible to assume that this dependence decreases as demand deviates from the expected level. The worst effects of the knife-edge would thus be avoided. The second result comes from the application of Keynes' procedure, as reconstructed by Kregel, to a situation where the long term-medium term dichotomy is adopted. By assuming constant long-term expectations, an equilibrium rate of growth can be found, where medium-term expectations only have to be fulfilled. As will become clear later on, in such a model investment is made to depend in some specified way on current demand or capacity utilisation and, also, a mechanism exists for evaluating investment projects. An autonomous investment demand function will be shown to be compatible with steady growth.

The reference to steady growth leads us to the final question to be mentioned in this Introduction. Is it possible to speak of steady growth when long-term expectations are given and constant? The answer to this question depends on what notion of steady state one has in mind. If what is referred to is the ontological steady state, that is, a notion of the steady state which is supposed to reflect an intrinsic quality of the economic system, the answer must be in the negative. If the preferred notion is that of the methodological steady state,[1] the answer is certainly in the positive. For, such a notion of the steady state does not confine change and evolution to the occurrance of exogenous events. On the contrary, change might develop from within as the result of the passage of time, or as a result of the resolution of a previously contained conflict. So, although we are studying it

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[1]Such distinction is vividly made in the Introduction to Halevi et al. (1992). "The methodological steady-state is a springboard, a *launching pad*, into the many dimensions of transformational growth. By contrast, the ontological steady-state is a *prison*, a sink which swallows up the products of imagination and conforms them to the timeless abstraction of a one-good, putty world" (p. 4). See also Harris (1978), ch. 2, for a discussion of the different uses of the steady state.

following a steady-state approach, what we are really concerned with is unsteady growth. After all, this is precisely the approach to growth theory Joan Robinson was advocating.'

This approach has a remarkable advantage. By dismissing golden ages as representing mythical states of affairs, and so ruling out growth paths endowed with overall internal consistency, it presents growth as originating from the compatibility of *some* economic relations, while some parameters are kept constant. Thus instead of presenting growth as ultimately tending to a state of perfect harmony, emphasis is placed on some crucial relation which helps explain the current rate of growth. This means that there is scope for the analysis of the possible effects on the constant parameters of the evolution over time of those economic relations. Some kind of path-dependence analysis becomes possible, then. As regards medium-term analysis, it is possible to present it as an example of the steady-state approach to unsteady growth. Some parameters are kept constant while some crucial relation helps explain the current rate of growth. The shifting equilibrium model as applied to the medium term offers also the possibility of studying the effects on the constant parameters of the model of the evolution over time of the capacity utilisation relations.

A fresh interpretation of the capacity utilisation model is offered here, therefore. Unlike the work already available in the literature, where no proper distinction is made⁻ between the medium term and long term, this distinction is stressed here. By doing so, most of the criticisms which have been levelled against the capacity utilisation models can be answered. As a result this body of literature acquires a neater characterization in terms of its methodological stance and its theoretical inspiration.

1.5. *Outline of the work*

An analysis of what has been called a steady-state approach to unsteady growth is the starting point of this work. The reason for it is that it is within this methodological approach that medium-term growth analysis can be placed. This approach rejects mythical golden ages, based as they are on ahistorical compatibilities, and suggests that growth is

better understood if attention is paid to the institutional framework in which growth takes place. This emphasis implies that, in order to explain growth, one must look at the *historical* consistency of a set of economic relations. It follows that different regimes of growth are possible, and that no single model of growth exists. The variety of the institutional and conventional arrangements, which can be established to make that consistency effective, will clearly give rise to a multiplicity of growth equilibria.

During the last ten years increasing attention and analytical efforts have been devoted to this particular approach to growth. However, instead of stressing the historical nature of these models, more attention has been paid to the contingent economic laws which can be extracted from each individual growth regime. Thus instead of locating their inspiration in the work of Joan Robinson, these growth theorists have drawn on a different kind of work. But there is no reason why the emphasis could not be shifted back to the historical nature of the models.

Chapter Two is entirely devoted to the illustration of this more recent approach to growth. Alongside the analytical structure, one aspect of this approach will receive particular emphasis. It is the potentiality which this approach displays with respect to institutionalism. It will also be pointed out that medium-term analysis, which is viewed here as a more appropriate characterization of the capacity utilisation model, is nothing but a special case of a more general model of growth which can be "closed" in many different ways.

Once the methodological setting is spelled out the capacity utilisation question can be taken up. First, it must be shown how a capacity utilisation problem can arise in the theory of economic growth. When such problem does not arise it means that assisting mechanisms exist to prevent it from arising. *Chapter Three* examines these mechanisms and associates them with the first three models studied in Chapter Two. It turns out that a capacity utilisation problem arises when a rather inflexible income distribution prevents effective demand from staying constant in the face of variations in its components. But a capacity utilisation problem can arise even if income distribution were flexible. Provided changes in the level of demand are allowed to manifest themselves through changes in the

degree of capacity utilisation, the adjustment of the economy to a different level of demand, given its long-term rate of growth, might give rise to an independent dynamics worth studying for its own sake. This is particularly true when no clear mechanism is offered explaining how the system goes back to its long-term growth path. Clearly, for no capacity utilisation problem to arise it must be assumed that adjustment is always successful.

Once it is clear how a capacity utilisation problem may arise, and that it can give rise to an independent dynamics, it is possible to turn to the analysis of such independent dynamics and discuss whether a growth regime can be centred on it. *Chapter Four* addresses this question by reviewing the literature on the capacity utilisation model. However, it is not just a survey that is offered in this chapter, for, despite the fact that the capacity utilisation model is about such growth dynamics involving the degree of capacity utilisation, it is not clear in this literature how this growth regime should be made sustainable. The crucial notion of the medium term and of medium-term equilibrium is therefore introduced in the analysis at this point. By separating medium-term from long-term investment, it becomes possible to make sense of the underlying nature of this growth regime and to identify the factors which explain why steady growth could result from it. It will be shown that all contributions in the capacity utilisation literature can be interpreted as elaborations of a fundamental structure, where long-term expectations are given and constant and where medium-term expectations are realised.

The equilibrium implied in the capacity utilisation model, like the other models examined in Chapter Two, is not based on ahistorical compatibilities. Equilibrium results from specific assumptions being made on the prevailing institutional arrangements and on the way individuals acquire knowledge and decide action. *Chapter Five* will address this final question and will specify the assumptions on knowledge and behaviour that can be associated to the capacity utilisation model. Keynes' theory of knowledge and the role of convention in economic analysis will be briefly discussed at this point. It will be argued that the equilibrium implied in the capacity utilisation model is best understood as a conventional equilibrium, that is an equilibrium where knowledge is acquired by means

of a conventional judgement and where action is decided according to such judgement. A

Conclusion will follow.

AN INSTITUTIONAL APPROACH TO GROWTH

2.1. *Introduction*

It was suggested in the Introduction that the difficulty of reconciling full employment growth with the Keynesian principle of effective demand might be overcome by working with more than one growth regime, each of which associated with a particular selection of exogenous and endogenous variables. The nature of this difficulty and the possible use of it to justify an analytical approach which admits of a multiplicity of solutions is precisely the subject matter of an article Sen published in 1963, and which has become more recently the source of inspiration for a number of growth theorists.

What Sen clearly demonstrates in this article, which focuses on distributional problems rather than on growth, is that the difficulty referred to above lies fundamentally in a problem of overdeterminacy. This means that the number of unknowns is smaller than the number of equations. Such overdeterminacy, which Sen demonstrates for the short period, will reappear later when a dynamic context is considered. The main proposition is the following: it is not possible to satisfy simultaneously an investment function independent from saving, full employment of capital and labour, and the marginal productivity theory of distribution.

Sen uses the following equations:

(a) $$X = X\,(L^*, X^*)$$

(b)

$$w = \frac{\delta X}{\delta L}$$

(c)

$$X = \pi + wL*$$

(d)

$$I = s_p\pi + s_w wL*$$

(e)

$$I = I*$$

(a) is a production function where X is the flow of the only good produced; $L*$ the amount of labour available in the economy and $X*$ the stock of capital in existence. This is made up of the same good. (b) says that the wage rate must be equal to the marginal product of labour. (c) requires profits and wages to exhaust the product. (d) requires investment to be equal to total saving. In this equation s_p and s_w are the marginal propensities to save out of profits and wages, respectively. Finally, (e) represents the independent investment function.

There are five equations, then, but only four unknowns; X, w, π, I. It follows that either an equation should be dropped or a further unknown introduced. As is well known, neoclassical theory overcomes the overdeterminacy by giving up the independent investment function. But marginalist distribution can be given up, too. If this is the case, as in Kaldor's theory of distribution, changes in the distribution of income can make full employment saving equal to autonomous investment. Giving up equation (d) provides another opportunity to close the system; it can be assumed 'that a pattern of taxes and subsidies always makes the volume of planned savings equal to the autonomously given level of investment $I*$ '.[1] Finally, Sen mentions the 'General Theory model' where full employment of labour is given up, thus making autonomous investment fully operational.

When we move to a dynamic context so that the economy is no longer constrained by a given labour force and a given productive capacity, the same kind of problem reappears. Now an additional equation showing the rate of increase of the labour force

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[1]Sen (1963), p. 57.

over time is introduced and the effect of investment on productive capacity is accounted for. This implies that the above system is augmented by the addition of a further equation and a further unknown, the equation determining the available labour force at any moment in time and the labour force itself, respectively. There is still one equation too many. So full employment growth cannot be made compatible with an independent investment function. Even if it was assumed that investment depended on the rate of interest, there would still be no guarantee that full employment be achieved. The rate of interest would be determined in the market for stocks, as the rate which equates the relevant demand and supply. There is no reason why it should make the flow of investment equal to the flow of full employment saving. Indeed, doing away with marginalist distribution will not solve the problem: it will be shown later that a Keynesian theory of distribution, like Kaldor's, can only make saving equal to the desired investment. For net investment to employ all the new labour force, changes in the capital:output ratio must be brought in.

The approach adopted by Sen in the treatment of distributional problems has been recently revived in the treatment of growth. Works by Marglin (1984a, 1984b), Dutt (1987, 1990) and Taylor (1991) have followed Sen's procedure by starting from a general framework and presenting different growth regimes as different ways of closing the same general framework. This attitude to analysis shows a degree of openness certainly unprecedented in economic analysis, for it is conceded that individual behaviour can be affected by various macroeconomic constraints, which are the result of the current institutional arrangements. Which particular model is relevant at any one time depends on the causal linkages identified at the macroeconomic level. As Taylor puts it:

a model's 'closure' has to be chosen and justified on the basis of empirical and institutional analysis of the economy at hand. Setting closures is impossible unless class structures and economic power relationships have already been defined. (1991, pp. 9/10)

Although Taylor emphasizes the structuralist element in this approach, there is no reason why conventions, norms and routinized behaviour should not be brought in to enlarge the picture. All this, in more practical terms, amounts to deciding on which variables are

going to be exogenous and which ones are going to be endogenous. This decision must be made with the purpose of producing a determinate system, that is, a system which yields an equilibrium solution. This requirement, however, does not turn the analysis into traditional equilibrium analysis, because, as Joan Robinson would say, it is still a causal story that has to be told, a story which can be reversed or have a sequel. So it cannot be ruled out that, at some point in time, 'equilibrium' will be disrupted, and that after a period of adjustment, a new 'closure' will become relevant.

This more institutionally-inclined view of the procedure is also different from the interpretation given by Dutt. In Dutt (1990) the succession of growth regimes together with the reversal or change of causal relations is explained by the fact that different things change at different speeds.

Any particular notion of equilibrium is thus a logical construction which chooses, for whatever reason, to hold some things as data and as not being explained within the model. (p. 9)

As the time-run is lengthened what was given in the previous model can be explained as some other variable becomes exogenous. What Dutt seems to be aiming at, however, is not a general model where more and more variables are explained and fewer and fewer explain, for it may well be the case that what was endogenous in the previous model becomes precisely the explanatory variable. A long-run position of equilibrium where both variables are explained by something else does not interest Dutt, either.[1] It must be the case then that each individual regime or 'closure' represents a particular causal macroeconomic relation which, because of the time element involved, happens to be predominant at any one time, without it being necessarily a step toward a fuller equilibrium. It must be said, however, that Dutt is not altogether clear on these methodological issues. If the account given here reflects his stance, there is still an element of determinism in the assumption that different things change at different speeds, which is not what is being advocated here. For example, is the switch from a neo-Keynesian regime, where distribution is a residual, to a neo-Marxian regime, where the

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[1] "The notion of a particular 'long-run' or 'long-period position' as in classical political economy, is thus not sacrosanct." (ibid., p. 9)

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real wage is the explanatory variable, just a matter of time to allow labour to put into place a device to control the real wage?

As for Marglin's attempt to justify the approach, it is based on the issue of empirical relevance. No single model is entirely satisfactory because the causal macroeconomic relation which it incorporates is not the only conceivable or feasible one.

What follows is designed to illustrate at some length the various aspects and the analytical foundations of this approach. The purpose for doing so is, firstly, to illustrate the analytical setting in which this work is placed, second, to show the potentialities of this approach with respect to institutionalism, which derive from the possibility of having different conbinations of exogenous and endogenous variables; finally, to introduce the capacity utilisation model simply as one regime among others, in particular one where the main causal factors are an autonomous investment function and an independent income distribution. For this growth regime, just like the others, it will be important to specify the kind of institutional or conventional arrangements which sustain the relevant equilibrium.

2.2. *The general framework*

In presenting the analytical foundations of the approach we will follow Dutt (1990). However, while in Dutt's work the emphasis is on closures, that is, on what is assumed to be exogenous, here the emphasis is on what is given up, that is, on the variables made endogenous for the sake of having a determinate system. The purpose of this shift of emphasis is to bring to light potential sources of conflict which otherwise would remain unnoticed.

Dutt assumes a closed capitalist economy which produces one good using two factors only, homogeneous labour and capital. Technology is given and exhibits fixed coefficients and constant returns to scale. Moreover, capital is eternal and all firms are identical. No government or money is included in the model. The basic structure of the

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system is made up of two equations, a production equation and a price equation. Production is either consumed or invested. So we have;

$$X = CL + gK$$

where X is total output, C consumption per worker, L employment, g the rate of growth of capital and K productive capacity. Since constant returns to scale have been assumed unit coefficients can be used instead. Thus we get;

$$1 = Ca_0 + ga_l$$

where a_0 is the labour coefficient and a_l the capital coefficient, obtained by dividing L and K by X. $\frac{K}{X}$, however, is made up of two different components, a technical coefficient and a given degree of capacity utilisation. This becomes clear when we divide both K and X by full capacity output X_f:

$$\frac{K\ /X_f}{X\ /X_f}$$

where the numerator represents the capital coefficient proper, and the denominator the degree of capacity utilisation. Only if current output equals full capacity output, i.e. when $X = X_f$, will the capital-output ratio be equal to the capital coefficient. It follows that in the general case the capital-output ratio will be different from the capital coefficient a_l.[1] The asymmetry in the treatment of labour and capital has certainly been noted. As Dutt points out, this is due to "the fact that labour is hired (and will therefore not be hired if it does not contribute to production) and capital is not (so that excess capacity may be held by firms)".[2] It follows from what we have just said that the production equation is best kept in this general form.

$$1 = Ca_0 + g\frac{K}{X}$$

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[1]Dutt seems to rule out the case when current output is higher than full capacity output. In fact, if full capacity is thought as normal capacity, without normal capacity being necessarily coincidental with the technical maximum, and the capital coefficient is defined with respect to normal capacity, the current capital:output ratio can be higher or lower than the capital coefficient.

[2]Dutt (1990), p. 12.

Price per unit of production goes to wages or profits. We have, therefore, the following price equation;

$$P = Wa_0 + rP\frac{K}{X}$$

P, W and r have the usual meaning: the price, the money wage and the rate of profit, respectively. Assuming $P = 1$ we get

$$1 = Wa_0 + r\frac{K}{X}$$

with W now representing the real wage rate. The reason for using $\frac{K}{X}$ instead of the capital coefficient a_l is the same as before.

The equations presented above can be said to constitute the common analytical core of any model of growth. They imply no more than the following propositions: for any given degree of capacity utilisation a) production can be either consumed or invested; b) what is not paid as wages is paid as profits. This means, for example, that only if we know the degree of capacity utilisation, the consumption rate and the real wage rate can we determine the accumulation rate and the profit rate. In other words, we have five unknowns, but only two equations to play with. So three additional explanations, in the form of independent relations, have to be supplied to account for the variables left unexplained. Provided no further unknown is introduced, the system will yield a determinate solution. At the same time no more than three independent relations can be added to the model, otherwise the model will become overdetermined. A particular model of growth, therefore, will be distinguished by what set of independent relations is added to that common analytical core, in particular, by what is going to be exogenous and what is going to be endogenous. This choice is not obviously unconstrained: if, for example, independent relations are introduced to determine the degree of capacity utilisation, the accumulation rate and the profit rate, the consumption rate and the real wage rate must be determined endogenously. This implies that any particular choice can be characterized by what one is prepared to sacrifice in order to avoid overdeterminacy.

What follows will be devoted to the illustration of four possible alternative choices, trying in each case to evaluate the severity of the 'sacrifice'. This will amount to what, in more traditional language, is known as the analysis of the microfoundations of the particular macroeconomic outcome. This is a question one must face even in a context where the focus is precisely on the inverse question, namely, the search for the macrofoundations of particular microequilibria. However powerful the macro constraint is, it is still a purposeful and creative individual who decides how to act.

If, for example, the system is closed by a given rate of growth of the labour force which "explains" the rate of accumulation g, it is important to understand why individual investors want to have their capacity grow at exactly that rate. Similarly, if the explanatory variable is the desired rate of accumulation and the rate of growth of employment is explained by it, one wants to know why a growing rate of unemployment ought to be compatible with a constant real wage. Neoclassical theory sidesteps the problem by accepting only those outcomes which turn out to be compatible with individually maximizing agents. This view may not be entirely satisfactory. As Taylor put it:

macroeconomics matters at its own level in the hierarchy of theories, ... the regularities one builds into macro models require justification much more from historical and institutional analysis (some microeconomic) than from optimization games that idealized firms or households are supposed to play. (Taylor, 1991, p. 10)

History and institutions, and - we may add - conventions and routinized behaviour, can then constitute an alternative, in the task of founding macroeconomic outcomes, to the notion of strict rationality advocated in neoclassical economics. So it might be more appropriate, as a basis for macro analysis, to refer to generalized patterns of behaviour than to individual optimizations. Habits and conventions can be more useful in describing individual behaviour than heroic optimization plans. Indeed, one could even think of situations where individual freedom is effectively restricted, so that institutional macro analysis is the only way to account for individual behaviour. It follows that strict

rationality cannot be the only basis of human agency. Different forms of rationality, as well as different levels of deliberation,[1] must be taken into consideration.

Therefore, when studying each individual regime it is important to evaluate whether the macroeconomic causal relation which is being portrayed is capable of affecting individual behaviour. In each case it will be necessary to specify what is the institutional or conventional basis which could justify the outcome. Far from turning the model into an equilibrium model, this specification will imply a temporary containment of a conflict, which can however explode at some later date, when, for instance, the current balance of power is lost, or the convention no longer holds, or when some innovative behaviour disrupts the previous orderly set of relations. The four selections of exogenous and endogenous variables will be named after their main causal mechanism. In the literature referred to above they have been named after schools of thought. This will also be retained for the sake of reference.

2.3. *The Full Employment Model (Neoclassical case)*

_ Let us consider one possible selection of independent relations to be added to the common analytical core. The market-clearing hypothesis, typical of neoclassical thinking, defines one. This implies adding to the price and production equations two independent relations requiring full employment of labour and equilibrium in the goods market. So we can write:

$$g = n$$

$$\frac{K}{X} = a_l$$

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[1]It may be possible to suggest that not all our actions are determined by rational calculation or conscious deliberation. There might be different levels of consciousness, and at each level information might be processed differently. See Hodgson, 1988, ch. 5.

where n is the rate of growth of the labour force. The two equations imply, respectively, that accumulation is going on at a rate equal to the rate of growth of the labour force and that capacity is being used at its normal level.[1] Finally, we need a relation linking distribution to growth. This is provided in the form of a saving function. A classical saving function is assumed here, implying that workers save nothing and capitalists save a constant fraction of their income. The fifth relation we need is therefore the following:

$$g = sr$$

where s is capitalists' propensity to save. We are now endowed with five independent relations which determine five unknowns: the degree of capacity utilisation, the accumulation rate, the profit rate, the consumption rate and the real wage rate. It is clear then that the introduction of an independent investment function, allowing for entrepreneurial investment propensities, would overdetermine the system. This result is fairly uncontroversial. Hahn and Matthews, for example, in their famous survey of growth theory wrote as follows:

By comparison with the basic neo-classical full-employment model, the introduction of an investment function that is independent of the rate of interest has the effect of introducing an extra equation without introducing an extra variable that plays any role (since r does not affect anything). It is therefore impossible as a rule for all the equations to be satisfied. Growth may be at a steady rate, but the neo-classical guarantee of the possibility of full employment obviously breaks down, unless other changes are made in the model as well. (Hahn and Matthews, 1964, p. 792)

This case can be assumed to be characterized, therefore, by the absence of an independent investment function. In this particular world there is no room for independent investment decisions. Whether this is a proper sacrifice or not is the subject of some discussion, but the importance of investment demand in the understanding of capitalism is widely acknowledged. Take, for instance, Sen (1966), Hahn (1987) and Marglin and Bhaduri (1990). After discussing Harrod's instability problem and the extent

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[1]Strictly speaking neither equation implies that there is equilibrium in the labour market or in the goods market. The condition $g = n$ may simply keep the rate of unemployment constant through time. Similarly, the condition $\frac{K}{X} = a_t$ may simply imply that that part of capacity which is in fact in use, is operated to its full extent. However, overall equilibrium in both markets can be deduced from the stability of income distribution. Alternatively, it can be said that the correct initial conditions already exist.

to which the Solow-Swan model provides an answer to this problem, Sen concludes by saying;

The difficulty is usually concealed by doing without an independent investment function in the growth models, and thereby eliminating the influence of expectations. It is a dodge, and like all clever dodges it has its usefulness, but is easy to outlive that. (p. 280)

Similarly, Hahn argues;

'Animal spirits', as Keynes called entrepreneurial investment propensities, may be determinants of the rate of growth which the economy is capable of. Equally important is the circumstance that investment behaviour will be of prime importance in the evolution of a sequence of short run equilibria. Neoclassical theory has little to offer on these matters and is open to criticism on these grounds. (p. 626)

Finally, the following is the opinion of Marglin and Bhaduri:

...Keynesian theory does far more than to offer a theory of the short run. It offers a distinctive way of viewing the capitalist economy in the long run as well. The essential novelty of this approach is precisely the central role attached to aggregate demand and particularly to investment demand as a driving force of the economy. Whatever the shortcomings of this theoretical perspective, the insistence on the centrality of demand remains an enduring contribution to understanding capitalism. (pp. 159/160)

So it seems that the severity of the sacrifice is not negligible. The full employment regime, then, can be said to describe a state of affairs where animal spirits have been suppressed. It follows that there is an inherent conflict in the model which prevents an equilibrium interpretation of it. For the model to tell a credible story, a mechanism has to be specified explaining how it is that entrepreneurial investment propensities do not play any role in the model.

In this model causality runs from an exogenously given rate of growth of the labour force to the rate of accumulation and the distribution of income. If the distribution of income can be viewed as stemming from the market-clearing hypothesis, there remains the problem of how to account for an endogenous rate of accumulation. It is important to think of an institutional arrangement which could make this causal linkage operative. With reference to the full employment neoclassical model Taylor makes this comment:

it is a generalization based upon the English Capitalism of thrifty family firms that was ceasing to prevail even in Victorian times. (Taylor, 1991, p. 14)

A particular production organization together with a generalized pattern of behaviour provides, therefore, one institutional setting in which the causal relation between n and g

can be made sense of. Outside any such context the model cannot be said to describe any actual state of affairs.

2.4. Profit-led growth (Neo-Keynesian case)

2.4.1. A different combination of exogenous and endogenous variables implies an altogether different direction of causality, and the model of growth which incorporates this new combination becomes a candidate for another institutionally determined growth regime.

If accumulation is supposed to be 'entirely governed by decisions of firms',[1] the direction of causality of the previous model is reversed. The equation linking the rate of accumulation with the rate of growth of the labour force will then be replaced by an equation linking accumulation with something more congenial to firms, such as the expected rate of profit on invested capital. This replacement is the distinguishing character of what is known as the neo-Keynesian case. Joan Robinson's famous banana diagram[2] can be kept in mind as the main reference point, but Kaldor and Kalecki have repeatedly viewed this relation as quite crucial for the understanding of the process of accumulation. In this model causality runs from desired accumulation to employment growth and then to distribution. So the distribution of income and the rate of growth of employment are explained by the autonomous decisions of firms. The question to ask, quite naturally, is whether this macro constraint is powerful enough to determine and explain individual behaviour in the field of employment and income distribution, just as in the previous case the question was whether the overall growth rate of the labour force could determine and explain individual behaviour in the field of investment.

The set of independent relations to be added to the common analytical core to obtain the neo-Keynesian case is the following:

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[1]Robinson (1962), p. 36.
[2]See Robinson (1962), p. 48.

$$g_s = sr$$

$$\frac{K}{X} = a_l$$

$$g_i = g(r)$$

where g_s and g_i represent desired saving and desired investment per unit of capital. Again we have a set of five independent relations which determine the usual set of five unknowns. Clearly, the addition of a further relation requiring accumulation to be carried out at the natural rate would overdetermine the system. Thus the neo-Keynesian regime of growth implies, in the general case, $g \neq n$.

2.4.2. We start with one of the two causal links: the desired rate of accumulation explains the rate of growth of the labour force. Clearly, no problem would arise if it were possible to postulate an entirely flexible supply of labour which contracts or expands according to the requirements of desired accumulation. In this case n would not be exogenously determined: an adjustment process would bring n to equality with the equilibrium rate of growth as determined in the above system. A reserve army would thus come into the story, providing workers whenever the rate of growth of the system exceeds the rate of growth of the labour force and absorbing workers whenever the opposite is the case. One can think, for example, of the rate of growth of the system as the rate of growth of the capitalist sector, with the result that the capitalist sector can, for the purpose of manning its equipment, draw on the reserve army working in the non-capitalist sectors of the economy. Similarly, whenever the capitalist sector is not keeping up with the rate of growth of the labour force, the non-capitalist sectors of the economy will grow relatively to the capitalist sector.

The idea of a reserve army is a typically Marxian idea, but there is no serious reason why it should not be applied to this neo-Keynesian kind of model as well. Kaldor seems to have the idea of a reserve army in mind when, with reference to an exogenously determined natural rate, he writes:

Such an approach is only valid in a universal context - where it refers to the *whole* productive activity of a closed or self-contained system, which has no "real world" analogy except when the economy of the world is considered as a whole. It is not a valid assumption for analysing the economy of a single region (and the nation, looked at as a sovereign political entity, is only a particular kind of region) which is dependent on other regions both for satisfying some of its needs and for providing a market for its products; and the "resource-endowment" of which (except for natural resources) cannot be considered as exogenously given. (Kaldor, 1980, pp. xxvi-xxvii)

A high propensity to move from a region or a state to another region or state can explain then the capability of firms' investing decisions to affect the rate of growth of employment. This propensity is undoubtedly the result of institutional and conventional factors. Strong family ties, or simply the habit of ruling out moving as an option, can make this propensity very low. But are migrations and labour mobility really exclusively driven by the demand for labour? Isn't national and international labour mobility a far more complex phenomenon than that implied by an endogenous supply of labour? If the answer to this question is positive, labour migrations cannot be used in all cases to explain how a given rate of desired growth determines the rate of growth of employment.

An alternative interpretation of the inequality $g \neq n$ is more in keeping with the Keynesian tradition. Instead of solving the inequality by adjusting n to g we could assume that the inequality is not actually a problem. One could say, for instance, that as long as $g \leq n$ the system is internally consistent. The labour supply function, therefore, would not be the only set of feasible long-period positions. Unlike the neoclassical case, it would become the boundary of a much larger feasible set including not only the points on the boundary, but also any point in the interior of the set. Growth in the labour force would only have the effect of moving the boundary of this set outward. No incompatibility would arise, therefore, from the previous inequality as the larger feasible set plays a role analogous to the Marxian reserve army. The gap between actual employment and potential employment will expand or contract according to the requirements of desired accumulation. A larger notion of a reserve army would be employed here, for it would not necessarily imply transfers from one country to another or from one sector to another.

In fact, the Keynesian argument is fundamentally a short-period argument. Chick (1983), for example, makes an extended use of this particular notion of the labour supply function, but no implication is drawn with respect to growth.[1] Marglin (1984b) points to the difficulty of applying this notion to the long run.[2] The large literature on non-market-clearing models of the labour market can certainly explain a constant rate of unemployment, less certainly a growing rate of unemployment. There seems to be no way, then, one can escape the internal contradiction of the system. The inequality $g \neq n$ is bound to produce, at some point in time, an alteration in the equilibrium of the system. But it could be argued that, while the divergence between actual and potential employment is not likely to be sustainable for a very long time, it might be sustainable for 'some' time. We would then have a situation where, for a given length of time, the inherent incompatibility of the system is not making itself felt. This situation might be what Marglin has in mind when he qualifies the use of the steady-state method.

...the steady state is an analytical device whose sole purpose is to permit us to abstract from economic fluctuations, and for this purpose the "long run" need only be of the order of a generation. There is nothing inherent in the concept of a steady state that makes it essential to assume the maintainance of a rate of growth of employment equal to the rate of growth of the labour force. (Marglin, 1984b, pp. 55/56)

This means that the inherent incompatibility of the system is provisionally settled by the particular assumption which is being made, that is, by the selected closure of the system. Joan Robinson's *limping golden age* was precisely designed to depict such a case. There desired growth explains the rate of growth of employment. In the absence of any tendency to move between sectors or areas when jobs are not available, one is led to consider, for the sake of making sense of this macro constraint, those institutional and social mechanisms which act as compensating mechanisms for a growing rate of unemployment. There are countries where higher education is virtually free and where universities experience an abnormally high drop-out rate. This is an example of a compensating mechanism because a growing rate of unemployment can be accommodated by having young potential workers spend (unsuccessfully) one year or

[1]See, in particular, ch. 7.
[2]See ch. 5, p. 107.

two at university. Obviously, as mentioned earlier, nobody can expect this growing divergence to carry on indefinitely. But it can certainly be the case that such compensating mechanisms allow firms' decisions, as concern investment, to affect the rate of growth of employment for some length of time.

2.4.3. Income distribution represents the other sacrificed variable of this model, for income distribution will assume whatever value is required to make saving equal to investment. This mechanism, which relies on differential saving propensities, is at the heart of the so-called Keynesian theory of distribution and can be seen as the result of the application of the Keynesian multiplier to distribution theory. As is well known it was Kaldor who, in a famous article on alternative theories of distribution,[1] distinguished between a short-period and a long-period use of the Keynesian multiplier. While in the short period the multiplier would determine the level of income, in the long period, when the level of income is fixed at the level of full employment, the same mechanism would determine distribution. Before addressing the issue of the foundations of this theory of distribution, two short digressions are in order.

To begin with, it was certainly noticed that the same theory of distribution was adopted in the full-employment neoclassical case. The question we are trying to address does not arise in that context, however. The reason for this is that the Keynesian theory of distribution is neither necessary for nor characteristic of neoclassical growth theory. It is not necessary because, as soon as the assumption of fixed coefficients is relaxed, variable proportions will assume the burden of bringing saving and investment to equality. It is not characteristic of neoclassical growth theory because marginalist distribution is the natural choice. Consequently, the question of whether income distribution serves the interest of macroeconomic equilibrium or is independently determined did not need to detain us there: marginalist distribution is perfectly compatible with the market-clearing hypothesis.

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[1]Kaldor (1955/56).

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The second question concerns the assumption of full employment in Kaldor's theory of growth and distribution. Kaldor claimed that:

...the system cannot long operate in a state of (Keynesian) under-employment equilibrium, because at any level of output short of "full employment" the aggregate demand associated with that particular level of output will exceed the aggregate supply price of that output, and thus lead to an expansion in output until a state of full employment is reached. (Kaldor, 1957, p. 593)

He also claimed that the operation of the long-period Keynesian multiplier would make the warranted rate of growth adjust to the natural rate of growth. Now, while the first claim could be somehow substantiated, the second is false. The point is convincingly made in Skott (1989).[1] There it is argued that full employment growth is achieved in Kaldor not only by means of flexible distributive shares but also by means of a flexible capital:output ratio. As is clear from the analytical structure of the "profit-led growth" model, the desired rate of accumulation, determined at the point of intersection of the saving function with the investment function, will coincide with the natural rate of growth only by pure chance. Flexible distributive shares, therefore, cannot ensure full employment growth: an additional flexibility is required. We are thus freed from the obligation of considering Kaldor's hybrid[2] model as a possible solution to the problem of making desired accumulation compatible with full employment growth. We can now go back to the discussion of the long-period Keynesian multiplier with the understanding that the assumption of full employment concerns only the utilisation of productive capacity.

For the long-period Keynesian multiplier to operate effectively what is in practice required is fully flexible real wages. For, if this were not the case and real wages were rigid, it would not be possible to fix income at its full employment level and satisfy investment decisions at the same time. The rate of accumulation would in this case be subject to the constraint of the availability of saving at that level of income. If, on the contrary, we want the rate of accumulation to equal the desired level, real wages must be reduced to a mere consequence of investment decisions. But in this kind of economy - as

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[1]See p. 25/26. That warranted growth and underemployment equilibrium are not incompatible with one another, in Kaldor's model of growth, was originally shown in Harcourt (1963).

[2]This definition is used in Marglin (1984b), ch. 8.

Marglin (1987) points out - one cannot ask questions concerning the effects of changes in real wages, "because the real wage, determined ultimately by the price level, is a consequence rather than a thermostat" (p. 990). This means that the real wage is in this model forced to lead a shadow life with any independent wage dynamics totally ruled out. Whether this is sustainable or not depends on what kind of credibility one is prepared to attach to an argument Keynes propounded in Chapter 2 of the *General Theory*. There Keynes argued:

...any individual or group of individuals, who consent to a reduction of money-wages relatively to others, will suffer a *relative* reduction in real wages, which is a sufficient justification for them to resist it. On the other hand it would be impracticable to resist every reduction of real wages, due to a change in the purchasing-power of money which affects all workers alike; and in fact reductions of real wages arising in this way are not, as a rule, resisted unless they proceed to an extreme degree. ...The effect of combination on the part of a group of workers is to protect their *relative* real wage. The *general* level of real wages depends on the other forces of the economic system. (p. 14)

The other forces of the economic system explain here the general level of real wages. Keynes is clearly referring to the state of demand in the output market. If a stable pattern of demand over time is assumed, it becomes possible to set up a similar causal link in a longer-run context. We would have then that desired accumulation is the force determining real wages. For this macroeconomic constraint to be operative workers must constantly ignore the evidence of a decreasing (increasing) purchasing power. Although one could assume that by doing so workers are maximizing, other explanations are possible. One possible explanation draws on cognitive psychology. Hodgson mentions one particular development:

It is typical of human behaviour, even with sophisticated economic agents with the full use of modern information technology, to systematically ignore both received sense data and even information which, in some sense, is 'understood'. (Hodgson, 1988, p. 83)

One could argue then that information on the general level of prices is disregarded because is viewed as meaningless in relation to one's existing frame of mind and cognitions.

Alternatively, if the view of the wage rate as a residual is not thought to be sustainable, one could assume that the state of class power relations is taken into account in the investment-decision process. The effect of the alteration in the balance of power

would thus be discounted in the investment decision. There is one particular situation when this interpretation of the profit-led growth regime seems very plausible. It is when firms have control over the price mechanism. In this case, pricing and investment decisions would be strictly related, and all possible consequences of the firm's price decision would be taken into account in the formulation of the firm's desired investment plan. Such a possibility has been investigated in the literature and can be associated mainly with the work of Eichner, Harcourt, Riach and others. Since, among the consequences of the price decision, variations in the degree of capacity utilisation are also considered, the analysis of these contributions is postponed until the next chapter.

2.5. *Surplus growth* (*Neo-Marxian case*)

When, unlike the previous case, distribution is not allowed to be residually determined, but is supposed to play a crucial role in the system, a different regime of growth is established. We then have a situation where the state of class conflict, reflected in a particular income distribution, acts as a binding constraint[1] on the capability of the system to grow over time. To see why this is the case suppose that the equation

$$W = W^0$$

where W^0 represents the exogenously given real wage rate, is added to the previous system. Since we have already five independent relations which determine five unknowns, this additional relation would clearly overdetermine the system. As a consequence, one independent relation has to be given up to make room for the relation reflecting the state of class conflict over the distribution of income. If the sacrificed relation is the investment function we would get what in the literature is known as the neo-Marxian case. The reason for this label is the concern which those who work within

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[1]Unlike the situation mentioned at the end of the previous section, here the state of class conflict is reflected in a precise distribution of income. There a more general view is taken.

the Marxian tradition show for class conflict, and their related reluctance to accept any explanation of growth which hinges heavily on people's psychology.

Causality runs here from distribution to accumulation, so while in the previous model income distribution was explained by the desire of firms to grow, in this model income distribution takes the role of explanatory variable and accumulation the role of the variable which is being explained. Again, as in the full-employment neoclassical case, animal spirits have been suppressed, so again, for this causal linkage to be of any relevance, it is necessary to show why individual investors should carry out precisely that rate of accumulation.

One could assume that animal spirits are not actually suppressed, but contained. This corresponds to Robinson's *bastard golden age*, when, the desired rate of accumulation being greater that the rate associated with a minimum acceptable real wage, the desired rate is not feasible. But the more interesting case is when the rate of accumulation actually behaves like a residual variable, in the sense that it adjusts to the distribution requirements without necessarily altering the plans of individual investors. This particular interpretation of the closure of the neo-Marxian model can be associated with the work of some neo-Ricardian economists who share with the neo-Marxian approach the concern for class conflict,[1] but do not rule out entrepreneurial propensities altogether. In fact, they are allowed to play an important part in the model.

One of the main projects of neo-Ricardian economists has been to reconcile the classical theory of prices and distribution, as reformulated by Piero Sraffa,[2] and the Keynesian principle of effective demand. This principle provides, in the opinion of these theorists, an adequate theory of output and employment to be associated with that theory of prices, which remains 'open' in that respect.[3] The fundamental idea of this approach is that the independence of investment from saving can be realised by means of variations in

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[1]The fact that in this approach it is usually the rate of profit which is determined exogenously should not imply a denial of the importance of class conflict. As Dutt (1990) points out, class conflict can determine distribution "by affecting government policy which determines the interest rate and hence the rate of profit" (p. 52).
[2]Sraffa (1960).
[3]See Eatwell and Milgate (1983), p. 7.

the productive capacity installed. This means that the Kaldorian distinction between a short- period and a long-period use of the Keynesian multiplier, to determine the level of income in the first case and distribution in the second, is replaced by a single use for that mechanism, that is, the determination of the level of income. The difference between the short- and the long-period operation of this mechanism is that in the short period it operates through variations in the degree of capacity utilisation, whereas in the long period it operates through variations in the productive capacity installed, given the degree of capacity utilisation. This change in the long-period operation of the multiplier enables neo-Ricardians to keep the two parts of the theory separate: the theory of output and employment, on the one hand, and the theory of value and distribution on the other. Thus, in the long period the Keynesian principle can be consistently applied without placing any constraint on the distribution of income. This idea has been advocated by Garegnani (1992):[1]

It will thus emerge that increases (decreases) in output, accompanied by increases (decreases) in productive capacity, may be the long-run normal effect of changes in effective demand, with the real wage and the normal rate of profits left to be determined by other circumstances - in particular, by the circumstances envisaged in the classical theories. (p. 48)

Let us consider now the so-called Cambridge saving equation:

$$g = sr$$

where g is the rate of accumulation, s the propensity to save out of profits and r the rate of profits. As has been pointed out by Garegnani, one could think that treating investment as the independent variable amounts to the same thing as treating the rate of accumulation as the independent variable. If this were the case, a theory of growth based on the Keynesian principle would in all circumstances require a flexible rate of profit, no matter whether the Keynesian principle manifests itself through a variable volume of investment or a variable rate of accumulation. Both variations would entail a change in g and, hence, in r. In fact, treating the volume of investment as the independent variable is not the same thing as treating the rate of accumulation as such. If we assume that a normal level of

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[1]The idea that the independence of investment from saving can be realised by means of variations in the level of capacity installed is for the first time presented in Garegnani (1978). See also Vianello (1985), p. 72.

capacity utilisation is generally restored, variations in the desired volume of investment will produce equiproportional changes in the numerator and the denominator of the ratio g. No change in g and, hence, in r would thus be required. What changes in the new equilibrium position is the level of the capacity installed and the levels of income and savings. This is how Garegnani illustrates the process:[1]

Let us assume that in the year t a fall in the incentive to invest occurs, such that...investment will become, say, one-half of what it would have been at the same date, had the previous trend of investment continued unaltered. Now, no obstacle arises against assuming, for the sake of our argument, that through an initially even smaller time rate of gross investment, entrepreneurs will, by year t', have adjusted productive capacity to the new lower trend of investment, and to the correspondingly lower level of aggregate output. When that has occurred, the rate of accumulation will necessarily be back to the ratio of capacity savings g^*. (1992, p. 57)

The independence of the volume of investment is thus shown to have different implications from the independence of the rate of accumulation. The former does not place any constraint on the distribution of income, while the latter requires a change in the distribution of income to be realised. The separation of the theory of value and distribution, on the one hand, and the theory of output and employment, on the other, proves to be possible in the first case, but not in the second. Therefore, by postulating the independence of the volume of investment rather than that of the rate of accumulation, neo-Ricardians can overcome the problem Marglin pointed out with respect to Kaldor's theory of growth. Investment decisions can now be realised without endangering the possibility of an independent wage dynamics.

The foregoing discussion can be formalized in a model which is obtained by adding to the neo-Marxian model two more independent relations which will determine two further unknowns. One equation will define the trend of investment; another will determine, given the ratio of capacity savings g, the capacity required to sustain any given time rate of investment. It must be stressed that the parameters of the investment function cannot be altogether exogenous, for although the average level of investment is the result

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[1]An earlier version of Garegnani's paper was circulated at a Conference in Udine in 1982. Some differences exist between the two versions: the emphasis on the contrast between the notion of an independent level of investment and that of an independent rate of accumulation can be found in the earlier version. In the later version what is essentially the same argument is presented by drawing a distinction between the actual rate of accumulation and the ratio of saving to capital at normal capacity utilisation, or ratio of capacity saving.

of entrepreneurial decisions, the growth rate of investment must be equal to the endogenously determined rate of accumulation. One possible way of representing such investment function is the following:

$$I_t = (1+g) I_{t-1}$$

where I_{t-1} is taken to convey the influence of the desired trend of investment and where g represents the ratio of capacity saving. Let us write now the entire system.

$$1 = a_0 C + g \frac{K}{X}$$

$$1 = W a_0 + r \frac{K_t}{X_t}$$

$$g = sr$$

$$\frac{K_t}{X_t} = a_1$$

$$W = W^0$$

$$I_t = (1+g) I_{t-1}$$

$$g = \frac{I_t}{K_t}$$

As can be seen, the purpose of the two independent relations is to establish the scale of the system at any given time: once desired investment I is determined as the result of the desired average level and of the given g, the last equation determines the level of capacity K which will make that particular level of investment possible to obtain, again, given the rate of accumulation g. It seems, therefore, that in what can be called the neo-Ricardian case entrepreneurial propensities and income distribution are no longer incompatible. This is achieved by assuming that entrepreneurial propensities and the forces affecting income distribution operate at different levels, with the result that they need not get in the way of each other. Entrepreneurial propensities operate at the level of the average scale of the system; the forces affecting income distribution operate at the level of the rate of growth of the system.

The previous discussion leads us to the conclusion that, for the causal linkage typical of classical thinking to be of any relevance, entrepreneurial propensities can be only partially exogenous. In particular, the parameter which determines the rate of growth of investment is endogenously determined.

2.6. *The capacity utilisation model* (*Kalecki-Steindl case*)

In all previous cases the assumption

$$\frac{K}{X} = a_1$$

rules out rates of capacity utilisation different from normal. When this assumption is relaxed, capacity utilisation becomes one of the variables to be explained within the model. Unlike the previous cases, where the degree of capacity utilisation is somehow technologically given, here it can be explained by desired accumulation. A new direction of causality is therefore identified: it is one which goes from accumulation to capacity utilisation. The main implication of this is that income distribution need no longer be explained by the desired rate of growth, but can be explained, at a probably more appropriate level, by the price-cost relation. These assumptions lead to the following model, which, as usual, has five independent relations and five unknowns.

$$1 = a_0 C + g \frac{K}{X}$$

$$1 = Wa_0 + r \frac{K}{X}$$

$$g = sr$$

$$1 = Wa_0 (1 + z)$$

$$g = g (r, \frac{X}{K})$$

Given the mark-up rate z, the propensity to save s, the labour coefficient a_0 and the parameters of the investment function (which is here kept implicit) the model will

determine C, W, g, r and $\frac{X}{K}$. The forces affecting income distribution will here manifest themselves through the determination of a mark-up rate z. This implies that the rate of profit r can change without this placing any constraint on such forces. This can be realised by means of a variable degree of capacity utilisation whose variations will produce the saving per unit of capital required to sustain desired accumulation. As a further consequence of the variability of capacity utilisation, desired accumulation g will now depend on the rate of capacity utilisation as well as on the rate of profit.

This model introduces the assumption of non-competitive price-setting behaviour, which implies that firms set prices by applying a constant mark-up on unit prime costs. This assumption has played an important role in the development of the capacity utilisation model, but, as will be discussed later, need not be taken in an extreme form. The main reference for such a price-setting behaviour is Kalecki's theory of the degree of monopoly. Prices in the economics of Kalecki are a linear function of unit prime costs and of the industry average price. The following is the basic relation:

$$p = mu + np$$

where u is the unit prime cost, m and n two positive constants and p the average industry price. When the average industry price is to be determined all variables have to be expressed in average terms (for which we use bold type throughout). So we have:

$$p = mn + np \ ^{[1]}$$

from which we derive:

$$p = \frac{m}{1-n} u$$

The average price of the industry is thus a linear function of average unit prime costs u. The parameter $\frac{m}{1-n}$ is what Kalecki called the 'degree of monopoly' of the industry as a whole. When both the coefficients reflecting the degree of monopoly of the industry and

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[1] This price equation, in the present form, is presented for the first time in Kalecki (1954). For a proof of the existence and positivity of the solution see Basile and Salvadori (1984/85).

average unit prime costs do not change with utilisation, we have, up to full capacity, a

perfectly elastic supply curve. As a consequence, it is only through changes in the degree

of capacity utilisation that 'demand and supply' equilibrium in the representative industry

is attained. In the economics of Kalecki, therefore, a mechanism exists to make

distribution independent of macroeconomic equilibrium.[1] This should be the sense of the

following passage;

> it is clear that capitalists may decide to consume and invest more in a given period than in the preceding one, but they cannot decide to earn more. It is, therefore, their investment and consumption decisions which determine profits, and not vice versa. ... Given that profits are determined by capitalists' consumption and investment, it is the workers' income...which is determined by the 'distribution factors'. In this way capitalists' consumption and investment conjointly with the 'distribution factors' determine the workers' consumption and consequently the national output and employment. The national output will be pushed up to the point where profits carved out of it in accordance with the 'distribution factors' are equal to the sum of capitalists' consumption and investment. (Kalecki, 1971, pp. 78/81)

Thus a variable level of output makes workers' and capitalists' claims compatible.

But does this result carry over to the longer run? In other words, is the endogenously

determined level of output (and, hence, degree of capacity utilisation) going to leave

investors content with what they are doing? The answer is not necessarily positive if

Kalecki, in discussing the determinants of investment, includes among others the rate of

change of the stock of capital equipment.

> Indeed, an increase in the volume of capital equipment if profits, P, are constant means a reduction in the rate of profit. Just as an increase in profits within the period considered renders additional investment projects attractive, so an accumulation of capital equipment tends to restrict the boundaries of investment plans. (Kalecki, 1971, p. 112)

Thus large excess capacity discourages investment, and the usual problem applies as

to whether the process of adjustment leads to the establishment of the desired ratio of

capacity to output. These problems will be investigated in greater depth in the rest of this

work. Here it was important to point out that Kalecki's theory of prices on its own cannot

provide adequate foundations for the capacity utilisation model, which is concerned with

issues of a longer-run sort rather than with the determination of the equilibrium level of

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[1]Kriesler (1989) has pointed to this aspect of Kalecki's economics: "In particular, neither [micro nor macro] theory dominates nor forms a constraint on the other. Rather than any form of hierarchical relationship, the two theories lie side by side (so to speak), and both give information which the other cannot give, while the interrelation of the two yields further information not obtainable from either in isolation." (p. 123)

output. To reiterate, the capacity utilisation model reflects a regime where price-cost relations explain distribution and where desired accumulation explains growth. For these two causal linkages to be simultaneously relevant the necessary institutional and behavioural assumptions must be specified.

2.7. *Conclusion*

It is to a proper understanding and specification of the last regime examined that the rest of this work is devoted. While in other models it is animal spirits and income distribution that are most often suppressed or determined residually, here it is the degree of capacity utilisation which is determined endogenously, while animal spirits and income distribution are allowed to display their effects. Whether such combination of exogenous and endogenous variables gives rise to steady growth depends on the significance attached to a variable degree of capacity utilisation, especially with respect to investment demand. In other words, it depends on whether an other-than-normal degree of capacity utilisation is compatible with investment proceeding at a constant rate. For this to be the case normal utilisation must cease to be a condition of equilibrium (at least in the "period" considered), and either assume a different role or disappear altogether.

The discussion on the capacity utilisation model is already at an advanced stage in the literature. The contribution offered here goes a step forward by addressing precisely the question of the compatibility of a constant investment rate with a non-normal degree of capacity utilisation. This question - it is argued - is more fruitfully studied within a wider steady-state approach to unsteady growth, where the capacity utilisation model is only a special case of a more general model of growth which requires additional relations to yield an equilibrium solution. This chapter was designed to illustrate this approach and to stress an aspect of it not fully appreciated in the literature, which is its potentiality with respect to institutionalism. The following chapter will start the discussion on the capacity utilisation model by addressing the question of the nature of the relation between capacity utilisation and growth. It will be argued that the need for a capacity utilisation model

arises from the relaxation of a set of assumptions made in the other models examined. Such assumptions prevent the degree of capacity utilisation deviating from its normal for any considerable length of time.

CAPACITY UTILISATION AND GROWTH

3.1. *Introduction*

Having presented the methodological context in which this work is going to be placed, we can now concentrate on its main concern, that is, capacity utilisation. In the models analysed in the previous chapter capacity utilisation is determined according to different mechanisms. It is part of the market-clearing hypothesis in the full-employment neoclassical case. It is the result of profit maximization in the 'surplus approach' models case. In the neo-Keynesian case competition and flexible distributive shares combine to ensure that capacity is always fully utilised. In all cases, then, the degree of capacity utilisation which is established is the desired or normal one. Finally, in the capacity utilisation models, capacity utilisation is exclusively determined by demand. The main implication of this mechanism is that in the general case the degree of capacity utilisation does not coincide with the desired or normal one. This chapter will be devoted to a more detailed examination of those mechanisms which are not based on demand, before moving on, in the next chapter, to the capacity utilisation model, which is the only growth regime where effective demand is allowed to affect in a direct way the degree of capacity utilisation. This excursion will make the question of the compatibility of a constant investment rate with other-than-normal utilisation emerge quite naturally from the analysis of the various ways in which that question can be prevented from arising. It

will emerge that it is by limiting, in varying degrees, the effects of demand on investment, and thus of the role of demand itself, that normal utilisation can be preserved.

The idea that effective demand, in a growth context, should affect capacity utilisation at all might seem implausible. For, unlike the rate of growth of the labour force, which is mainly the result of exogenous forces, capital accumulation is mainly the result of endogenous forces. It would follow from this that there is no apparent reason why capacity should not be made to grow not only at a rate equal to the rate of growth of effective demand, but also in such a way as to ensure full capacity utilisation. In fact, the reason why full (or normal) capacity utilisation cannot be guaranteed exists and lies in the dual role of capital accumulation. Capital accumulation represents at the same time an autonomous component of effective demand and an addition to the existing capital stock.[1] Some degree of coordination is therefore required if capital is to be constantly fully utilised. For this coordination to be successful various assumptions can be made, ranging from the extreme of doing away with effective demand altogether to the other extreme assumption of abandoning any notion of normal utilisation. Between these two extremes a number of coordinating mechanisms exist. Any of these mechanisms, as well as the extreme ones, can be resorted to to achieve the equality of the normal (or desired) with the equilibrium degree of capacity utilisation. If none of these mechanisms is available, the equilibrium degree of capacity utilisation will in the general case deviate from its normal. A problem will then arise as to what significance should be attached to a growth regime in which capacity is not used at its normal level. Recourse to a different level of coordination will become necessary at that point. This chapter, through a closer analysis of the above mentioned mechanisms, will build up exactly to that point, taken up in the remaining chapters, when the conditions for a meaningful and feasible 'variable utilisation' growth regime will have to be spelled out and fully justified. Each coordinating mechanism will be associated with a particular growth regime, thus

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[1]Obviously this is true because a period longer that the short run is being considered here. In the short run capital accumulation is only a component of effective demand.

following the same structure as the previous chapter. But before doing that, another aspect of the models illustrated in the previous chapter has to be explained.

In the models analysed in the previous chapter labour and capital are the only factors of production. As regards their utilisation two problems arise. One is whether demand for labour services and technical capacity grows at the same rate as their supply does and another is whether labour and capital are fully utilised at each moment in time. In formal terms we have:

(a) $$g = n$$

(b) $$L_t^d = L_t^s$$

which refer to labour, and

(c) $$\frac{\Delta K}{K} = \frac{\Delta X}{X}$$

(d) $$\frac{K}{X} = a_l$$

which refer to capital. An equal rate of growth of supply and demand for labour and capital, that is conditions (a) and (c), is clearly a necessary condition for labour and capital to be fully employed at each moment in time, that is_conditions (b) and (d). However, they are not sufficient conditions, because only if labour and capital are fully employed at the beginning, can full employment be kept over time. Correspondingly, full employment of labour and capital over time, i.e. conditions (b) and (d), is a sufficient but not necessary condition for (a) and (c) to be true. If we now turn all these equalities into inequalities and therefore write:

(a') $$g \neq n$$

(b') $$L_t^d \neq L_t^s$$

(c') $$\frac{\Delta K}{K} \neq \frac{\Delta X}{X}$$

(d') $$\frac{K}{X} \neq a_l$$

we shall notice that the previous relations are all reversed. An unequal rate of growth of supply and demand of labour and capital, i.e. conditions (a') and (c'), is a sufficient condition for labour and capital not to be fully employed over time, i.e. conditions (b') and (d'). It is not a necessary condition because labour and capital could be unemployed over time even if conditions (a') and (c') were not true. Correspondingly, non-full employment over time is a necessary but not sufficient condition for (a') and (c') to be true. For, the conditions (b') and (d') are also compatible with (a) and (c).

It must also be noted that whenever the conditions $\frac{K}{X} = a_l$ or $\frac{K}{X} \neq a_l$ are at issue, it is always overall capacity and overall output which are being considered. How output is distributed among the various units of capacity is therefore of no relevance. It does not matter, for example, whether some units of capacity are being used at their normal level, while other units are not operated at all. Similarly, it does not matter whether, within a given time unit, capacity is used at full speed, while it is left idle for the rest of a larger time unit.[1] It is the overall degree of capacity utilisation we are looking at. These qualifications, however, are not altogether irrelevant when it comes to discussing equilibrating mechanisms.

Since in a general model of growth both aspects of the use of labour and capital should be considered, it is interesting to re-examine each individual growth regime to see whether all four previous questions have been answered. The neo-Keynesian and the neo-Marxian growth regimes are the more straightforward ones because the structure of the models, either in their assumptions or in their equilibrium solutions, implies that all four questions can be answered. As regards the use of labour both regimes imply condition (a'), as there is no assumption that desired growth or surplus growth coincide with the rate of growth of the labour force. This means that also (b') is true. As regards the use of capital both regimes adopt the assumption (d), implying that full or normal capacity utilisation is continuously preserved. This means that also (c) is true, that is,

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[1]The degree of capacity utilisation can be said to have three different dimensions: firstly, the length of time within a given time unit during which capacity is actually operated; secondly, the speed of operation for any given time unit; thirdly, if capacity is divisible, the number of units which are being operated as opposed to the overall number of available units. For the difference between the first two see Betancourt (1987).

capacity is growing at the same rate as output. Since in both cases full employment of labour is not required, the issue of the scale of the system is not addressed. In the neo-Ricardian interpretation of the surplus growth regime, the scale is determined by entrepreneurial investment propensities.

The neoclassical regime adopts assumptions (a) and (d): but while (c) follows immediately from (d), (b) does not necessarily follow from (a). This means that while it is certainly the case that full (or normal) capacity utilisation over time implies that capacity and output are growing at the same rate, it is not necessarily true that growth at the natural rate ensures full employment of labour over time. In fact there is no reason why this should be the case. Full employment over time results only if, initially, labour and capital are available in the proportions required by growth at the natural rate.

Finally the capacity utilisation model needs to be examined. While as far as the use of labour is concerned no difference exists between this regime and the neo-Keynesian and neo-Marxian cases, when it comes to capacity utilisation this case implies condition (d'), from which, however, condition (c') does not follow. In words, a different-from-normal degree of utilisation does not necessarily imply a divergence between the rate of growth of capital and the rate of growth of demand for capital services. It follows from here that whenever $\frac{K}{X} \neq a_I$ two different regimes of growth are possible: one where $\frac{\Delta K}{K} = \frac{\Delta X}{X}$ and another where $\frac{\Delta K}{K} \neq \frac{\Delta X}{X}$. By including the degree of capacity utilisation among the endogenous variables of the model, the capacity utilisation case implies that the degree of capacity utilisation will be constant over time. Hence condition (c), i.e. $\frac{\Delta K}{K} = \frac{\Delta X}{X}$, will apply.

The purpose of the foregoing digression has been to point out that the issue of the scale of the system is often left unaddressed in the models of growth examined. It is not made clear, therefore, how large is the economy at each moment in time, as opposed to its rate of growth. It is simply assumed that the issue is dealt with in another part of the theory, and that it does not impinge on the determination of the rate of growth. In fact, neoclassical growth theory resorts to price flexibility in both cases, to ensure either that

$g = n$ and that $L^d = L^s$, with the result that only one of these conditions can be achieved. Post-Keynesian growth theory, for its part, cannot but assume that it is effective demand that determines how large the economy is. While this is explicitly recognized in the neo-Ricardian approach, it is only implicit in the more standard Kaldorian story. But there is no reason, as will become clear later, why this mechanism should not impinge on the determination of the rate of growth. For this to be the case particular assumptions have to be made. When these assumptions are relaxed, as in the capacity utilisation model, it will be possible to see how the issue of the scale of the economy and that of its rate of growth are not entirely separable. Before turning to the question of effective demand and its role in determining the level of capacity and its rate of growth, the neoclassical theory of the degree of capacity utilisation must be reviewed. No question of effective demand arises in such a context.

3.2. *Capacity utilisation and neoclassical theory*

In the neoclassical growth regime it is the market-clearing hypothesis which superintends the determination of the degree of capacity utilisation. As made clear in the previous chapter, this means that no independent investment demand will prevent capacity from being fully utilized. So the problem originating from the dual role of accumulation is here resolved by reducing it to a single role, that of adding to the existing capacity. The potentially contradictory nature of accumulation is avoided by simply removing the source of the conflict altogether. As a result of this restriction, the equilibrium degree of capacity utilisation will not deviate, in the general case, from its normal or desired value. The neoclassical context, therefore, is the ideal setting for discussing normal utilisation, which can be defined as that particular degree of capacity utilisation which will be established if output can always be sold. If output can be always sold there is no reason for unintended excess capacity, so the degree of capacity utilisation becomes an *ex ante* economic variable. The optimal degree of capacity utilisation will be chosen and it will depend on economic costs. In this context, therefore

normal or optimal utilisation is the only way capacity utilisation can be relevant to growth.

3.2.1. *Matthews' model.* That the degree of capacity utilisation can be an alternative source of savings, thus making possible a different rate of growth without any change in the distribution of income, or an increase in consumption with the same rate of growth, can be seen by a closer analysis of the capital:output ratio. This ratio is equal to the following expression:

$$\frac{K}{X} = \frac{k}{u}$$

where k is the technical capital coefficient and u the degree of capacity utilisation expressed as a ratio of actual production to capacity output. Now, if we assume the coefficient k given and constant, variations in u will produce changes in the capital:output ratio which are entirely equivalent to those resulting from a change in the coefficient of production. Thus given the technique and the saving propensity, it becomes possible, for instance, to achieve a rate of growth equal to the natural rate in a situation where the technique and income distribution cannot be altered.[1]

One of the first attempts to take advantage of this opportunity and to model capital utilisation in the context of a neoclassical model of growth is represented by a model developed by Matthews in 1960.[2] It might be interesting to start from this one. The main purpose of this model was to reconcile a monetarily determined interest rate with the requirements of steady growth. No attempt was being made therefore to address the question of the inclusion of an investment function in a steady-state growth model. However, one of the prominent features of this model is a variable degree of capacity utilisation, and these variations come into existence through the operation of an independent investment function.

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[1]Here we continue to make the assumption of differential saving propensities, so that variations in the average propensity to save are made possible by variations in the distribution of income.
[2]Matthews (1960).

In this essay Matthews tries to reconcile a rate of interest determined by liquidity preference theory with growth at the natural rate. The problem with a monetarily determined interest rate is that, being unaffected by real forces, it prevents changes in the technical capital:output ratio, with the result that these changes cannot be used to achieve full employment growth. It follows from here that, given the interest rate and, hence, the distribution of income, the equilibrium rate of growth will not in the general case coincide with the natural rate of growth. What Matthews suggests in order to overcome the problem is to assume an investment function which does not depend exclusively on the rate of interest. But this can only be the first step, for the immediate result of this assumption is to modify the current capital:output ratio and the equilibrium rate of growth which, in the general case, will not coincide with the natural rate.

To see this let us write Harrod's fundamental equation:

$$g = \frac{s}{v}$$

where s represents the propensity to save and v the capital:output ratio. In general, v depends on the rate of interest. Matthews, adopting an accelerator-type investment function, assumes that v depends on the rate of growth g, too. In both cases there is no reason to presume that the equilibrium value of g comes to coincide with the natural rate g^*. It must also be noted here that variations in the capital:output ratio v do not come about through variations in the technique, which is assumed constant, but through variations in the degree of capacity utilisation.

Since the introduction of a general accelerator-type investment function is not a sufficient condition to achieve full employment growth, Matthews suggests adding into the investment function a term which grows at the natural rate. He is able to show that, provided some conditions are satisfied, the addition of that term makes the system grow at the natural rate.[1] This implies that the ratio v will be such that the equilibrium value of

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[1]The economic foundation of this term lies, according to Matthews, in the idea that potential output growth somehow stimulates investment and consumption. In particular, Matthews refers to a model, a` la Goodwin, where the introduction of an upper limit and a lower limit to output fluctuations, limits which are assumed to grow at the natural rate, is equivalent to introducing in the investment function a term which grows at the natural rate.

g coincides with the natural rate g^*. Again, variations in v will not come about through variations in the technical coefficients, but through variations in the utilisation rate.

Thus, by adding to the other terms of the investment function a term growing at the natural rate, Matthews is able to reconcile, by means of a variable degree of capacity utilisation, a monetarily determined interest rate with full employment growth. This model, therefore, provides a favourable setting for asking the question of whether a flexible (endogenously determined) degree of capacity utilisation can be reconciled with the main requirements of a neoclassical growth model. An answer to this question is given by Matthews himself in the survey of the theory of economic growth he wrote with Hahn (Hahn and Matthews, 1964). There they argue that in equilibrium it is not possible to have a rate of capacity utilisation different from that implied in the capital:output ratio associated with the given interest rate.

If the average degree of utilisation were correctly foreseen entrepreneurs would adjust the planned capital-intensity of production so as to equate the expected realised rate of profit to the rate of interest. The assumption that the average degree of utilisation can vary without affecting the planned capital-intensity of production therefore amounts to treating as a variable the degree to which entrepreneurial expectations are not fulfilled. In so far as indefinite persistence in erroneous expectations may be regarded as inconsistent with long-run equilibrium, models based on this assumption are not true steady-state models. (p.793)

This means that it is not possible to have a macroeconomic equilibrium which is not also justified by firms' maximizing decisions. It is not possible, therefore, to separate the micro and the macro concepts of capacity. The average degree of capacity utilisation can vary only if this variation is the result of a maximizing decision on the part of the firm. In other words, it can vary only if it is included in the production function of the firm on the same footing as the quantities of capital and labour. It follows that the attempt to found the variability of the degree of capacity utilisation upon the operation of an independent investment function cannot be successful in this context. It is not possible to change the degree of capacity utilisation for reasons other than those related to the profit maximizing behaviour of the firm, which implies a particular combination of capital, labour and utilisation.

It must be concluded, then, that a neoclassical theory of the determination of the equilibrium degree of capacity utilisation cannot but be entirely consistent with the choice-

theoretic foundations proper to neoclassical theory. This implies that it is only through changes in utility and production functions that capital (or capacity) utilisation can be of any relevance to growth. Changes in the degree of capacity utilisation will occur, for instance, if workers develop a different attitude to working unsocial hours and accept a given wage differential which they were not prepared to accept before. In the remainder of this section, we shall examine two growth models where the production function has been extended to allow for a variable degree of capacity utilisation, with the ultimate aim of appreciating the relevance of capacity utilisation to growth whenever the conditions typical of the neoclassical regime prevail.

3.2.2. *Marris' model.*

It was Marris, in 1964, who first carried out this extension of the production function, thus allowing for a consistent treatment of utilisation in a neoclassical growth model. In this book, Marris provides a definition of the optimal degree of capacity utilisation and examines the implications of this notion for equilibrium growth. This notion is based on the balance of two opposing forces, the declining unit cost of capital as utilisation is increased, and the simultaneous increase in the cost of those inputs whose prices vary rhythmically. The most natural instance of these prices is provided by wage differentials which must be paid for working unsocial hours. When these opposing elements are considered, it becomes clear that a problem of optimal use of capital equipment arises. In Marris' analysis the choice of the optimal degree of capacity utilisation, as well as depending on wage differentials, depends also on the relation between the basic wage and labour productivity and on the scale of production. The reason is the following:

If the basic wage is low relative to productivity, the ratio of wages to profits without shift-work will be low. Therefore a given proportionate increase in wages due to the shift premium will cause a relatively small increase in total costs;...And if the scale of production is large, shift-work is less likely to be hindered by 'indivisibilities' in capital equipment. (Marris, 1964, p. 23)

As already noted at the beginning of this section, from the point of view of the economy as a whole, capacity utilisation is an alternative source of savings. Thus, if we hold constant the rate of growth, an increase in utilisation must be associated with a lower

saving propensity. Alternatively, given the saving propensity and the capital coefficient

(or capital productivity), an increase in utilisation will have beneficial effects on growth.[1]

Marris makes the assumption that profits are entirely saved and wages entirely consumed:

a different saving propensity, therefore, implies a different distribution of income. But a

different distribution of income, in turn, affects the optimal degree of capacity utilisation.

Taking into account these relations Marris presents the following growth model:

$$s^* = \frac{g}{hk}$$

$$h = h(s, w^o, O)$$

$$s = s^*$$

where g is the natural rate of growth, k a measure of capital productivity, h the degree of

capacity utilisation, w^o the average wage differential, s the propensity to save, s^* that

particular value of s required to sustain natural growth given h and k, and O a measure of

the level of production. The first equation shows that, given the technique in use, if the

rate of growth is to be held constant, the rate of utilisation and the saving propensity must

vary in the opposite direction. The second equation shows that the optimal degree of

capacity utilisation depends on income distribution, wage differentials and the scale of

production. The third equation shows that the saving propensity required to achieve

natural growth must be equal to that level which justifies the given degree of capacity

utilisation. So we have three equations which determine three unknowns, s, s^*, and h,

that is, the equilibrium combination of utilisation and income distribution which will

allow the economy to grow at the natural rate.[2]

Among the parameters of this model wage differentials play an important role. They

can be taken to reflect workers' dislike for working unsocial hours. Thus, low degrees of

capacity utilisation, resulting from high wage differentials, will be taken as evidence of a

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[1]See also Winston (1971) where the emphasis is on underdeveloped countries.

[2]No room can be found in this model for an independent investment function. If we let the degree of capital utilisation be determined by the need to satisfy entrepreneurial investment propensities, the system would clearly become overdetermined. That autonomous investment does not play any role in this analysis is clearly stated by Marris: "...we shall assume that whatever the level of total output associated with the planned rate of utilisation, the government or some other body ensures that investment, defined as the volume of orders for new capital goods, is precisely equal to the savings forthcoming at this level of output, and total demand is therefore always in balance with total supply." (Marris, 1964, p.12)

strong dislike for shiftwork. This regime would necessarily imply low rates of consumption or low accumulation per head. A change in workers' attitude, due, for example, to an improvement in the transport system during those hours, will be followed by a change in wage differentials. As a result of this the optimal degree of capacity utilisation will change. Higher consumption or higher accumulation per head will then become possible. But no change in the rate of growth will take place, as this is always determined exogenously by the rate of growth of the labour force. Therefore, the essence of this contribution - following Winston - is "that under-utilisation is not primarily the result of irrationalities and misconceived planning. It appears, instead, to be largely a rational response to a widespread preference for working at a 'normal' time of day".[1]

3.2.3. *Betancourt and Clague's model.* In the model just presented, the capital coefficient k is assumed to stay constant. In neoclassical theory, however, changes in income distribution are associated with changes in the chosen technique, with the result that the adjustment process becomes more complex. Although this aspect is not overlooked by Marris,[2] he does not assume a production function with a possibility of continuous substitution between labour and capital. This extension is carried out in another important work on the economics of capital utilisation, namely Betancourt and Clague (1981).[3] In this work, Betancourt and Clague show that, provided the production function fulfils certain conditions, an increase in the rate of capital utilisation is generally associated with a higher capital:labour ratio.[4] The intuitive explanation of this result is that the factor which has become less expensive will be used more intensively.[5] So it becomes possible now to reformulate Marris' simple model and to take into account changes in the technique of production. The main implication of this reformulation will be that, given the rate of increase in the labour force, the production possibilities and the

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[1]Winston (1971), p. 57.
[2]See Marris (1964), chapter 2.
[3]An earlier attempt to integrate Marris' contribution into orthodox production theory is Winston (1974), where a more general theory of capital utilisation and idleness is presented.
[4]For a different result see Calvo (1975).
[5]See Betancourt and Clague (1981), chapter 1, p. 17, where this result is presented as *Proposition 1.*

propensity to save, a particular combination of the rate of capital utilisation and the technical capital:labour ratio will be established in equilibrium.[1]

In order to take account of a variable capital:labour ratio, Betancourt and Clague use Solow's model and add to it a term representing the degree of capital utilisation. Then we have the following system: [2]

(1) $$\frac{\Delta L_t}{L_t} = \gamma$$

(2) $$Q_t = F(uK_t, L_t)$$

(3) $$\Delta K_t = sQ_t$$

where (1) establishes the rate of growth of the labour force, (2) represents the production function, with u measuring the degree of capital utilisation, and (3) shows that investment must be equal to saving. In the last equation ΔK_t and s represent, respectively, the addition to the capital stock at time t and the propensity to save. Since constant returns to scale are assumed, we can write the production function in the following way:

$$q = f(uk)$$

where q represents output per worker and k the capital:labour ratio. If we divide the saving-investment equality by the amount of labour L_t, the system can be rewritten.

$$sq = sf(uk)$$

$$\gamma k = sq$$

So, given the rate of increase in the labour force γ, the propensity to save s and the degree of capital utilisation u, the system will determine the equilibrium values of the capital:labour ratio k and of investment per worker sq. This solution can be given a graphical representation as in Figure 3.1.

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[1]A theory of capital utilisation instead of a more general theory of capacity utilisation is offered in Betancourt and Clague's contribution. This means that only duration in the utilisation of capital is taken into account, while speed is not considered.
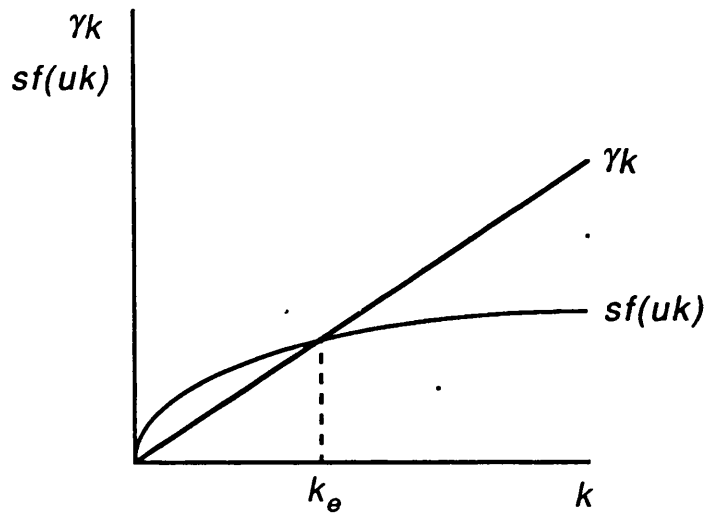[2]See Betancourt and Clague (1981), chapter 10, par. 2.

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Figure 3.1

As may be seen a change in the degree of utilisation has the same effect as a change in the propensity to save. A change in either of these shifts the function $sq = sf(uk)$ upwards. The final equilibrium value of the degree of capital utilisation will depend, however, on the particular relation between k and u. What is possible to say is that if the equilibrium degree of utilisation is higher and the propensity to save has not changed, then higher accumulation per worker and, hence, higher output per worker, become ⁻ possible.

To conclude, this is a model where the macro notion of capacity must be understood with respect to its micro counterpart. There is no macroeconomic causal relation to determine the degree of capacity utilisation: no effective demand gets in the way of the establishment of a normal degree of utilisation. Utilisation can be relevant to growth only through its normal value, which is established as that value which makes the equilibrium positions of individual agents mutually compatible. One has to look therefore at the determinants of that normal value and at the relations between this normal value and the equilibrium value of the other variables in the model to interpret the relation between capacity utilisation and growth.[1]

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[1] In Foss (1981) changes in the degree of capacity utilisation between 1929 and 1976 are explained mainly by resorting to the micro theory of capacity utilisation. See also Oi (1981) for a similar interpretation of

3.3. *Capacity utilisation and the Keynesian theory of distribution*

Entrepreneurial investment propensities are at the heart of the so-called neo-Keynesian regime, and yet output can always be sold if the conditions proper to this regime prevail. For this result to be possible what is obviously required is that consumption can always make up for any shortfall of investment or be reduced whenever investment rises. When this is the case investment can display any independent dynamics, without this affecting the overall level of demand. Therefore, investment can be carried out in the expectation that capacity will always be fully utilised. A different matter, of course, is whether enough profits will be obtained for that investment to be fully justified. But this is precisely what the neo-Keynesian regime is all about. The mechanism which makes all this possible is the combination of differential saving propensities with flexible distributive shares. Thus, what is basically assumed in the neo-Keynesian case is that the saving rate, i.e. saving per unit of capital, always adjusts to the accumulation rate. When such flexibility applies, there seems to be no obstacle for normal utilisation to be established.

As mentioned at the beginning of this chapter this model implies in the general case the condition $g \neq n$, from which follows $L_t^s \neq L_t^d$. It also implies the condition $\frac{K_t}{X_t} = a_1$, from which follows $\frac{\Delta K}{K} = \frac{\Delta X}{X}$. Unlike the neoclassical model where the scale of the system is implicitly determined by the condition $L_t^s = L_t^d$ [1], in this case the scale is left unspecified. It is determined in another part of the theory without impinging on the determination of the endogenous rate of growth. Any exogenous change in the average scale of the economy is dealt with successfully by means of a process of rescaling which changes the average level of all the macro variables without changing their rate of growth. This means that changes in X_t will be followed by proportionate changes in K_t while everything else stays the same. In fact, in order to avoid the complications of changes in X_t, they are ruled out altogether in post-Keynesian growth theory. Changes in demand are reflected in variations of the share of profits, not in variations of the output sold.

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data. Basically the observed increase in the degree of capacity utilisation over this period is viewed as a response to changing relative factor prices.

[1] We set aside the difficulties, which arise in this context, regarding the realisation of this condition.

Skott has criticized Kaldor's model precisely on this point, arguing that the influence of output on the desired capital stock does not represent in Kaldor an accelerator mechanism.[1] Since the level of output is determined by the assumption of full capacity utilisation, any variation in demand alters the profitability of investment only by changing the share of profits in income. When such changes in demand occur, assuming that investment is relatively insensitive to profitability as compared to saving, a new equilibrium with a different rate of growth and a different rate of profit will be established. No change in the degree of capacity utilisation will take place, however.

When changes in the level of output do occur, what is crucial, for the system not to surrender to Harrodian instability, is that investment profitability as perceived by investors remain unaffected by such occurrances. What higher or lower levels of output (degree of capacity utilisation) should signal then is not that capital is more or less capable of generating profits, but that more or less capital is required in the economy. When this is the case, the excess capacity can be removed or the additional capacity created, without endangering the previously (before the change in demand) established rates of profit and growth. If, on the other hand, a change in the level of output, and hence in profits, is supposed to signal a change in investment profitability, the so-called neo-Keynesian model may no longer be the relevant model of the economy. Demand becomes another source of profits alongside distribution, which is the only source of profits considered in that model.

So the neo-Keynesian case stands out as the model where long-period equilibrium cannot be disturbed by changes in the level of output, because such changes are either ruled out or reduced to minor disturbances unlikely to take the economy away from its long-period growth path. But what is required for these changes to be considered effectively minor disturbances? In other words, what is required for the observation of other-than-normal profits and other-than-normal degrees of capacity utilisation not to affect the expected profitability of investment in the long term? or, what is required to make the tendency to a fully adjusted growth path constantly effective?

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[1]See Skott (1989), p. 26.

To start with, it must be recalled that the task of rescaling the economy can be accomplished either by a temporary reduction or acceleration of the rate of growth, or by removal or addition of capacity as required. In fact, the removal or the addition of the required capacity can be viewed as an instantaneous fall or increase in the rate of growth. This means that the "traverse" from one long-period equilibrium to another, which differs from the first only in its average scale, can be instantaneous or can require different lengths of time. For it to be instantaneous excess capacity must be wiped out as soon as demand falls. This is possible when fierce competition drives marginal firms out of the market. Similarly, additional capacity must be installed as soon as demand rises. Clearly this will be the case if it is possible to draw on an internal reserve of capital equipment or to a external market. Otherwise new equipment has to be produced before it can be installed.

As Kaldor came to admit in one of his last contributions, it is a fact that excess capacity is not usually wiped out by a fall in demand.

...the stylized facts derived from observation suggest that when there is a recession or a slump *all* firms suffer a loss in demand, and the reduction of output is distributed among the different firms more or less equally, and not concentrated on the inefficient tail of the industry. ...The relatively inefficient firms suffer the penalty of low profits, which means that from the point of view of the *buyer* it is a matter of indifference whether he buys from a high-cost or a low-cost firm. The high-cost firm can compete effectively with the low-cost firm because its inefficiency is not reflected in its prices, only in its profits. (Kaldor, 1985, pp. 46/47)

So when competition is superseded by a state of affairs in which firms are price-makers and quantity-takers instead of being price-takers and quantity-makers, instantaneous adjustment, at least in the event of a fall in demand, should be ruled out. But increases in demand do not lead to instantaneous adjustment either. Reserves of capacity, if they are held at all, are held by firms already in existence. The important implication of this is that reserves of capacity enter already in the calculation of the rate of profit. Therefore, bringing that capacity into use when demand is higher will not re-establish the old rate of profit. It will increase it.

What is left, then, is a more or less quick process of adjustment of capacity to demand by means of a temporary reduction or acceleration of the rate of growth. Indeed, the question here is whether it is quick enough to justify focusing exclusively on the

long-term growth path; or whether adjustment plays such an important part in the story that it becomes difficult to justify that exclusive focus. Growth might be more adequately explained by looking at adjustments paths than at long-term paths. There is also the possibility that what happens outside the equilibrium path leads to a modification of this very path. The expected profitability of investment might be altered by a variable rate of profit and a variable degree of capacity utilisation. So the answer to the question concerning the requirements for variations in output and utilisation to be considered minor disturbances really depends on the existence of mechanisms which can cut short the adjustment process. These mechanisms are the same as those which ensure instantaneous adjustment. There they operate instantaneously. But a very quick adjustment still justifies the emphasis on equilibrium paths.

So competition is required not only to ensure the system's long-period dynamics (if prices were not flexible the saving rate could not adjust to the accumulation rate) but also to ensure that short-term disturbances do not impinge on those long-period dynamics. Even if we assumed that prices were exactly at the level required for desired accumulation, changes in the level of output would become a serious problem if competition did not prevail. Indeed, as the case of a higher that normal level of output shows, a competitive economy may not be sufficient to rid the model of all its problems. What, in actual fact, the neo-Keynesian case requires is the assumption of instantaneous (or nearly instantaneous) adjustment. And there is no reason to restrict a competitive economy to one where such an adjustment takes place. When instantaneous adjustment is ruled out, the economy might spend a considerable length of time out of equilibrium. Hence, to show that normal capacity utilisation will be restored alongside its associated normal rates of profit and growth, an adjustment mechanism has to be specified. We move from a case (the neo-Keynesian case) where no 'traverse' analysis is conducted, because the system is supposed to move instantaneously from one long-period position to another, to a case where such analysis is necessary, because the system does spend time out of equilibrium. An attempt to model the path the economy follows between two fully adjusted situations has been made by some 'surplus approach' theorists.

Before moving to the 'surplus approach' theorists an important development in post-Keynesian dynamic theory must be mentioned. This is associated with the works of Eichner, Harcourt, Asimakopulos and others. The most prominent feature of these contributions is the intimate relation established between pricing and investment decisions. One of their implications is the endogenous determination of the degree of capacity utilisation. However, as should immediately become clear, this model of capital accumulation cannot be associated with the so-called capacity utilisation model. What distinguishes the two models is that while in the former the endogenous determination of the degree of utilisation is consistent with firms' long-term expectations, in the latter no such consistency is assumed.[1] It follows from this fundamental difference that the comments made with respect to the standardized neo-Keynesian model apply to this particular development as well. Here, too, the flexibility in the price-cost relation and the effectiveness of the tendency towards the long-term growth path make sure that no capacity utilisation problem arises.

Eichner's theory of pricing in the oligopolistic sector of the economy was intended to

specify the mechanism by which the aggregate savings rate is adjusted to determine the warranted growth rate in post-Keynesian macro-dynamic models. (Eichner, 1973, p. 1196)

In line-with (what here is called) the neo-Keynesian growth model, then, the adjustment of the economy to the equilibrium rate of growth is accomplished through a flexible saving ratio, although the flexibility of the saving ratio here hinges upon the ability of the firms to set prices and not on the differential saving hypothesis. Firms are assumed capable of manipulating the profit margins so as to obtain the finance required for their investment programme, with the result that variations in the saving ratio becomes the economy's key adjustment mechanism to different rates of growth. Some notion of normal utilisation is therefore implicit in Eichner's model. Oligopolistic firms will always see to it that they have sufficient capacity so as to face peaks in demand and that, at the same time, the degree of utilisation does not go below certain levels. A low degree of

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[1]This statement will become clearer as we proceed in the discussion of the capacity utilisation model.

capital utilisation is a real cost for the firm, and this is always taken into account in its price setting behaviour.

...the price in an oligopolistic industry will normally be set so as to result in the members of that industry operating at between 65 and 96 per cent of engineer-rated capacity ...(Eichner, 1976, p. 47)

The last proposition suggests that, in Eichner's analysis, normal utilisation is, in fact, more a range of values than one specific value. This should not surprise, for, in this context, the notion of normal utilisation is indissolubly linked to the price and investment policy of the firm. For example, a lower degree of utilisation will be accepted if this lower level is implied in the solution of some optimization process designed to enhance the long-term growth prospects of the 'megacorp'.[1] So, unlike the previous approaches, here normal utilisation implies more than just short-run profit maximization. The typical time horizon of the oligopolistic firm is the long term and, therefore, any decision is judged according to the effects which it might have within that time horizon. What all this fundamentally implies is the rather heroic assumption that the process of accumulation and its various aspects are simultaneously considered, held together and constantly monitored. As a result of this the best possible combination of price, investment and degree of utilisation will be chosen. Eichner puts the point very clearly;

Thus the pricing decision in an oligopolistic industry is intimately bound up with the capital accumulation process. This linking of the price level to the industry's investment program is, in fact, the single most important feature of the pricing model set forth below. (Eichner, 1976, p. 56)

This approach, therefore, encompasses within a single analytical framework both the demand side and the production side of investment. In fact, they become inseparable. The contradictory nature of accumulation is here resolved by assuming that the most fundamental task of the megacorp is precisely to tame that nature.

To sum up, the mark-up over cost will be determined in such a way as to generate enough internal finance to carry out the planned investment expenditure. Moreover, the selected mark-up rate will be, loosely speaking,[2] optimal. This choice will result in the maximization of the long-term growth rate of the oligopolistic firm. Implicit in that

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[1]This is the term Eichner uses for the modern oligopolistic firm.
[2]See Eichner (1976), p. 97.

solution is also a particular degree of capacity utilisation, which will be reflected in the real cost the firm is prepared to pay in order to secure a given amount of additional internal funds. The notion of normal utilisation is, therefore, an entirely endogenous notion. At the same time it is what the firms expected to realise.

An approach similar to Eichner's is adopted in Harcourt and Kenyon (1976).[1] There it is argued that the firm

> chooses a mark-up that will produce the required level of retained profits with which to finance the desired investment expenditure, and persists with the implied price, allowing capacity to vary with the level of demand around some average expected level associated with the chosen mark-up. (p. 454)

Here, too, a steady pattern of accumulation is possible, where capacity grows in step with demand, and where the degree of capacity utilisation and the mark-up are those which solve the firm's optimization problem.

This approach, therefore, does not show how a capacity utilisation problem may arise. Assumptions are made for this to be the case. One of these is the emphasis on equilibrium paths as compared to that placed on adjustment paths. As mentioned earlier, an attempt to model the way the economy moves from one long-term growth path to another has been made by 'surplus approach' theorists. It is to this attempt that we now turn.

3.4. *Capacity utilisation and the 'surplus approach'*

It was certainly noticed that no discussion of the determinants of normal utilisation was carried out in the previous section. It was simply assumed that normal capacity utilisation is somehow determined, while some space was devoted to the problems involved in its re-establishment once any departure from it occurs. In fact, in this context, the notion of normal capacity utilisation is not very different from the similar notion in neoclassical theory. It is that level of capacity utilisation which would be chosen if firms

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[1]The same general idea underlying these models can be also found in Riach (1971) and Asimakopulos (1975). There, the argument is made that the monopoly power is chiefly directed towards obtaining, or protecting, a particular rate of return on capital. This implies, quite clearly, that pricing decisions cannot sidestep investment decisions and, indeed, the requirements of the long-period growth of the firm. Thus, the same idea of optimality underlies the pricing decision in this approach as well as in Eichner's.

were price-takers and quantity-makers. It is the conditions required for its establishment that are obviously different: here, unlike the neoclassical case, the Keynesian hypothesis, implying that investment determines saving and not the other way round, makes the task of restoring normal utilisation more problematic. There is a non-neoclassical theory of normal capacity utilisation, however, and the reason why we mention it now is that it has been developed mainly along Sraffian lines.[1] Thus before embarking upon the question of the adjustment mechanism, some space should be devoted to it.

Joan Robinson did not go any further than saying: "In long-run competitive equilibrium the relation of total income to the stock of capital is determined within certain limits by technical conditions" (Robinson, 1962, p. 11). No separation was therefore emphasized between the capital coefficient proper and the degree of capacity utilisation, the implication being that such degree is somehow exogenously determined. In fact, as Kurz has emphasized, the choice of the degree of capacity utilisation is an integral part of the choice-of-technique problem.[2] Therefore, it should be treated in exactly the same way.

A proper treatment of normal capital utilisation within the analytical framework of the surplus approach presupposes a reformulation of the three sets of data of that approach, as they are conventionally specified, i.e. (i) the methods of production available, (ii) the ruling distribution of income, and (iii) the level and composition of output. (Kurz, 1986, p. 46)

In the case of capacity utilisation, the methods of production refer to the different systems of operation (different shift-work structures, for example) available; the distribution of income refers to the current structure of wage differentials; finally, the level and composition of output refer to the temporal pattern of output (different patterns of fluctuations in output may require different average normal degrees of capacity utilisation). When the specification of the relevant data[3] is complete, the optimal degree of capacity utilisation can be selected as the cost-minimizing degree or as the degree which maximizes the rate of profit,[4] just as the optimal technique is chosen as the technique

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[1]For the notion of competition typical of this approach see Eatwell (1981).

[2]For a general treatment of the choice-of-technique problem, see Pasinetti (1977), ch. 6.

[3]Obviously they include also the technical methods of production, the basic wage rate and the level and composition of output.

[4]In Kurz (1990a) the same problem is analysed in the case of a two-sector economy.

which maximizes the rate of profit, once the relevant data are fully specified. There is obviously no reason why the optimal degree of capacity utilisation should coincide with the technically highest feasible degree.

It is clear that normal capacity utilisation is, in Kurz's analysis, an entirely microeconomic notion, and the important implication of this is that any macro notion of capacity should eventually come to terms with it. Kurz puts particular emphasis on this point:

> ...it is by no means plausible that the competitive decisions of entrepreneurs should deliberately aim at the preservation or restoration of a degree of utilisation of productive capacity which is not profit maximizing and therefore, under competition, cost minimizing. (Kurz, 1986, p. 52)

The other important implication of Kurz's notion of normal utilisation is that any deviation from that rate is bound to reduce the rate of profit. That profits should be reduced with falling utilisation is quite straightforward. It is not so straightforward that profits should be reduced when utilisation rises above normal. Despite the fact that reserves of capacity exist at any single time, Kurz tends to rule out that increasing utilisation above normal leads in the general case to any increase in profits.[1] But this is at odds with another central tenet of the 'surplus approach', namely, the elasticity the system displays in providing the extra capacity required for any increase in output. Garegnani (1992) and Kurz (1992)[2] stress such elasticity especially with respect to the inherent tendency of the system to move towards a fully adjusted situation, after changes in the pattern of demand cause it to move away from normal capacity utilisation. Rather than acting on the real wage, additional productive capacity can be created by taking advantage of the margins of unused capacity which are usually available in the economy. But why should producers be prepared to use their capacity more intensely if it is not profitable to do so? If, on the other hand, a higher rate of profit could be obtained by increasing the degree of capacity utilisation above normal, why should producers want to adjust capacity and realise a lower rate of profit? Garegnani points to the way out of it: one should distinguish the normal rate of profit from the actual rate of profit and allow for

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[1] As well as in Kurz (1986) the point is made in Kurz (1990b).
[2] This is a modified version of Kurz (1990b).

the possibility that the actual rate of profit rises above the normal rate. Super-normal profits can originate from different sources: firstly, quite naturally, from prices rising above their competitive level; secondly, from the use of the planned excess capacity;[1] finally, super-normal profits can result from the fact that the disadvantage of falling short of a given amount of excess capacity has not been taken into account in the calculation of costs.

Whatever the source of super-normal profits, there remains the fact that the rate of profit can at any one time be higher or lower than the normal rate of profit, which is the rate of profit associated with normal capacity utilisation, with these fluctuations being clearly the result of the role which in this context is given to effective demand. This context, therefore, is quite different from the previously discussed neo-Keynesian one. There the normal rate of profit does not change unless the underlying assumptions of the model justify a different normal rate. Here actual profits are allowed to fluctuate around their norm. So one cannot rule out, at least in principle, that the perceived investment capability of generating profits is altered by the empirical evidence provided by actual profits. The question mentioned at the end of the last section can now be properly addressed.

In the previous chapter a model was presented incorporating the idea Garegnani has put forward and others have advocated whereby any desired variation in investment can be met by adequate adjustments of the productive capacity, with the result that no change in the normal distribution of income is required. In fact, no change is required in the actual distribution, either, for variations in the degree of capacity utilisation will make the task of changing the scale of the economy equally possible. So while in the neo-Keynesian case the scale of the economy is left unspecified, in the 'surplus approach' case it is one of the variables to be determined and is made to depend on desired investment. As to the rate of growth, here it is determined by the forces governing income distribution. If we assume, however, that normal distribution coincides with the particular distribution required for desired accumulation to be realised, the two models,

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[1]This might also imply an increase in prices.

the neo-Keynesian model and the 'surplus approach' model, can be compared with respect to their 'traverse' analysis. The fact that in the former changes in the *level* of demand are not traced back to their cause,[1] while in the latter they clearly result from changes in entrepreneurial investment propensities, is not relevant to our question.

A diagram may help clarify this question. If we plot the log of overall capacity on the vertical axis and time on the horizontal axis, any given growth path can be represented in the following way.
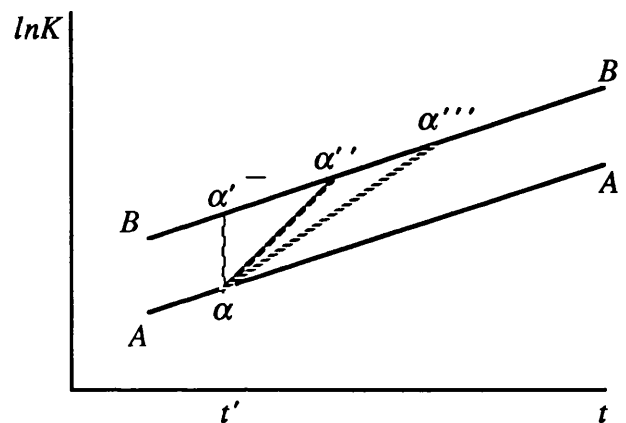

Figure 3.2

Suppose that at time t' the economy has to move from the path AA' to a different growth path which, however, is characterized by the same rate of growth. This means that it is only the average scale which has changed. Suppose the new growth path involves a higher average scale, the path BB'. Different routes are obviously possible. First, we have the route implicit in the neo-Keynesian model, the route $\alpha\alpha'$. This is the case of the instantaneous adjustment. But, as figure 3.2 shows, many other routes are possible. According to which route is taken, the time required to complete the adjustment will clearly be different. Since instantaneous adjustment is not contemplated by the 'surplus approach' theorists, one of the alternative routes will be the relevant one.

Although Garegnani and Kurz argue that the economy will find itself almost always off the normal growth path, they are not prepared to deny the normal growth path any

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[1] It would be difficult, in this context, not to attribute these changes to demand factors.

theoretical significance. Whatever the length of time the economy spends off the equilibrium path, it will nevertheless keep moving towards it. This means that actual profits and normal profits are kept rigidly separate, with the normal rate of profit never losing its role of long-term reference point. Once the necessary adjustment has been completed, actual profits will stop signalling that productive capacity needs to be changed and normal profits will take over as the main signal for investment decisions. The set is prepared then for the economy to move along the equilibrium path, unless a new change in demand starts the process all over again. That the tendency to move towards the equilibrium path is continuously at work is stressed in a number of contributions. Vianello (1985) and Ciccone (1986), for example, despite admitting that the average rate of accumulation might not have anything to do with the normal rate of accumulation, do not dismiss the notion of a normal rate of profit as the rate associated with normal capacity utilisation. The following passage provides an example of this approach.

It cannot be ruled out that for a while the efforts made to reduce productive capacity relative to production may be ineffective, or even have the perverse effect of widening the gap between potential output and demand. But under-utilisation, as well as over-utilisation, of productive capacity is by its very nature a temporary phenomenon... We shall suppose that the tendency to produce under normal conditions will prevail, eventually leading to a new fully adjusted situation. (Vianello, 1985, pp. 81/82)

When evaluating these contributions it is not easy to avoid the impression that the normal rate of profit is, in actual fact, devoid of any significance. If the actual rate of profit can be, even on average, different from the normal rate of profit, why should expected investment profitability carry on being based on that rate? On what grounds would normal profits be an appropriate signal for investment decisions? More importantly, how are investors supposed to get to know that rate? Steindl, in commenting on the usefulness of the distinction between actual and normal profits, has shown scepticism.

This distinction is quite legitimate analytically. But do managers live with such a dichotomy? It would rather seem that they cannot have much interest in calculating, on the basis of a normal profit rate, normal prices that will never become reality however long the run. To my mind what this amounts to is only the recognition that there is never a long-run equilibrium in an economy with changing accumulation rates (and there is no gravity either). (Steindl, 1990, p. 430)

This distinction represents, therefore, an instance of inadequate macro foundations of microeconomics. What is overlooked is the dual role of investment, its capacity-creating *versus* its income-generating role, with the two roles kept separate for the sake of not interfering with each other. The way this separation is realised is precisely by means of the normal rate of profit, i.e. the rate of profit associated with normal capacity utilisation. In Eatwell (1983) the double-faced nature of investment is acknowledged, but the solution provided implies a final and explicit rejection of any notion of autonomous investment in its income-generating role.

The origin of the problem is that on the one hand investment is assumed to be the independent variable, whilst on the other hand variation in the composition and perhaps the overall size of investment is the mechanism by which capacity is adjusted to demand. The solution may be found in Keynes's own analysis of long-period employment; it is *not* investment which is the independent variable, it is the 'state of long-term expectations'. (p. 282)

Each state of long-term expectations will be associated with a particular level of demand and, hence, with a particular stock of productive capacity. If the state of long-term expectation changes an adjustment process will be started off, "but the usual oscillations and instabilities of multiplier-accelerator models will be damped by the *fixed* level of demand associated with the state of long-term expectation" (Eatwell, 1983, p. 283).

However, as Kregel[1] reminds us, Keynes did not fail to consider the possibility that long-term expectations might be influenced by events of a shorter-run character. His *shifting equilibrium* model is precisely designed to allow for such a possibility. The events of a shorter-run character are, in our context, different from Keynes' short-term expectations, but the idea behind this procedure is the same: long-run tendencies may not be independent from short-run occurrances. Here, the particular relation we are concerned with is that between long-term expectations and medium-term expectations. As suggested in the general Introduction, the former reflect the capability of investment to generate profits, the latter the need to adjust capacity. In the models discussed so far, there is no explicit consideration of the medium term and medium-term expectations, however.[2] In the neo-Keynesian case, the problem does not even arise because

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[1]Kregel, 1976.

[2]Since we are considering this problem in connection with the operation of the principle of effective demand, the neoclassical case need not be mentioned.

departures from normal capacity utilisation are ruled out: capacity is always adjusted to demand and adjustments are instantaneous. This is not the case in the 'surplus approach' where the normal growth path is nothing but a centre of gravity. Capacity is, in most cases, unadjusted to demand, while accumulation goes on at some more or less regular pace. The medium term,[1] then, should be the appropriate setting for analyzing the problems of accumulation. However, it is somehow implicitly assumed that the time-run is long enough for the medium term always to come to an end and long-term analysis not to become meaningless. So while in the neo-Keynesian case the medium term and medium-term expectations do not exist, in the 'surplus approach', although in actual fact contemplated, the medium term is played down with the purpose of not putting long-term analysis at risk. When medium-term occurrances, like, for instance, disappointment of medium-term expectations, are allowed to affect long-term variables, the tendency of the system to move towards the normal growth path might be constantly frustrated.

Such a state of affairs is what Steindl takes as typical of modern capitalist economies. The attempt to adjust capacity in order to restore normal capacity utilisation will, in Steindl's opinion, drive the economy further and further away from the growth path associated with normal capacity utilisation. It is to his ideas that we now briefly turn.

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3.5. *Steindl's stagnationist theory*

The necessary association of the neo-Keynesian regime of growth with a competitive economy has been emphasized by Steindl. He has pointed out that the emergence of oligopolistic elements in contemporary economies has marked the erosion of the neo-Keynesian phase of growth and the subsequent establishment of a different growth regime. A competitive economy - in Steindl's words - is an economy with 'a great number of producers, many of them near the margin of existence'. In the case of a fall in

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[1]In terms of the diagram shown above, the medium term corresponds to the dotted lines linking two long-term growth paths.

demand, instantaneous adjustment is what we should expect from this economy. When a competitive economy is superseded by an oligopolistic economy

aggressive price strategies become very risky, because the few main producers all have substantial margins, and to drive out one of them would require a ruinous price war. If the growth rate declines, the oligopolists are therefore more prepared in most cases to accept low long-term rates of utilisation than to engage in cut-throat competition. That means that the profit function becomes fairly rigid, and the weight of the adjustment is thrown on utilisation, with adverse effects on investment and further growth. (Steindl, 1979, p. 7)

In this kind of economy, the mechanism by which surplus capital is squeezed out, typical of a competitive economy, is destroyed. Instantaneous adjustment is therefore ruled out. Consequently, the economy will experience lower than normal rates of capacity utilisation. It is Steindl's main contention that the economy may never recover from such low rates of utilisation, with the result that it may stagnate at low rates of utilisation and low rates of growth or, worse, experience a continuous decline in utilisation and growth.

Two kinds of models can therefore be inspired by Steindl's work. If the economy effectively settles at low rates of growth and utilisation, an equilibrium might be said to exist where at least one set of expectations must be realised. Medium-term expectations, as defined in this work, might constitute the set of expectations which is realised at this equilibrium. Long-term expectations would, however, be kept constant. Alternatively, in a second kind of models, disappointment of medium-term expectations can be supposed to affect long-term expectations. The resulting picture would be one of a continuously shifting equilibrium. In the case of a downward adjustment, which in fact is the only one considered by Steindl, the picture would be one of declining growth and utilisation.[1]

In fact, there is a third kind of model which Steindl's work can inspire. The following passage provides the fundamental idea.

We need to distinguish between those shifts to or from profits which are due to effective demand, and those which result from changed price-cost relations independent of demand. The neoclassical tradition now *en vogue* takes great delight in confusing these two cases of a shift in profit. In fact, neoclassicism does not admit of anything but full utilisation in the long run, and even in the short run adopts the same assumption when considering practical problems. For the Keynesian tradition, on the other hand, the concept of utilisation is of central importance. (Steindl, 1979, p. 3)

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[1] It might be argued that Steindl's declining growth and utilisation rates might be the result of fixed long-term expectations and an unstable medium-term equilibrium. This interpretation would run into some difficulties. The reason is that the fixity of long-term expectations will, at some point, rescue the system from plunging further into depression.

This means that normal profits, i.e. those which are associated with a constant level of demand, and non-normal profits, those which depend on demand deviating from that level, are put on the same level, with the result that both acquire long-period status. Thus, instead of having long-term expectations shifting as a result of disappointed medium-term expectations, we would have the medium term and the long term complementing each other. Effectively, the result is that the long term is absorbed into the medium term. Investment would be decided by considering both sources of profits; the profits which can be obtained if no demand problem existed, that is, at normal capacity utilisation, and the profits, which can be positive or negative, which result from demand determining output.

Thus Steindl's work offers a variety of sources of inspiration for the construction of a growth model whose main feature is the relation between demand and capacity utilisation. In the previous models effective demand does not affect utilisation, either because it is ruled out altogether, or because assisting mechanisms are postulated to make sure that such relation does not impinge on the functioning of the model. No such mechanisms are assumed in Steindl's analysis. The result of this is that, now, it becomes fully apparent what are the possible implications of demand being allowed to affect utilisation. When these implications become clear, it may be that a new regime of growth emerges as one where the interplay between capacity utilisation and demand assumes centre stage. At that point it will become necessary to explain on what grounds this growth regime can be said to be sustainable.

3.6. *Conclusion*

The excursion carried out in this chapter through a variety of models was intended to show how a capacity utilisation problem could arise in a growth context. When no limits to production come from effective demand, as in the neoclassical case, the theory of capacity utilisation reduces to the theory of normal or optimal capacity utilisation. When a mechanism exists to make up for any variation in investment, thus keeping demand at a

constant level, no change in the degree of capacity utilisation is obviously required. Such a mechanism is the flexibility in income distribution and applies to the neo-Keynesian case. Finally, when changes in demand and utilisation are not ruled out, but normal profits and normal utilisation do not cease to act as centres of gravity of the system, over- and under-utilisation of capacity might still be regarded as temporary phenomena. Such arguments are those advocated by neo-Ricardians.

So, when effective demand is not ruled out altogether and, also, operates through variations in the level of output and utilisation rather through the share of profits in income, and when at the same time the power of attraction of normal profits and normal utilisation is not immediately taken for granted and is, so to speak, suspended, then a problem arises as to how to model the growth of an economy which is experiencing such a state of affairs.

The following chapter will address this problem. The argument will be developed on the basis of the available literature on the capacity utilisation model. However, a re-interpretation of this literature will be offered. Such re-interpretation will be achieved through the introduction in the analysis of the notion of the medium term and of its related notions of medium-term profits and medium-term expectations. By doing so it will become clear that steady growth is possible even when the current degree of capacity utilisation is different from a predetermined normal degree. In fact, normal utilisation could also disappear altogether from the analysis. However, it is only as a variant of medium-term analysis that this possibility can be understood. In all cases, medium-term analysis must be placed within the so-called steady-state approach to unsteady growth. For it is still a historical story that has to be told. For this reason the specification of the institutional and conventional arrangements underlying the model is also required. This will be the subject of the final chapter.

CAPACITY UTILISATION AND THE MEDIUM TERM

4.1. *Introduction*

This chapter will present the argument that the so-called capacity utilisation model is, fundamentally, a kind of stationary model where long-term expectations are fixed while medium-term expectations are allowed to be disappointed. This interpretation should offer a solution to the debate[1] over whether these models are truly steady-state models or simply amount to an application of the short-period Keynesian multiplier with a given investment function. Although they use the steady-state method, they are not truly steady-state models because the question of whether long-term expectations are realised or not is not addressed. At the same time they do not amount to a simple application of the short-period multiplier because the time-run they consider is long enough for capacity to change. The appropriate setting for these models is, then, the medium term, when capacity is in the process of being adjusted to demand, but when full adjustment has not yet been reached.

It was Steindl who stressed the possibility that modern capitalist economies might be found stagnating at low rates of growth and low rates of capacity utilisation. The main reason for this was the inflexibility of the profit share due to the fact that no oligopolist will risk a price war, preferring low capacity utilisation to an active price policy. It is possible to say that the capacity utilisation model has made Steindl's proposition more general by allowing above normal as well as below normal rates of growth and capacity

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[1]This debate has mainly taken place in *Political Economy* since 1986.

utilisation. Steindl's assumption that firms have a target rate of capacity utilisation is also retained.

Mark-up pricing is always assumed in the capacity utilisation model. It reflects the belief that in a competitive economy other-than-normal degrees of capacity utilisation are, by their very nature, a temporary phenomenon. In fact, there is no reason why the capacity utilisation model should be restricted to a non-competitive economy. What is at issue here is the role of effective demand and the possibility that it limits the degree of utilisation of capacity in the longer term as well as in the short term. Such a macroeconomic relation can constrain a competitive economy just as well as a non-competitive economy. Unless one is prepared to identify a competitive economy with one where instantaneous adjustment takes place, all kinds of economies will experience other-than-normal rates of capacity utilisation. If, in addition, what is being discussed is medium-term equilibrium instead of long-term equilibrium, a regime of growth which features other-than-normal rates of capacity utilisation is entirely compatible with the assumption of a competitive economy.

In the following the main literature on the capacity utilisation model will be surveyed. Through the survey the argument put forward here will be gradually constructed. After having illustrated the original version of the model (Rowthorn, 1982), other contributions will be considered. It will be shown that the models are not addressing a typically short-term problem. At the same time, the fact that the assumption of a target degree of capacity utilisation is retained (either implicitly or explicitly) shows that they are not addressing a long-term problem either. What they are addressing is whether utilisation and effective demand pose a sensible question outside the short term, and whether steady growth can result from a situation where the interplay between these two factors is given pride of place. As shown in the previous chapter, in long-period post-Keynesian growth theory, effective demand does not affect utilisation. The Keynesian multiplier is not used in its original formulation:[1] in Kaldor, the multiplier determines distribution, given the level of output; in the 'surplus approach' the multiplier determines the level of the capacity

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[1]Keynes' multiplier is in money terms. Here the aspect of Keynes' multiplier which is being considered is that it was meant to determine the level of output (in value terms) given capacity (in value terms).

installed. In the capacity utilisation model the Keynesian multiplier is applied in the way Keynes applied it, for it determines the level of output for any given level of available capacity, or, which amounts to the same thing, the degree of capacity utilisation. The implication must be then that there is a context, different from the short period, where the notion of effective demand per unit of capacity preserves its relevance. It is our opinion that this is the way in which the capacity utilisation model should be interpreted. In a sense, the original nature of the model is brought to light here. Such a nature will reveal that the model is as much within the Keynesian tradition as it is within the Kalecki-Steindl tradition. This means that the contribution offered here can be seen as yet another attempt to develop Keynesian themes outside the short period.

Before embarking on the capacity utilisation model proper, a very simple model will be presented showing how the extension of the principle of effective demand beyond the short period works out. To show that the operation of the Keynesian principle outside the short period is not necessarily associated with mark-up pricing, the model has been stripped of any assumption concerning income distribution.

4.2. *The Keynesian multiplier outside the short period*

The model is the following:

$$\frac{\Delta K}{K} = \alpha + \beta \frac{\Delta X}{X}$$

$$\frac{\Delta K}{K} = \frac{\Delta X}{X}$$

$$\frac{X}{K} = \frac{1}{s}\frac{\Delta K}{K}$$

We have then an investment function, a condition of steady growth and a saving function, which is, in fact, the Keynesian multiplier in its original formulation.[1] The system can be decomposed in two different parts. The first part consists of the investment

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[1]This is clear if we multiply both sides of the saving function by K.

function and the steady growth condition. Assuming that $\frac{\Delta K}{K}$ and $\frac{\Delta X}{X}$ represent, respectively, the rate of growth of the capital stock and the rate of growth of real demand, and assuming also that their equality is a condition of steady growth, it is possible to find that common value g of the two rates of growth which is compatible with the investment function. This is easily determined:

$$g = \frac{\alpha}{1-\beta}$$

Once this rate of growth is determined the question arises as to what makes it sustainable. For any given level of capacity installed a particular rate of growth is possible either because enough saving in relation to capacity is forthcoming or because the capital:output ratio changes in accordance to that requirement. A combination of the two is also possible, of course. Since in this model no assumption concerning income distribution has been made, saving cannot be manipulated. It is the capital:output ratio, then, that has to change to ensure that saving in relation to capacity takes up the value determined in the first part of the system. We have, therefore, as the second part of our model:

$$\frac{X}{K} = \frac{1}{s}\, g$$

where $\frac{X}{K}$ is the output:capital ratio and s the propensity to save. As shown in *Chapter Two* the output:capital ratio consists of two components: a capital coefficient and a degree of capacity utilisation. If we let k stand for the capital coefficient and u for the degree of capacity utilisation the output-capital ratio is given by[1]

$$\frac{X}{K} = \frac{u}{k}$$

If we assume fixed coefficients, what actually adjusts is the degree of capacity utilisation. We have then the Keynesian multiplier in its original formulation, with the difference that now we are not interested in the scale of the system but in the relation between output and capacity. Substituting for $\frac{X}{K}$ and solving for u we have:

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[1]This is obtained dividing X and K by full capacity output X_f.

$$u = \frac{k}{s} g$$

So what this model determines is, first, a rate of growth of output and capacity which satisfies investors and, second, a degree of capacity utilisation which makes this rate of growth sustainable. That this is an application of the notion of effective demand per unit of available capacity can be seen by changing the parameters of the investment function: the degree of capacity utilisation will be affected accordingly. At the same time capacity is growing. So we have that demand factors determine capacity utilisation in a growth context. It must be noticed that there is a particular set of expectations which is fulfilled at this equilibrium: demand is growing as expected, so investors will be content with what they are doing and carry on investing at the same rate.

The particular formulation of this model implies that the pattern of investment demand is not affected by the established degree of utilisation, with the result that a high rate of growth might be associated with a low degree of capacity utilisation, and *vice versa*. There is no obstacle for this effect to be incorporated into the model. One way to go about this is to assume that low rates of capacity utilisation discourage investment, while high rates stimulate investment demand. The following modification of the previous model can be suggested.

$$\frac{\Delta K}{K} = \alpha + \beta \frac{X}{K}$$

$$\frac{X}{K} = \frac{1}{s} \frac{\Delta K}{K}$$

When the output:capital ratio is decomposed as before, the model changes in the following way;

$$\frac{\Delta K}{K} = \alpha + \frac{\beta}{k} u$$

$$u = \frac{k}{s} \frac{\Delta K}{K}$$

In this model a particular degree of capacity utilisation justifies a particular rate of capital accumulation, which means that the limits which effective demand places on capacity utilisation are allowed to affect investment. All this implies that the role of effective demand per unit of capacity is not confined to the analytical outcome of the model, but is extended in such a way as to become relevant for investment behaviour itself.

For equilibrium to be obtained capacity utilisation has to settle down at a level compatible with current investment. Figure 4.1 shows such equilibrium.
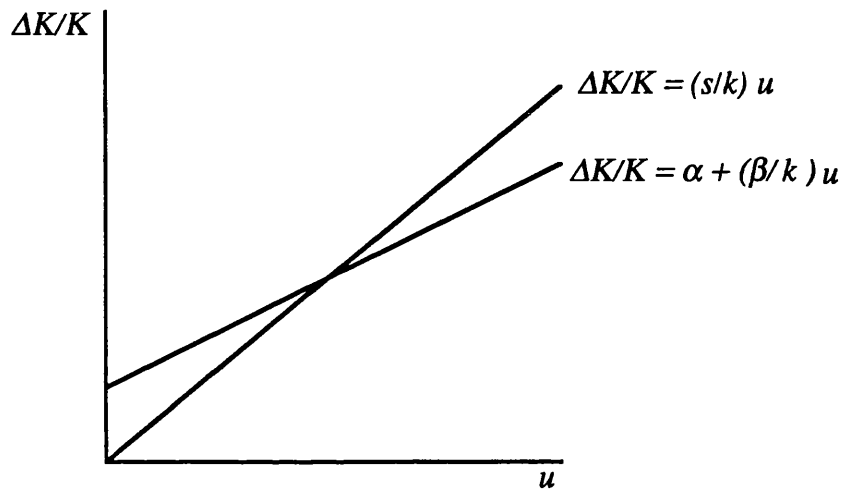

$\Delta K/K$

$\Delta K/K = (s/k)\, u$

$\Delta K/K = \alpha + (\beta/k\,)\, u$

u

Figure 4.1

Stability requires that the investment function cut the saving function from above. More precisely, it requires that $\alpha > 0$ and $\dfrac{\beta}{k} < \dfrac{s}{k}$. The set of expectations which are fulfilled at equilibrium here concern the degree of capacity utilisation. Investors will find that the degree of capacity utilisation is precisely what they expected, so they carry on investing at the same rate.

It is interesting to note that this analysis has been used by Marglin to illustrate Harrod's growth model.[1] In his 1984 book on growth and distribution Marglin argues that the Keynesian animal spirits are crucial to Harrod's growth model and that his model can be viewed as a bridge between Keynes and the neo-Keynesians. In particular, he argues that

[1] See Marglin (1984), ch. 4.

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In contrast with Evsey Domar's approach to the long run (1946), in which the relationship between capital and output is purely technological, the precise form of Harrod's functional relationship depends, *à la* Keynes, on capitalists' "animal spirits": equilibrium requires that the various players - investors as well as savers - be satisfied. Equilibrium indeed is defined as a steady growth path that makes capitalists content to carry on the existing rate of growth. (Marglin, 1984, p. 73/74)

This passage seems to fit quite well with the notion of effective demand per unit of available capacity put forward earlier. To say that in a growth context the relation between capital and output depends on animal spirits, and not on technological factors, is another way of saying that effective demand poses a limit to the degree of capacity utilisation also outside the short term.

As an alternative to the short term there is not just the long term, however. If that was the case, the operation of the Keynesian multiplier outside the short term would run into serious difficulties. For, once the investment stimulated by the utilisation signal is carried out, there should be no reason why the output:capital ratio should not return to its long-term normal value. The degree of capacity utilisation, there, signals departures from equilibrium positions, and disequilibrium is not obviously compatible with a position of steady state. Similarly, the fact that demand and capacity are growing at the same rate does not exhaust the equilibrium requirements. If the degree of capacity utilisation is different from the desired level, investors cannot be *entirely* satisfied with their investment policy. But why should investors be *entirely* satisfied with their investment policy at any given time? After all, there are aspects of any investment project which cannot be evaluated on a continuous basis. It is not inconceivable to assume, then, that while some aspects of a particular investment policy are not being checked, others are on the basis of realised results. In fact, it may be precisely the difficulty of checking the long-term returns of investment on the basis of realised results that induces investors to check their decisions on a different basis.

Suppose that various indicators signal a permanent increase in demand. Consequently, investors will want to speed up accumulation. But they will not be in a position to check before some time whether the programme they have started was the right one or not. Therefore, in implementing their programme they will not attach any

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importance to the fact that normal profits, i.e. profits at normal utilisation, are not being obtained. This does not mean, however, that some means of checking the adequacy of the running programme will not be sought. It might be decided, for example, that as long as the pressure of demand is making itself felt through a high rate of growth or a high degree of capacity utilisation, the new higher rate of accumulation should not be altered. The higher rate of growth or the higher degree of capacity utilisation, which in the previous two models justify a higher accumulation rate, are not to be taken, therefore, as proper disequilibrium signals. Otherwise there would be no equilibrium to speak of, because expectations would be constantly disappointed. What is important, then, is that the non-normal rate of growth or the non-normal degree of capacity utilisation become the object of an act of expectation formation. Equilibrium will obtain when this particular set of expectations is realised. This equilibrium, implying a particular rate of growth and a particular degree of capacity utilisation, is a medium-term equilibrium. A medium-term growth path can be identified, therefore, where medium-term expectations are constantly realised. In graphical terms the medium-term path would be the path linking two long-term paths. The last diagram of *Chapter Three* can be shown here again.
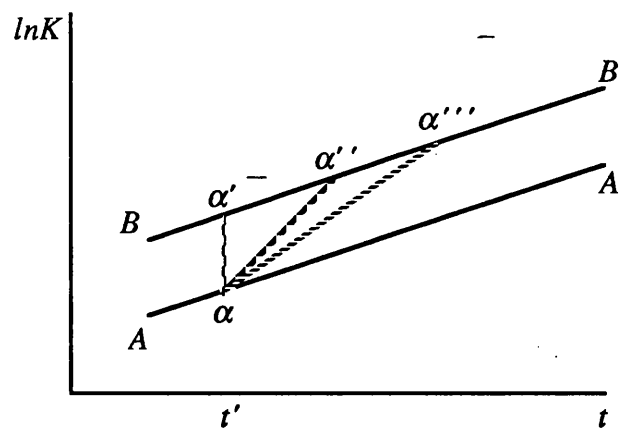

Figure 4.2

If the general conditions of the economy justify a shift from AA' to BB' any path different from the instantaneous path $\alpha\alpha'$ will imply that some time goes by before the new long-term growth path is reached. Any such path would be a medium-term path.

Along this path, while a medium-term equilibrium is allowed to be established, long-term expectations are not being checked. It is the nature of this path that we think the capacity utilisation model is all about. It is to its development that we now turn.

4.3. *Rowthorn's model*

As shown in *Chapter Two*, the so-called capacity utilisation model (or Kalecki-Steindl growth regime) is based on mark-up pricing, a variable output:capacity ratio and an investment function which depends on the rate of profit as well as on capacity utilisation. It represents a development of a line of thought started by Steindl, who emphasized the importance of capacity utilisation both as an adjustment mechanism and as a determinant of investment. The first instance of this model is Rowthorn, 1982, where these ideas are used to build a coherent equilibrium growth model. It is this model, then, that we take as our main reference point. Later versions can be viewed as elaborations of the original model.

Prices in this model are determined by applying a constant mark-up t on unit wage costs. Since unit costs are assumed constant up to full capacity, prices are invariant with respect to changing degrees of utilisation. We have, therefore,

$$p = (1 + t) \, wl$$

where w is the money wage and l the labour coefficient. The gross rate of profit is then given by

$$r = \frac{twlQ}{pK}$$

where Q is the current level of output and K the amount of fixed capital in existence. Substituting from the price into the profit equation and dividing Q and K by full capacity output Q_f we obtain

$$r = \frac{t}{1+t} \frac{u}{k}$$

where u is the current level of capacity utilisation expressed as a percentage of full capacity and k the capital coefficient when capital is used at full capacity. Given k and t the rate of profit is a linear function of the degree of capacity utilisation. The profit function in Rowthorn's model is actually much richer. Overhead costs are included in the model in the form of overhead labour, depreciation and taxes. The first is expressed as a constant percentage of full capacity output; the others as a constant percentage of the existing capital. The omission of depreciation may not be viewed as a legitimate procedure. It clearly amounts to assuming that capital is eternal and, consequently, that gross and net profits coincide. The reason why it need not be an illegitimate procedure is that the investment function usually adopted in the capacity utilisation model implies, for the whole economy, a positive rate of net accumulation even at zero profits (see below). When this is the case the model's outcome will imply a positive rate of net accumulation. Consequently both net and gross profits will be positive. This is not true if the model's outcome implies a negative rate of net accumulation, as in this case gross profits will be positive but net profits will be negative. Assuming an overall positive net rate of accumulation does not necessarily mean that all firms are experiencing a positive rate of accumulation. Some of them will not be renewing their capital, some will be growing faster that the average. It is the overall rate which is assumed to be positive.

So far nothing is substantially different from the generalization of this particular kind of models presented in *Chapter Two*. What makes this further analysis worthwhile is the fact that Rowthorn's model and its subsequent versions make explicit the investment function. The advantage of this is that an equilibrium solution can be determined and discussed. Moreover, a clear specification of the mechanisms which underlie investment demand is of great importance for the appraisal of the nature and relevance of this growth regime.

The investment function in Rowthorn's model is expressed in the following terms:

$$g = \alpha + \beta r + \gamma u$$

where α, β and γ are positive constants. Since profits are also related to the rate of accumulation by this saving function

$$g = s_r r$$

where s_r is the proportion of profits saved, the degree of capacity utilisation and the rate of profit must be in a particular relation to each other for excess demand to be zero. This relation, called the 'realization curve', can be derived substituting from the investment into the saving function. Solving for r we obtain the following equilibrium schedule:

$$r = \frac{\alpha + \gamma u}{s_r - \beta}$$

For any given degree of capacity utilisation the schedule gives that value of the rate of profit which makes investment per unit of capital equal to saving per unit of capital. For the realization curve to lie entirely in the positive quadrant, $(s_r - \beta)$ must be greater than zero. This requires $s_r > \beta$, which implies that the sensitivity of investment to changes in profits must be lower than the sensitivity of saving to similar changes. When this is the case the slope of the curve is positive. For the same reason points above the realization curve are points of excess supply, while points below are points of excess demand. Given the degree of capacity utilisation, any increase in the rate of profit produces more saving than investment. Similarly, any decrease in the rate of profit reduces saving to a larger extent than investment.

To be in equilibrium the economy must lie on the realization curve. But the relation between the rate of profit and the degree of capacity utilisation is governed by the profit function. So equilibrium will obtain at the point of intersection of the two curves. The following figure depicts the equilibrium configuration.
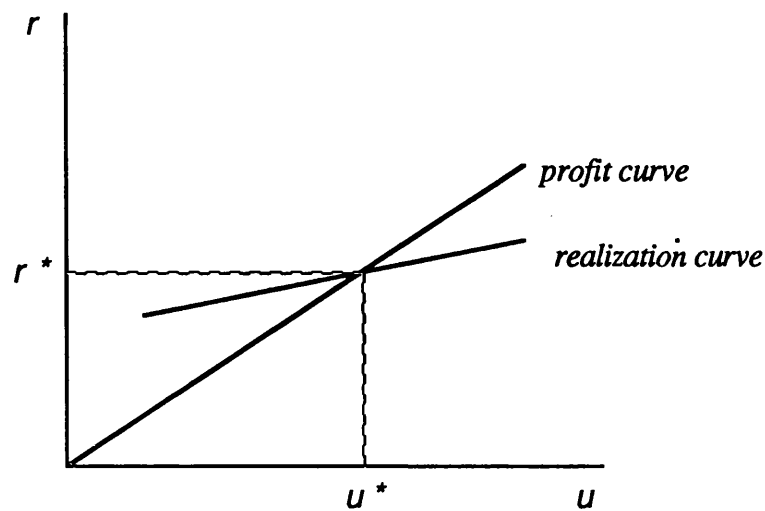
Figure 4.3

Since all points above the realization curve are points of excess supply, for equilibrium to be stable the profit function must cut the realization curve from below. When this condition is met any displacement along the profit curve will bring about forces capable of correcting the excess demand. To derive the formal condition of stability we need to write the profit and the realization equations again.

$$r = \frac{t}{1+t}\frac{u}{k}$$

$$r = \frac{\alpha}{s_r - \beta} + \frac{\gamma}{s_r - \beta}u$$

For the profit curve to cut the realization curve from below the following condition is clearly required:

$$s_r > \beta + \frac{\gamma k(1 + t)}{t}$$

The nature of the equilibrium solution of the model requires some discussion. At the intersection of the profit and the realisation curves the degree of capacity utilisation and the rate of profit are at a level which entirely justifies the current rate of accumulation. So

it should be possible to say that investors are content with what they are doing. The way Rowthorn justifies the inclusion of the utilisation term in the investment function does not seem to imply, however, that investors are at all satisfied.

Firms normally seek to maintain a margin of unused capacity to meet anticipated growth in future demand and as a reserve against unforeseen contingencies where a rapid increase in production may be required. The latter reason is particularly important in oligopolistic industries where a temporary inability to satisfy demand may result in a permanent loss of market share. (Rowthorn, 1982, p. 17/18)

This means that whenever utilisation is high firms will try to restore the desired amount of excess capacity by investing more, whenever it is low they will slow down investment in an attempt to get rid of the unwanted excess capacity. But the solution of the model is not such as to ensure that the equilibrium degree of excess capacity coincides with the desired degree of excess capacity. The problem arises, then, as to whether in this position all sets of expectations are realised. Only when all sets of expectations are realised can investors be said to be content with what they are doing. When more or less investment is undertaken because excess capacity turns out to be smaller or larger than the desired amount, it must be the case that investors see the re-establishment of normal capacity utilisation as the likely outcome of their actions. Hence, normal and expected utilisation of capacity coincide. The capacity utilisation equilibrium, therefore, can be hardly seen as an equilibrium where all sets of expectations are realised.

4.4. Other contributions

The foregoing analysis constitutes what can be defined as the core of the capacity utilisation model. In works following Rowthorn's contribution this core has been used to study more complex dynamics involving interrelations between growth, distribution and inflation.

In Dutt (1984) once the basic dynamics of the model is spelled out,[1] changes in the industrial structure are introduced to explain variations in the profit margins. In particular, it is argued that fast growth encourages potential entrants to enter the industry with the

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[1] In his later book Dutt claims that his model was developed independently of Rowthorn's model. See Dutt (1990), p. 219, n. 13.

attraction of higher profits. As a result of this, industrial concentration would be reduced and with it mark-up rates.[1] Thus whenever a higher growth rate is established following, for example, a higher labour share,[2] profit margins would be further reduced. Conversely, retarded growth, leading to higher concentration ratios, would induce further depression through increasing profit margins. But general equilibrium is not ruled out altogether. For, a cumulative process is set in motion and a stable equilibrium is shown to be attainable.

The dynamics of the mark-up over unit costs is assumed to be governed by the following relation;

$$t' = f(g, t)$$

where t' is the rate of change over time of the mark-up t. The relation between t' and the rate of growth g, according to the previous argument, is a negative one. That between t' and the mark-up rate t changes sign from positive to negative as t increases. Dutt argues that a given change in the mark-up has different effects according to whether the level of the mark-up is high or low. In particular, it accords the firm a greater market power at low levels of t, with the result that t' rises as t is increased. But it induces greater entry at high levels of t. So the power of firms to push up mark-up rates, when they are in fact high, is greatly reduced. For the economy to be in long-run equilibrium t' must be zero. Figure 4.4 shows the locus of such points, i.e. the set of pairs of g and t which makes t' = 0. As shown by the arrows the mark-up rate will increase or decrease according to whether the actual position of the economy is below or above the locus t' = 0.

The actual position of the economy, for any given level of the mark-up, is determined by the condition of equilibrium between saving and investment. This condition is fulfilled at the point of intersection of the realization curve with the profit curve. The locus of such points, derived by Dutt, shows in accordance with the stagnationist argument, a negative

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[1]Industrial concentration is generally assumed to be a crucial determinant of the mark-up rate. See for example, Cowling (1982). For a survey of the available evidence see Sawyer (1985), ch. 6.
[2]One can see from the previous figure that a change in the distribution of income in favour of wages will shift the profit function downwards. Following this shift a higher rate of capacity utilisation and a higher rate of growth will follow.

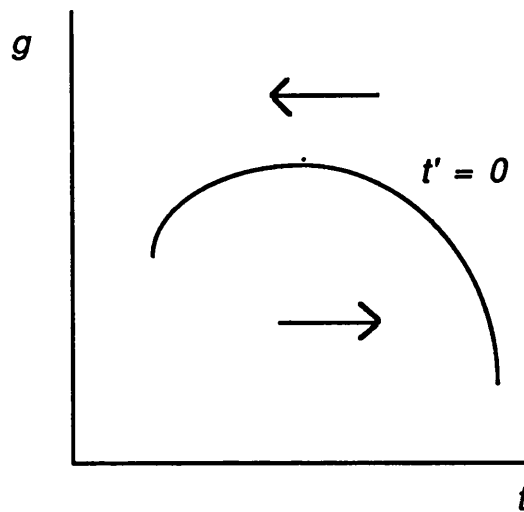relation between the level of the mark-up and the rate of growth of the economy.

g

$t' = 0$

t

Figure 4.4

When this locus is drawn in the same diagram as the locus $t' = 0$ the long-period[1] rate of growth can be determined at their point of intersection. Figure 4.5 shows such points.
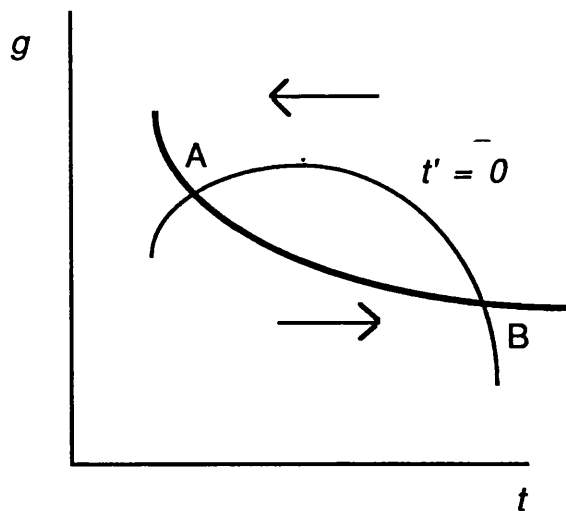

g

A

$t' = 0$

B

t

Figure 4.5

Two equilibria are clearly possible, but only B is stable. If the rate of growth happens to be higher than the level implied by A, the economy will grow at a rising rate until,

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[1]It will be argued below that 'long-period equilibrium' is not the most appropriate definition for this kind of equilibrium.

presumably, full capacity is reached. Otherwise the economy will be trapped at point B with a low rate of growth and great inequality of income distribution.

Another model where Rowthorn's analytical core forms the underlying basis is Taylor's stagnationist model of economic growth (Taylor, 1985). There a different kind of distributional dynamics is suggested. Unlike Dutt's model, where changes in the industrial structure are the main reason for changes in the mark-up, here prices and money wages both adjust according to a mechanism where the overall level of economic activity, aspiration levels and productivity gains play the main role. The system will be in equilibrium when distribution, as measured by the mark-up rate, is constant through time. For this to be possible prices and money wages must vary at the same rate. So long as price and wage inflation diverge, distribution cannot stay constant. As a result of this, commodity market equilibrium is disturbed. Equilibrium is reached at a point on the commodity market schedule where stability of the distributive shares is obtained.

Equilibrium in the goods market is obtained when saving equals investment. Slightly simplifying Taylor's formulation, saving is given as usual by

$$g^s = sr$$

and investment by

$$g^i = g_0 + h[r - (i - P)] - k\tau$$

where, besides the usual symbols, i is the rate of interest and P the price inflation rate. In this particular formulation of the investment function the accelerator effect is captured both by the second and by the third term. Recall that the rate of profit, given the mark-up τ, is a positive function of the degree of capacity utilisation. The term $k\tau$ also is meant to capture accelerator effects on investment demand. So, profits deriving from different levels of capacity utilisation have the same effect on investment as profits deriving from changes in the distribution of income. In addition to this, it is supposed that changes in income distribution, as measured by changes in the mark-up rate, affect investment in their own right. This influence is negative as a shift to profits heralds a negative shift in aggregate demand.

We require that $g^s = g^i$. Hence we obtain:

$$(h - s)r - h(i - P) - k\tau + g_0 = 0$$

For any given mark-up rate and any given rate of interest, a positive relation exists between the rate of profit and the inflation rate. Since an increase in the inflation rate lowers the real rate of interest as measured by $(i - P)$, investment is stimulated. A higher profit rate necessarily follows because larger saving must be forthcoming.

Taylor assumes that price inflation responds positively to the level of economic activity as measured by the profit rate and, also, by what he calls 'core inflation' which results from τ exceeding τ^*. The inflation equation is therefore the following:[1]

$$P = \psi_\pi (r - r^*_\pi) + \varphi (t - t^*)$$

The two equations together form a two-dimensional system for the rate of profit and rate of inflation. The solution of this system implies that the goods market is in equilibrium and that the current inflation rate is that justified by the current profit rate. Figure 4.6 gives a graphical representation of this short-run equilibrium.
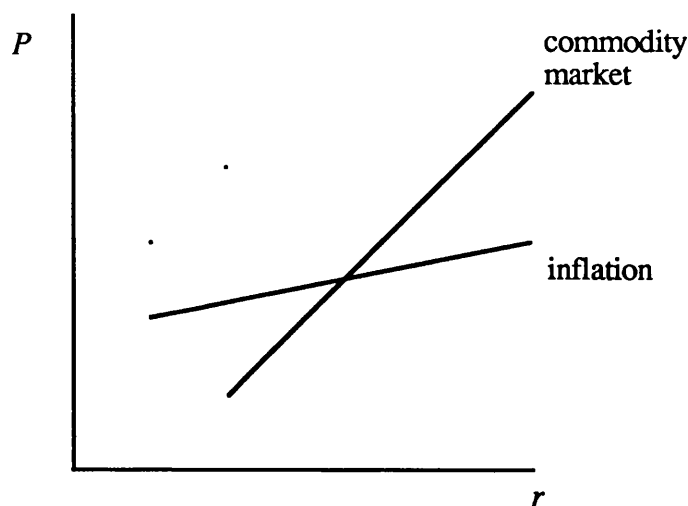

Figure 4.6

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[1]Taylor takes account also of productivity growth. But it is not essential to our argument.

There is obviously no guarantee that at the point of intersection the mark-up rate will be stable. At any given rate of profit money wages are not necessarily varying at the same rate as prices. Money wage inflation is governed by the following relation;[1]

$$w = \varphi\,(t - t^*) + \psi_w\,(r - r^*_w)$$

As long as price and wage inflation diverge the two loci will carry on shifting because the mark-up rate is changing. A position of steady state will be reached when the point of intersection of the goods market schedule with the inflation schedule implies a rate of profit which is making prices and money wages vary at the same rate. Clearly, when $w = P$, the mark-up rate will be stable and equilibrium in the goods market will no longer be disturbed.

As one would expect in a model with inflation, asset markets are also introduced. However, the purpose of this presentation was to point to the particular longer-term use of Rowthorn's analytical core. And to this end the exclusive reference to distributional dynamics was not inappropriate.

A model similar to Taylor's is presented in Dutt (1987). Again, price and money wage adjustment mechanisms are attached to Rowthorn's analytical core and a long-run dynamics is studied. As in the previous model, long-run equilibrium is reached when prices and money wages vary at the same rate, so that distribution is stable through time.

4.5. *The medium term and the long term: a re-interpretation of the capacity utilisation model*

Like Rowthorn, both Dutt and Taylor, when it comes to explaining the reason why capacity utilisation is an argument in the investment function, refer more or less explicitly to the need to restore normal capacity utilisation. Dutt is quite clear on this:

Firms have a certain desired level of excess capacity due to fluctuations in demand, or expected growth in demand which, given indivisibilities in capital equipment, may make it profitable for present value maximising producers to build ahead of demand. When the utilisation of capacity falls below the desired

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[1]Here, too, unlike Taylor's formulation, productivity growth is not taken into account.

level, producers will want to increase utilisation, and thereby disinvest to reduce the stock of capital, and conversely when the utilisation rate rises above the desired level. (Dutt, 1984, p. 28)

But some notion of normal capacity utilisation is also implicit in Taylor's contribution:

... investment projects get undertaken even though firms are not at full capacity. Several microeconomic justifications can be provided for this assumption - building capacity ahead of demand to exploit decreasing capital project costs or to provide a margin of safety against a sudden upswing in sales, maintaining barriers to entry, or keeping up overhead capital. (Taylor, 1985, p. 388)

So it seems that an internal contradiction threatens the models described so far. On the one hand it is assumed that a position of steady state is attainable; on the other, the equilibrium degree of capacity utilisation is, in the general case, different from the normal one. If excess capacity is defined in terms of its microfoundations in some places, and in terms of the overall balance of saving and investment in some other places, we are clearly bound to face some contradiction. Such a contradiction could be overcome if we made an attempt to explain excess capacity, as resulting from the saving-investment equality, in terms of the underlying investment behaviour. What we need is the very simple requirement that, in equilibrium, the expected rate of capacity utilisation coincide with the realised rate. This requirement is even more compelling in models like Dutt's or Taylor's where a distribution dynamics is studied. If an equilibrium level of income distribution is determined, the question of the equilibrium level of capacity utilisation becomes indeed inescapable.

The argument put forward here is that the investment considered in these models is, in fact, of two different kinds. As a consequence two different notions of profits and two different sets of expectations must also be specified. On the one hand we have the investment which is justified by the growth potential of the economy, on the other the investment designed to alter the scale of the system. In order to make sense of this distinction one can think of capacity as made up of a certain number of units. Each unit will grow at a particular rate depending on various circumstances, but it is not necessarily true that the existing number of units is the correct one given the appropriate scale of the system. So at any given time the existing capacity will have to provide not only for the new capital equipment warranted by the growth potential of the economy, but also for the

need to alter the number of capacity units in the economy. Although this distinction is hard to make in practice, it is of great importance to the effect of studying the motives underlying investment behaviour. In graphical terms the distinction becomes quite clear. Recalling the graph used in earlier chapters, where the log of capacity is plotted against time,
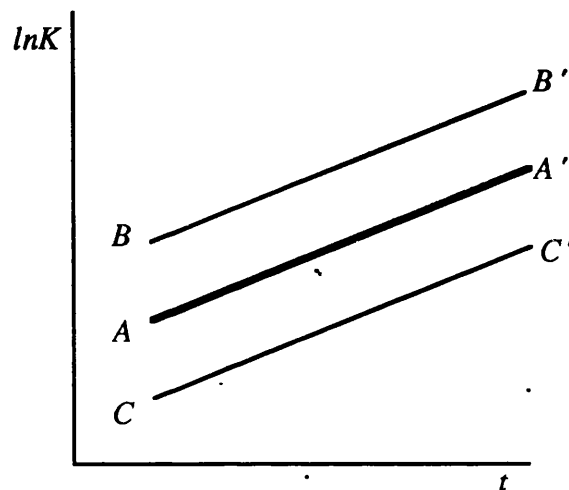

Figure 4.7

the slope of any long-term path represents the rate of growth of the economy when no change, at any given time, is required in the existing number of capacity units (i.e. at any give time capacity is adjusted to demand, or normal utilisation prevails), while the position of any given long-term path shows the average scale of the economy. This implies that the rate of growth typical of that economy may stay the same even if the average scale of the system changes. This would be reflected in a parallel shift of the long-term growth path. Capacity, therefore, can grow either along a long-term growth path, or between growth paths. When the former is the case it means that the correct initial conditions are satisfied; otherwise the correct initial conditions have to be created. In our terms, the correct number of capacity units is available in the first but not in the second case.

As mentioned earlier such adjustment can be instantaneous, or else require some time to be completed. When it is instantaneous investment will be at any single time of one

kind only. It will be designed to alter the scale of the system when the economy is moving instantaneously from one long-term growth path to another; otherwise it will be entirely justified by the growth potential of the economy. In fact, adjustment can almost never be instantaneous. So the economy will very often find itself carrying out both kinds of investment: this means that for some time accumulation will deviate from its long-term value as the economy is in the process of re-adjusting itself.

To these two kinds of investment can be associated two different notions of profits. On the one hand, we have normal profits which provide an index of the extent to which the economy is growing, on the other, we have other-than-normal profits which signal the extent to which the existing capacity is inadequate to the scale of demand. Normal profits reflect, therefore, the profits that can be gained once the correct initial conditions have been established, which are also the only profits entrepreneurs can rely upon in the longer term. Higher normal profits will induce each individual capacity unit to grow faster but no additional unit will be considered necessary at any point in time. Similarly lower normal profits will bring about slower growth, but no removal of excess capacity will be taken into consideration.

When actual profits deviate from normal profits, i.e. the profits associated with normal capacity utilisation, it may be the case that the initial conditions are not the correct ones. More or fewer capacity units may be required at any single time along the growth path. It might be the case, that is, that the long-term growth path has shifted upwards or downwards. The change of scale, therefore, can make itself felt through changes in the degree of capacity utilisation and, hence, in the rate of profit. In particular, higher than normal degree of capacity utilisation and higher than normal profits[1] will signal that more capacity is required; lower than normal utilisation and lower than normal profits will signal that some capacity must be phased out.

Finally, two sets of expectations can be defined according to whether they concern normal profits or other-than-normal profits. Earlier we called the first set of expectations long-term expectations and the second set medium-term expectations. For long-term

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[1] It is important to distinguish higher than normal profits from higher normal profits. The first imply that capacity utilisation has changed while the second imply that capacity utilisation is constant.

expectations to be realised it is required that the economy grow as expected, which implies that actual normal profits coincide with expected normal profits. For medium-term expectations to be realised it is required that the current degree to which capacity is inadequate to the scale of demand equals the corresponding expected degree, which implies that current other-than-normal profits coincide with expected other-than-normal profits. This means that the actual direction and intensity of the force which is pushing the economy across from one long-term path to another is precisely that expected.

It is clear that both kinds of expectations cannot be simultaneously realised, unless the correct initial conditions have been established and the long-term growth path has been reached already. When capacity is adjusted to demand no deviation from normal profits will be expected and observed. This means that no rescaling of the economy is considered necessary and so no force of the above mentioned kind is assumed to be at work. When the correct initial conditions have yet to be created, medium-term expectations might be realised, but a deviation from normal profits will be expected and observed, which means that long-term expectations cannot be realised. Therefore, whenever an equilibrium is assumed to exist implying equality between the current and the expected degree to which capacity is inadequate to demand, it must be the case that long-term expectations are given and are not being checked in the light of realised results.

Thus, when the initial conditions are not the correct ones for the economy to proceed along a long-term growth path, accumulation will have to diverge from its long-term level precisely to create those initial conditions. Such process might be long enough for it to become worth studying independently of the long-term advance. A fresh set of expectations will have to be defined, then, and the question concerning the requirements for their realisation will have to be posed. It is along these lines that the capacity utilisation model should be re-interpreted, that is, as a model primarily concerned with the process through which the correct initial conditions for normal growth are created, while normal growth itself is taken for granted. But the creation of the correct initial conditions is itself a process of growth, which may or may not be steady. When it is steady, as in

the capacity utilisation model, one has a model where steady growth is compatible with non-normal capacity utilisation.

The reference to the notion of normal capacity utilisation, and the justification of the utilisation term in the investment function on the basis of the need on the part of entrepreneurs to restore normal utilisation, is not out of place then when it is acknowledged that what is being studied is not long-term growth, but medium-term growth. In graphical terms this would correspond to any non-instantaneous path linking two long-term paths, such as $\alpha\alpha'$ and $\beta\beta'$.
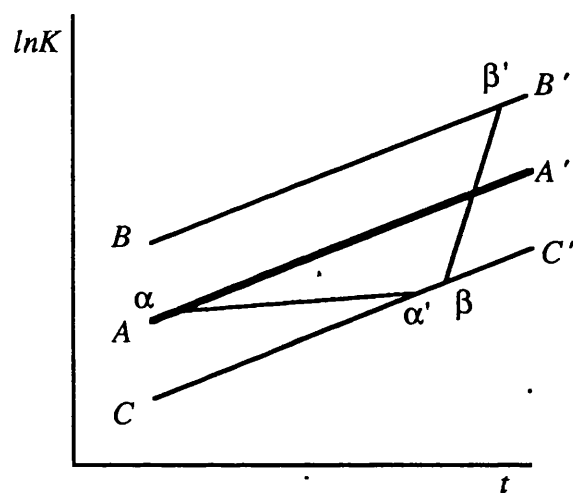
Figure 4.8

Nowhere in the capacity utilisation literature this point has been made. On the contrary, emphasis has been placed on the steady-state nature of this growth regime, with the result that an easy criticism has been levelled against it. Steady growth - it has been argued - is incompatible with disappointed expectations, as normal profits and normal utilisation are not realised in the model's equilibrium. The reply should have been that these expectations are not being checked at equilibrium, but are given and constant, and that expectations concerning capacity utilisation are exactly realised.

4.6. *The new interpretation and the different versions of the model*

This section will try to identify in the different versions of the capacity utilisation model what has been said to be the underlying nature of this general model.

In Rowthorn's model distribution is fixed so that the rate of profit changes only as a result of changes of the degree of capacity utilisation. Normal utilisation, as a target for individual entrepreneurs, is also assumed given and constant. Accumulation, apart from a constant term, depends on the rate of profit and the degree of capacity utilisation. Equilibrium obtains at the intersection of the profit curve and the realization curve, where the degree of capacity utilisation and its associated rate of profit generate a volume of investment which gives rise precisely to that degree of utilisation. The role of expectations is not made explicit in any apparent way.

One possible interpretation of the model is that investment reacts to profits as if they reflect in any case a change in the long-term profitability of investment. There would be a difference in the reaction, however, according to whether the source of long-term profits is distribution or effective demand. When distribution changes, it will be reflected in a change in the rate of profit only, so that investment will be affected only through the profit term. When effective demand changes, it will be reflected in a change in the degree of capacity utilisation as well as in the rate of profit, so that investment will be affected through both the profit and the utilisation terms. The problem with this interpretation is that it clashes with the explicit reference in the model to normal utilisation as a target for entrepreneurs. Otherwise this interpretation would not be unacceptable. In fact, as it will be shown later, it can be viewed as a development of the particular reconstruction of the model which is suggested here. It is through this reconstruction that it becomes clear that normal utilisation may lose its analytical and practical relevance. Before then, and until any other argument is made explaining why the notion of normal utilisation should be dismissed, that suggested here seems the most fruitful way to reconstruct the capacity utilisation model on a more solid basis.

Rowthorn's investment function, which is re-written here for convenience,

$$g_i = \alpha + \beta r + \gamma u$$

could be reformulated so as to separate, in the terms in r and u, the part which pertains to normal profits and normal utilisation from the part which pertains to other-than-normal profits and other-than-normal utilisation. We would have then,

$$g_i = \alpha + \beta r^* + \beta r_e + \gamma u^* + \gamma u_e$$

where r^* and u^* represent the normal rate of profit and the normal degree of capacity utilisation, and where $r_e = r - r^*$ and $u_e = u - u^*$. It is clear that r_e and u_e can be both positive or both negative. Since distribution and normal utilisation are given, it is possible to collect the terms α, βr^* and γu^* in one single constant term A.

$$g_i = A + \beta r_e + \gamma u_e$$

When r_e and u_e are equal to zero, clearly no change in the scale of the economy will be required. So investment will be entirely explained by the term A which indicates how fast the economy would grow if it happened to be endowed with the correct initial conditions.

The equilibrium of the model can also be looked at with this distinction in mind. Recall that equilibrium obtains at the point of intersection of the profit and the realization curves. When the economy is endowed with the correct initial conditions, it must be the case that intersection occurs at the point which corresponds to normal utilisation on the profit curve. In order to see the two components of the rate of profit and of the degree of capacity utilisation, a new origin should be fixed precisely at the point of intersection of these two curves. All points in the second quadrant imply higher than normal rates of profit and utilisation; all points in the fourth quadrant lower than normal rates of profit and utilisation.
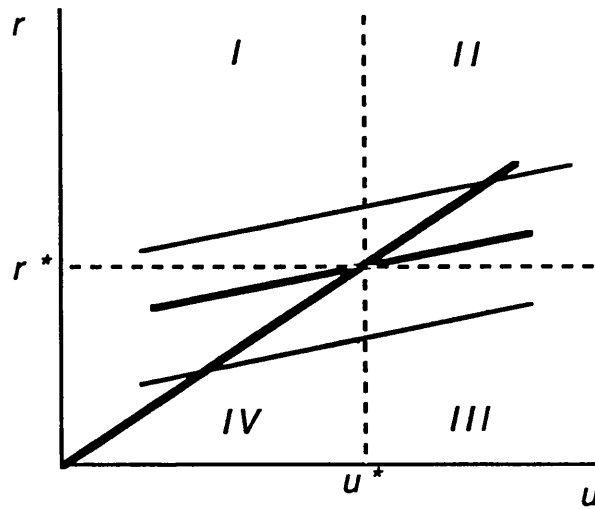
Figure 4.9

It must be said that the model does not explain how long-term equilibrium is determined. What it determines and explains is the medium-term equilibrium which comes to be established once a change in effective demand displaces the economy from its long-term path. Such change can manifest itself, for example, through a change in the actual propensity to save, which will shift the realization curve upwards or downwards according to whether actual saving is decreasing or increasing.[1] When the former is the case intersection will occur in the second quadrant, with higher than normal profits and utilisation; otherwise intersection will occur in the fourth quadrant with lower than normal profits and utilisation. In both cases the constant term A still represents long-term growth. Actual growth, however, will be affected by the need to adjust the average scale of the economy. Therefore, it will be higher or lower than A according to whether effective demand is displacing the economy upwards or downwards.

It was assumed here that the displacement of the economy to a higher or lower rate of growth and utilisation is the result of a change in the actual propensity to save. The actual nature of this change must be stressed, for otherwise it would imply a change in the long-term conditions of equilibrium. This displacement could also have resulted from a change

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[1]See section 4.3. for the equation of the realisation curve.

in the actual distribution of income, which implies a shift in the profit curve. In this case the rate of profit at normal utilisation would also change. The main consequence of this change is that now the rate of profit associated, for example, with higher-than-normal rates of capacity utilisation is not necessarily higher than the original normal rate of profit. This case will not be analysed here, but there is no difficulty in accommodating it within the general model.

Expectations are not mentioned in Rowthorn's work, but they can be easily accommodated. In his medium-term equilibrium long-term expectations are not met, because profits and utilisation are different from normal, but they are not being checked in the light of actual results either. Medium-term expectations, on the contrary, may be realised. They are not always realised, however. Only after a process through which expectations are adjusted according to actual results, will medium-term expectations be finally confirmed.

The question of whether this is a temporary equilibrium or not has not been properly faced yet. There is one obvious sense in which this cannot but be a temporary equilibrium: long-term expectations cannot be given and constant for any length of time, with the result that medium-term equilibrium cannot be equated to steady-state equilibrium, i.e. an equilibrium which can be disrupted only by an exogenous shock. Within this view, when the new long-term path is reached, so that the correct initial condition are re-created, expectations as to the degree to which capacity is inadequate to demand will become equal to zero. At the same time, the actual change in the propensity to save, which has signalled the parallel shift of the long-term path, will be reversed. In Rowthorn's model this would imply a shift in the realization curve, so that the intersection with the profit curve comes to occur again at normal utilisation.

There is another sense in which medium-term equilibrium cannot but be a temporary equilibrium. It is assumed in the previous case that, at some point in time, long-term expectations are confirmed by realised results. One could argue, on the contrary, in a way reminiscent of Keynes' treatment of long-term expectations, that such expectations are not liable to be checked in the light of realised results. It might be the case, that is, that no

clear endogenous mechanism existed to revise long-term expectations. Medium-term equilibrium, then, would be a temporary equilibrium not because long-term equilibrium would take over at some point in time, but because long-term expectations are shifting either exogenously or, for instance, as a result of disappointed medium-term expectations. In graphical terms this would imply a shift in the realization curve and a new medium-term equilibrium.[1]

Divorcing long-term expectations from realised results clearly deprives normal utilisation of most of its importance. If realisation of the normal values of profits and utilisation may be of no relevance whatsoever for the formation of long-term expectations, then normal profits and normal utilisation cease to be a condition of equilibrium and become a kind of reference point useful when decisions to alter the scale of the system must be made. As a consequence, long-term accumulation takes on more and more the nature of a constant term in the investment function, liable to change for reasons which are not explained within the model. From this point a final step can be taken: this would imply isolating from the constant term the part which is supposed to depend on expected normal profits and expected normal utilisation, and explaining it in the same way as investment related to non-normal profits and to non-normal utilisation. This is precisely what happens in Rowthorn's model, where a single parameter (β) is used for the rate of profit and a single parameter (γ) for the degree of capacity utilisation, regardless of whether they are normal or other-than-normal. But then it should be admitted that normal utilisation and normal profits have lost entirely their analytical relevance. It should also be explained how it is that the overall (or long-term) profitability of investment comes to be affected by both sources, that is, distribution and effective demand.

This is even more so in Dutt's and Taylor's models. Unlike Rowthorn's model where distribution is exogenous and only output dynamics is studied, in these models a distribution as well as an output dynamics are studied. Here distribution is assumed to depend, among other things, on the level of activity or on the degree of capacity

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[1]Given the particular way in which Rowthorn's model is formulated, when long-term expectations change it is easier to assume that it is the parameter α which changes.

utilisation, just as the degree of capacity utilisation depends on distribution. This implies that capacity utilisation and distribution are now determined at the same level, and that no separation exists between a long-term context where distribution is determined, and a medium-term context where the degree of capacity utilisation is determined. Again, the conclusion that normal profits and normal capacity utilisation no longer play any role in the analysis should have been drawn.

4.7. *Amadeo's model*

The view of the capacity utilisation model as fundamentally dealing with medium-term equilibrium fits almost perfectly with a later version of the model, due to the contributions of Edward Amadeo.[1]

Reduced to its essential structure, Amadeo's model consists of two equations: a saving function and an investment function. To formulate the saving function it is assumed, just like in Rowthorn's model, that prices are determined by applying a constant mark-up t on unit wage costs. Since unit costs are assumed constant up to full capacity, prices are invariant with respect to changing degrees of utilisation. We have, therefore,

$$p = (1 + t)\, wl$$

where w is the money wage and l the labour coefficient. The gross rate of profit is then given by

$$r = \frac{twlQ}{pK}$$

where Q is the current level of output and K the amount of fixed capital in existence. Substituting from the price into the profit equation and dividing Q and K by full capacity output Q_f we obtain

$$r = \frac{t}{1+t}\frac{u}{k}$$

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[1] Amadeo (1986a, 1986b, 1987)

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where u is the current level of capacity utilisation expressed as a percentage of full capacity and k the capital coefficient when capital is used at full capacity. Given k and t the rate of profit is a linear function of the degree of capacity utilisation. If the assumption that profits are entirely saved and wages entirely consumed is made, this profit function becomes a saving function and the share of profits in income, given by $\frac{t}{1+t}$, comes to coincide with the saving ratio s. The saving function we then obtain is the following;

$$g_s = \frac{su}{k}$$

where g_s is the savings per unit of capital. The investment function is the following:

$$g_i = \alpha + \beta\ (u - u_n)$$

where g_i is the rate of growth of the capital stock and u_n the normal degree of capacity utilisation and where "α stands for 'animal spirits' and β measures the speed of adjustment of investment to changes in capacity utilization".[1]

In equilibrium, the rate of growth of the capital stock induced by the current degree of capacity utilisation must equal the saving per unit of capital ensuing from that utilisation rate. Equilibrium thus requires:

$$g_i = g_s.$$

For this to be the case the rates of capacity utilisation and growth must assume the following equilibrium values.

$$u^* = \frac{\alpha - \beta u_n}{\frac{s}{k} - \beta}$$

$$g^* = \alpha + \beta\ (\frac{\alpha - \beta u_n}{\frac{s}{k} - \beta} - u_n)$$

This equilibrium configuration can be shown on a diagram.
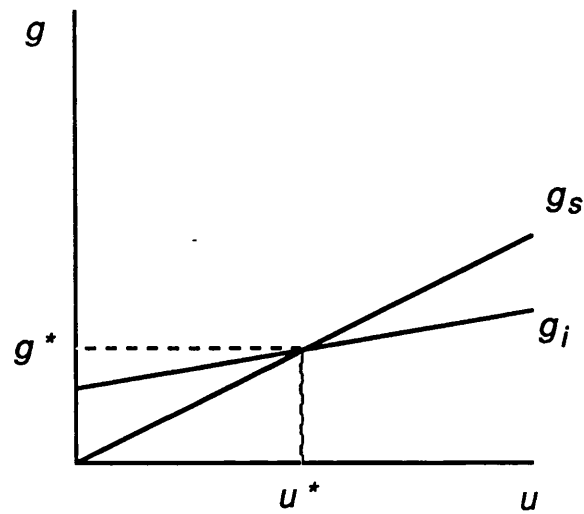
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[1]Amadeo (1986b), p. 151.

Figure 4.10

Since the normal degree of capacity utilisation is exogenously given it can lie on either side of the equilibrium degree and only by chance coincide with it. The result thus confirms the proposition that "the interaction of the behaviour of the individual firm with movements of aggregate demand" might make firms "unable to achieve their utilization target".[1]

The model can be interpreted in the following way: α represents not just animal spirits, but also that rate of accumulation which would be effected if capacity were adjusted to demand, i.e. if $u = u_n$. In other words, it is that rate of accumulation which keeps the economy on the long-term growth path; or that rate which would be chosen if effective demand movements did not displace the system from its current long-term path. When movements in effective demand do occur, the current degree of capacity utilisation will be modified: this is a signal that capacity is inadequate to demand. If we exclude instantaneous adjustment, which would reduce effective demand problems to minor disturbances, the process of adjustment requires that accumulation be accelerated or slowed down according to whether effective demand has moved upwards or downwards. The coefficient β measures the speed of this adjustment. When β is sufficiently high

[1]Amadeo (1986b), p. 149.

adjustment will be almost instantaneous. The advantage of this kind of adjustment is that the higher or lower rate of accumulation does not make effective demand problems worse; in fact, we would have that the condition $u = u_n$ is immediately restored. When adjustment is not instantaneous, accelerated or retarded accumulation is bound to affect effective demand, with the result that some independent dynamics, internal to the overall process of adjustment, need to be studied. Amadeo's model is precisely about these dynamics and about the existence of an equilibrium where the current degree of capacity utilisation, which reflects the level of effective demand, exactly justifies the current rate of accumulation, which is one of the determinants of effective demand. Such dynamics, however, would not result in an equilibrium if the role of expectations were not made explicit. In order to have an equilibrium, expectations as to the degree of capacity utilisation must be realised. Current accumulation must give rise to that degree of capacity utilisation which is required to cause it to be maintained over time. For this to be the case current and expected utilisation must coincide.

Therefore, a different set of expectations exists, apart from that which concerns the profitability of investment in the long term, that is, those profits which could not be increased by changing the level of capacity in the economy. If it is assumed that output from a given capacity can always be sold in the long term (i.e. normal utilisation can always be realised), it is certainly true that these expectations are not realised at equilibrium, which implies in the general case an other-than-normal degree of capacity utilisation. So such expectations are given and constant and are not checked in the light of realised results: this is reflected in the constancy of the parameter α. The set of expectations which is realised instead is that concerning the extent to which capacity is inadequate to demand. At equilibrium, therefore, accumulation is steady because investors find that current utilisation confirms expectations. This means that they are investing exactly what the state of capacity inadequacy requires, and observing that experience confirms expectations feel justified in maintaining that rate of accumulation. This set of expectation is what we have called medium-term expectations. The model is

therefore one where long-term expectations are given and constant, and where medium-term expectations are eventually realised.

Medium-term expectations in this model (Amadeo, 1986b) are based exclusively on current values. In another paper (Amadeo, 1987) a more elaborate system of expectations formation is assumed, one where expectations are not based exclusively on current values. However, no essential difference exists between the two models: in the second model expectations are only made explicit, while in the first they are kept implicit. The problem is that Amadeo, when talking about these expectations, refers to them as long-term expectations, thus lending himself to the criticism of what is then the role of normal utilisation.

In a debate which took place in *Political Economy* a few years ago, this point was made in a number of contributions. In particular the contrast was noted[1] between an equilibrium situation and the fact that expectations as to the long-term use of capacity are constantly frustrated by experience. One would have a situation where investors have certain expectations about the growth of sales, and yet are content with a different growth of sales, thus behaving irrationally. The interpretation suggested here provides an answer to this criticism. There is no contrast between an equilibrium situation and disappointment of long-term expectations. Such expectations are simply not being checked and can change only for an exogenous occurrance. What is being checked instead is medium-term expectations. With respect to these expectations the model shows that an equilibrium exists where expectations are realised. The economy will be moving along a medium-term path where the adequacy of the adjustment plan is constantly confirmed by experience. Other-than-normal degrees of capacity utilisation are used therefore as signals to check whether the current adjustment policy is precisely that required by the transition the economy is going through.

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[1]See Committeri (1986, 1987).

4.8. *Conclusion*

The purpose of this chapter has been gradually to bring to light what is argued here to be underlying structure of the capacity utilisation model. Among the various versions examined, Amadeo's has been presented as the closest to this structure, as the two identified components of investment demand are there clearly distinguished.

The interest of this reconstruction does not lie, however, in the heuristic content of the model, for, as it is, it might be viewed as simply complementing long-term analysis. In terms of the graphical representation used in this chapter, this would imply that when adjustment is completed, the long-term growth path becomes relevant again. This reconstruction is in striking contrast with the emphasis on the role of Keynesian effective demand which is typical of this literature. Rather, its interest should be viewed as providing a starting point in a process of reconsideration of Keynesian growth theory. Such a process should aim at giving the Keynesian principle of effective demand a more appropriate role in the theory of accumulation, in particular as determining not only the volume of capacity but also the degree of capacity utilisation. In this reconstruction the importance of the two components of investment demand should not be overlooked. At the same time the role of uncertainty and of the institutional arrangements which individuals set up to face uncertainty should be given due consideration.

In some sense, the contributions of Rowthorn, Dutt and Taylor can be viewed as having gone through that process too quickly, with the result of losing the insights which can be gained from the retention of the two categories of the long and the medium terms. But a remnant of that approach exists and can be seen in the retention of the notion of normal capacity utilisation, which is however inappropriate.

In the following chapter attention will be focused on the conventional and institutional arrangements that individuals set up to face uncertainty. It will be argued that it is through such explicit reference that the medium term can acquire full legitimacy as an appropriate context for the analysis of accumulation.

CAPACITY UTILISATION, CONVENTIONS AND UNSTEADY GROWTH

5.1. *Introduction*

In the previous chapters, the expression steady growth has often been used to convey the idea of a growth path where some sets of expectations are realised. Such use of the expression could be criticized. Truly steady-state models - it might be argued - imply that all kinds of expectations are realised. In fact, steady-state growth analysis can be given at least two different interpretations. On the one hand, there is the view which holds that steady-state growth reflects an intrinsic quality of the economic system; once the system gets on that track no endogenous mechanism could divert the system from its course. On the other, steady growth is viewed as a benchmark against which various disequilibrium dynamics can be studied.

As made clear in the general Introduction, it is the latter view which is taken here. This view is also in accordance with the one Joan Robinson favoured. Equilibrium analysis in her view was possible, but it was not justified on the basis of an intrinsic coherence of the relevant economic relations. Rather it was justified on the basis of a temporary containment of an intrinsic incompatibility of the relevant economic relations. The imbalance embedded in such a seemingly equilibrium situation explains why the system eventually moves away from it.

The interesting aspect of this approach is that emphasis can be laid either on containment or on change and evolution. In this work containment features prominently;

however no concessions are made to the first of the two approaches mentioned. No concession is made, that is, to the ontological steady state, where no change or evolution is possible unless it is exogenously driven.[1] What is used here instead is the methodological steady state, where history and time do not have to be thrown out of the picture.

Once the steady state ceases to be viewed as reflecting an inherent quality of the economic system, its range of applicability naturally widens. This means that a larger number of economic structures can be represented by this analytical construct. What is required is that specific assumptions are made explaining the *historical* consistency of a set of economic relations. Such historical consistency must be set against the atemporal consistency of the ontological steady state, where a specific set of economic relations is preserved simply by an equal rate of growth of all the relevant variables. An example of this wider application is provided by the treatment of a process of adjustment. Any such process falls naturally outside the scope of steady-state analysis when its ontological variant is considered. However, it is a legitimate question for the methodological steady state. Medium-term analysis, as illustrated in the previous chapters, is precisely an example of the use of the methodological steady state for the analysis of a process of adjustment.

When we look at a process of adjustment in this particular way, it almost necessarily follows that the process acquires an autonomy which it would not have otherwise. For, it is one thing to study a dynamic path where expectations are continuously disappointed, although to a decreasing degree, and quite another to study a path where at least one set of expectations is realised. The first kind of analysis is designed to complement equilibrium analysis,[2] where the consistency of economic relations is brought to light. The second does not necessarily need to be complemented with a different level of analysis, as the set of economic relations which it represents is endowed with internal consistency of a *historical* kind. The duality of the first kind of approach is therefore

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[1]See note 1, page 25.
[2]That a mutually supportive relationship might exist between the study of economies out of equilibrium and comparative statics, that is, the study of economies in equilibrium, was asserted by Samuelson and given the name of 'correspondence principle'.

dismissed, and in its place we find a single process unfolding over time, with periods of stability followed by periods of rapid change. Thus the adjustment of capacity to demand, when approached in this way, which is precisely what medium-term analysis is supposed to do, could be treated as a fairly independent question. No immediate need exists therefore to associate this analysis to a comparative-statical analysis, where capacity is continuously adjusted to demand. What is required is the spelling out of the assumptions which make the set of relevant economic relations internally consistent. In the case of capacity adjustments the assumptions must necessarily concern the investment function.

The purpose of this chapter is to establish a symmetry among the growth regimes discussed in *Chapter Two*. There it was pointed out that, for the sake of having a determinate system, potentially disruptive conflicts have to be contained by resorting to some conventional or institutional arrangement. A list of growth regimes was therefore given, with different conflicts associated to different containing arrangements. However, while the first three are fairly well established in the literature, the fourth regime, which there was called the Kalecki-Steindl regime, is not exactly so. The endogenous determination of the degree of capacity utilisation, as the key to solve the conflict between a given distribution and a given investment function, has attracted considerable attention in the literature only in the last ten or twelve years. To get a clearer understanding of this notion and to place it more firmly within a growth model is precisely the contribution this work is expected to make. In particular, in this chapter, the conventional or institutional arrangements which make the Kalecki-Steindl model determinate must be made explicit. So while the previous chapter has identified the underlying nature of the model, presenting it as a model of a medium-term kind, this chapter will provide the relevant behavioural foundations. It will become clear that such foundations have a strong institutionalist flavour.

The structure of the chapter is as follows. First, a parallel will be set up between medium-term analysis, on the one hand, and Keynes' methodology in the face of uncertainty when applied to the determination of the level of money income, on the other. Second, it will be argued that such methodology allows for the role of conventions in the

economic sphere. It will be also pointed out that such a role is entirely consistent with Keynes' theory of knowledge as spelled out in the *Treatise on Probability*. Once such preliminaries have been dealt with it is possible to go back to growth theory and illustrate what kind of conventions can be assumed to sustain the capacity utilisation model.

5.2. *Keynes' methodology in the face of uncertainty*

In a famous article in the *Economic Journal* (1976) Kregel argued against the claim that post-Keynesian macro theory was ill-equipped to deal with one of the most important Keynesian themes, i.e. the treatment of time and the sequential nature of the economic process. With an illuminating account of Keynes' methodology in the face of uncertainty, Kregel argues that post-Keynesian macro theory does not depart from that methodology and that the assumption of perfect foresight and full information is as alien to that school as it is alien to Keynes. As mentioned earlier, Kregel's argument is that Keynes had in mind three different models of the economy, one of static equilibrium, one of stationary equilibrium and one of shifting equilibrium. The model of static equilibrium was designed to show that the operation of the principle of effective demand had nothing to do with disappointment of expectations. Here long-term expectations are fixed and short-term expectations are realised. In the model of stationary equilibrium, short-term expectations are allowed to be disappointed, but the process of re-establishing equilibrium will not be disrupted by a change in long-term expectations. Finally, such disruptions are not ruled out in the model of shifting equilibrium. Here, Keynes' model "will describe an actual path of the economy over time chasing an ever changing equilibrium - it need never catch it" (Kregel, 1976, p. 217).

Keynes' method is therefore one where a specific selection of givens, independent and dependent variables is chosen for any particular problem. To analyze the operation of the principle of effective demand, for example, Keynes thought that the relevant independent variables were the propensity to consume, the marginal efficiency of capital, the liquidity preference, the wage unit and the quantity of money. All these factors would

determine the object of the analysis, that is, the volume of employment and the money national income. It is certainly true that any of these factors can change without much warning, either independently or as a result of the performance of the system. However, such continuous change could render the analysis virtually impossible. So a taming assumption was required and it was offered in the guise of a fixed state of long-term expectations. This implied the constancy of the three psychological variables.

On several occasions Keynes stressed the point that the economic system is not violently unstable. We can infer from this that he cannot have considered the assumption of the constancy of those independent factors too unrealistic. With particular reference to the state of long-term expectations he pointed out that "the state of long-term expectation is often steady, and, even when it is not, the other factors exert their compensating effects" (*G.T.* p. 162). Thus, whenever the state of long-term expectations changes the shifting model will describe the sequence of effects which that change has generated, but there are reasons to believe that it will be soon possible to describe the economy again by means of a stationary model. In Keynes' approach, therefore, stability and change are part of the same process, as both depend on the decision to maintain or to discard a given set of general expectations.

It is Kregel's main contention that the post-Keynesians have not departed from Keynes' methodology, and that a kind of stationary model was used by those theorists not because perfect foresight and full information was being assumed, but because specific economic relations could be more easily defined and worked out in a context where some factors were assumed constant. In particular, in the study of growth and capital accumulation, productive capacity becomes one of the variables to be determined. In this context, Kregel mentions the possibility of taking the marginal efficiency of capital or "animal spirits" as the independent variable, and reminds us that this is the assumption post-Keynesian growth theory has made throughout.[1]

In fact, the marginal efficiency of capital and "animal spirits" are not the same thing. In the words of Joan Robinson, "the 'animal spirits' of the firms can be expressed in

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[1]See Kregel (1976), p. 219.

terms of a function relating the desired rate of growth of the stock of productive capital to the expected level of profits" (1962, p. 38). In the words of Keynes, the marginal efficiency of capital is "equal to that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price" (*G.T.* p. 135). Those returns are what long-term expectations are concerned with. While it is certainly the case that post-Keynesian growth theory has assumed animal spirits as the independent variable, it cannot be equally said that it has assumed the marginal efficiency of capital as the independent variable. For example, the desired rate of accumulation is, in Robinson's analysis of growth, that "rate of accumulation which is generating just the expectation of profit that is required to cause it to be maintained" (1962, p. 49). This means that the expectation of profits cannot be the independent variable in that model of growth, for the obvious reason that this expectation is determined endogenously. Expectations are adjusted as realised results become available, with equilibrium being reached when actual results confirm previous expectations. Traditional post-Keynesian growth theory can be associated therefore with realisation of long-term expectations.

Realisation of long-term expectations does not make Kregel's distinction inapplicable, however. For one could envisage the following list of models: a) a model where long-term expectations are always realised; b) a model where long-term expectations are allowed to be disappointed, without affecting animal spirits; and, finally, c) a model where such disappointment can affect animal spirits. These three models would correspond, respectively, to Keynes' static, stationary and shifting equilibrium models. In fact, when the significance of long-term expectations is qualified, it becomes clear that Kregel's suggestion to develop a model of growth where long-term expectations are given and constant is possible to follow.

As argued in the previous chapters, Keynes' notion of long-term expectations includes both medium-term and long-term expectations. There is no distinction between those profits which signal that capacity is inadequate to demand and those which are associated with a fully adjusted capacity, as there is no distinction between investment

designed to adjust the scale of the system and that designed to provide for its long-term growth. When this distinction is made it becomes clear that long-term expectations can be given and constant and that an equilibrium rate of growth can be determined at the same time. This is possible because now it is medium-term expectations that have to be realised. The parallel with Keynes' list of models can thus be re-established. To Keynes' static model would correspond a model where, given long-term expectations, medium-term expectations are always realised. To the stationary model would correspond a model where, given long-term expectations, medium-term expectations can be disappointed, but eventually realised. Finally, to Keynes' model of shifting equilibrium would correspond a model where disappointment of medium-term expectations, or other exogenous occurrances, are allowed to change long-term expectations. As argued many times, the underlying nature of the capacity utilisation model conforms to the stationary model.

The important implication of this parallel derives from the fact that Keynes' short-term analysis is not necessarily a complement of long-term analysis as traditionally understood. Similarly, medium-term analysis should not be viewed as a complement of long-term analysis, that is, as being confined to the analysis of the adjustment to a normal state of affairs where growth is justified exclusively by its long-term component (as opposed to growth justified also by the need to alter the scale of the system). The fact that in most of Keynes' analysis long-term expectations are given and constant does not point to a hierarchy in the analysis, implying a superior level at which long-term analysis becomes relevant again and where short-term problems disappear. What it points to is simply that for Keynes' main problem, i.e. the determination of the level of money income and employment, that selection of independent variables seemed appropriate. Any other problem, even of a longer-term nature, will require a different selection of independent variables. There is no presumption, however, that when a long-term problem is considered, any short-term element disappears.

In all cases we are dealing with a problem of decision making in a context of fundamental uncertainty. Even the Keynesian shifting model does not imply a return to traditional long-term analysis. Such a model does not turn exogenous long-term

expectations into endogenous expectations. The extent to which short-term expectations are disappointed does not tell us how long-term expectations are going to change. It tells us that an occasion for a change in long-term expectations may have occurred; but such expectations have to be specified again. The success of an investment cannot be judged before a long time has gone by; by then too many factors will have changed, so realised results will be of little relevance to decide whether to repeat the investment or not.

At the same time, as mentioned earlier, Keynes stressed the fact that the state of long-term expectations is often steady even in the face of disappointed short-term expectations. What is the source of this stability then? The question does not have an obvious answer: in this context, the intrinsic stability of reality must be ruled out, because, even if reality were in fact stable, it could hardly be known. The answer must lie in the fact that individuals provide themselves with rules of action so that they can get by in an uncertain world. Such rules have very often a conventional basis. It is to the importance of such rules that we now turn.

5.3. *The role of conventions in economic analysis*

The present discussion on the role of conventions cannot be understood without first briefly illustrating Keynes' approach to uncertainty and its related theory of knowledge. For Keynes, external reality cannot be interpreted in a deterministic way: even if it were possible to isolate a system and study its internal necessary relations, there would be no guarantee that the same underlying conditions will be repeated. In the *Treatise on Probability* Keynes contends that "states of the universe identical in every particular, may never occur, and, even if identical states were to recur, we should not know it" (CW, VIII, p. 276). But reality cannot be interpreted in a probabilistic way either. In Keynes' view, the calculus of probability has only replaced causal necessity with statistical necessity. Reality is reduced to "an urn containing black and white balls in fixed proportions". The result is that the above argument can be applied to a probabilistic view just as well as it can be applied to the deterministic view. In a non-repetitive world,

neither as an economic theorist nor as a decision maker can one assume that the underlying conditions will remain invariant when a supposedly causal economic relation is being considered and projected into the future. So the next question to ask is in what way the fact of uncertainty affects individual decision making and what it is that agents come to know if reality cannot be the object of knowledge.

As Carabelli has argued with respect to Keynes' cognitive approach:

Control over the compatibility between hypothesis and material came, according to him, from within, rather than from outside, the process of knowledge. (Carabelli, 1985, p. 163)

What is relevant is not whether two events are materially related or not, but whether there is any *known* relation between the two events, or, which amounts to the same thing, whether there is any ground for believing that one is related to the other. The object of knowledge, therefore, is propositions and their mutual relations. It is precisely at this level that probability and probability theory become relevant again.[1]

At the beginning of the *Treatise on Probability* Keynes makes clear that what he wants to discuss is "the truth and the probability of *propositions* instead of the occurrance and the probability of *events*" (CW, VIII, p. 5). So the theory of probability becomes a branch of logic, and in particular that which deals with inconclusive arguments. Probability is defined as the degree of belief which is rational to attach to a given proposition relative to a particular *corpus* of knowledge. The *rational* qualification is here crucial as Keynes thought that although the *corpus* of knowledge, from which indirect knowledge of another proposition is derived, is selected according to subjective factors, the probability relation itself is objectively determined. As Fitzgibbons has argued in his reconstruction of Keynes' vision:

...just as there is a deductive logic which deals with the category of correct and false deduction, so too there is a larger logic which deals with the categories of knowledge, ignorance, and rational belief. This logic of probability is concerned not with the subjective, but with the objective grounds for belief. (Fitzgibbons, 1988, p. 14)

But how do we argue from given premisses? Fitzgibbons provides the answer.

All knowledge depends ultimately upon analogy with what we already know, and so upon principles of knowledge seen only murkily by the mind. (ib., p. 20)

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[1]For an analysis of the different accounts of the notion of probability see Lawson (1988/89).

Although this definition is general enough to encompass almost all kinds of knowledge, there is one important sense in which it should be interpreted in this context. Indirect knowledge, which is the knowledge we acquire by argument,[1] can be viewed as a common ground excluding, on one side, situations where a conclusive argument can be reached, on the other, situations where no argument whatsoever is possible. The former would reflect a state of certainty, the latter a state of uncertainty.[2] Between these two extremes all kinds of probability relations can be established, but the principles of knowledge which we resort to in each individual case may be different.

Suppose the evidence on which a particular proposition should stand is so scant that no degree of belief can be rationally attached to it. We would say that we are in a state of uncertainty and that there is no probability relation one can speak of. When this is the case we would say that we have no guide to action. But this need not be the end of the story, for, as Lawson has put it,

...although people face uncertainty in the sense of being unable to 'predict' the future outcomes of *all possible* current actions, they possess extensive knowledge of current societal practices, obtained through their own involvement, which can provide the basis for determining how to get by. (Lawson, 1985, p. 917)

So if one does not live in isolation, a possibility arises to turn the previous state of uncertainty into a different state where sensible decisions can be made despite the scarcity of the evidence. The way this may come about is by resorting to some generally accepted conventional judgement, which implies that some degree of rational belief is *in fact* attached to a given proposition. So what seemed to be a situation where no probability judgement could be made is turned into one where a probability judgement can be actually made, with the result that another way of arguing from given premisses becomes available. One can see that following a conventional way of arguing is just another way of arguing by analogy.

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[1]This is the probability relation, whereby given the evidence h a "rational belief of the appropriate degree" can be attached to a proposition a.
[2]See Lawson (1985).

In economic decision making scarcity of evidence is a recurrent state of affairs: the complex nature of the economic system emerges not only at the level of the material reality, but also at the level of the *known* relations between economic magnitudes. The result is that conventions may come to play a crucial role in economic decision making. If little ground exists for attaching any degree of rational belief to an economic proposition, conventional judgements may put people in a position to make sensible decisions. The importance of conventions and routinized behaviour has been often emphasized in the literature. Hodgson, for example, in his *Economics and Institutions* argues that:

...habits and routines may have a positive role since full conscious deliberation over all aspects of behaviour is impossible because of the amount and the complexity of the information involved. (Hodgson, 1988, p. 131)

There is another important role for conventions and routines also emphasized by Hodgson. Such routinized behaviour, apart from reducing the complexity of day-to-day behaviour, provide valuable information for other individuals.

Such inflexibilities or constraints actually suggest to the individual what other agents might do, and the individual can then act accordingly. Whereas if these rigidities or 'imperfections' did not exist the behaviour of others could change with every perturbation in the economic system, and such frequent adjustments to behaviour might be perceived as random or chaotic. (ibid. p. 132)

This passage should not be interpreted in the sense that conventions help to construct a causal model of the economy, but in the sense that they help to create rules of knowledge. If no recognizable pattern can be detected in other agents' behaviour, then no conventional judgement could be extracted from it. Conventions, therefore, are important not merely because they provide easy ways of getting by, but more fundamentally because they provide information on what other agents usually do in similar situations, and on the judgement which invariably underlies that behaviour. In fact, conventions are such precisely because they reflect generalized behaviour. So the more widespread and established these behaviours are, the more reliable is the information they provide, and the more likely it is that they will be reproduced through time. This will make those conventions even more widespread and established than before. A virtuous circle is generated: once a convention is established it provides itself the means of its survival and strengthening.

It is precisely this aspect that makes conventions important to economic analysis. It is because they tend to be reproduced through time that economic analysis becomes possible. In an uncertain world conventions provide the means to guide action and, more importantly, to check whether it was appropriate or not. A rule of behaviour must necessarily be based on a mechanism whereby action is taken if a particular event occurs. This implies that action is repeated if that particular event is itself repeated.

If the convention is widely upheld, economic analysis can set itself the task of searching for the conditions for that event to be repeated. An equilibrium model can then be set up where individuals are reproducing a situation which is exactly that which justifies that behaviour. Justification for individuals' behaviour can be sought also outside the economic model which is being considered. In that case it is just assumed that the convention holds good, so that behaviour is replicated through time. In the medium-term model which is studied here both possibilities are represented. It is to this model that we now turn.

5.4. *Conventions and medium-term analysis*

In the previous chapter the capacity utilisation model was presented fundamentally as a model where long-term expectations are given and constant and where medium-term expectations are realised. This meant that the investment designed to provide for the growth of the system was exogenously determined and the investment designed to alter the scale of the system was being checked in the light of realised results. Such realised results, however, have nothing to do with the final success of the alteration in the scale of capacity; that cannot be judged before a long time has elapsed. What they refer to instead is the value of a variable (the degree of capacity utilisation) which is simply being used as a guide for investment decisions. Accumulation, therefore, is explained in the model either by resorting to exogenous factors or to factors which are endogenous to the model, but which represent a (more or less adequate) substitute for the "true" explanatory factors of investment, which is the prospect of long-term (normal) profits.

This means that a wedge is driven between behaviour and material reality, as behaviour is not explained on the grounds of the effect that it produces on reality, but on the grounds of some conventional rule which is either entirely outside the economic model or based on some internal mechanism. An example of this approach to decision-making is provided by the constancy of long-term expectations. Holding long-term expectations constant means that no matter what profits are generated by economic activity, long-term accumulation will carry on unchanged until the factors which are supposed to explain it change themselves. Thus something different from realised profits helps investors to form long-term profit expectations. Knowledge of the possible results of the investment activity is not obtained through the observation of reality, but by resorting to some alternative way of arguing, which is however not made explicit in that version of the capacity utilisation model where medium-term and long-term expectations are neatly separated.[1] Based on that argument, behaviour is then decided.

What is made explicit in that version of the capacity utilisation model is the rule upon which medium-term investment is decided. Indeed, this is what the model is all about. This means that the investment designed to alter the scale of capacity is not given and constant in the same way as long-term investment is. Although the realisation of normal profits is what both kinds of investment are ultimately aimed at, it is sensible to assume that they are decided on according to different rules. Obviously, if medium-term investment were also given, the model would be reduced to studying only a short-term dynamics, implying the determination of a particular degree of capacity utilisation as that which brings investment equal to saving. Instead we have an endogenous dynamics which partly explains accumulation. Thus on the top of long-term investment a positive or negative addition must be considered, according to whether the scale of the economy needs to be enlarged or reduced. Such endogenous dynamics, however, is not based on whether the alteration in the scale of capacity proves successful or not. For example, it is not based on whether normal profits are obtained from the capacity added to the existing one. It would take some time to assess whether that addition was the correct one or not.

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[1]As argued earlier, Amadeo's model is the closest to this version of the capacity utilisation model.

Instead, such dynamics is based on some index of the extent to which capacity is inadequate to demand. If this index turns out to be constant through time, behaviour will be constant, too. Such index is the degree of capacity utilisation. Thus although this particular component of investment is ultimately designed to produce the correct amount of capacity (which is the capacity capable of generating normal profits), it is explained in the model by the degree to which this ultimate target is missed.

As probably remembered, the medium-term version of the capacity utilisation model, associated to the work of Amadeo, yields an equilibrium where accumulation is exactly justified by the degree of capacity utilisation which results from that accumulation rate. Expectations, therefore, are realised at equilibrium: the current degree of capacity utilisation turns out to be exactly that which warrants the current rate of accumulation. One can see, then, that the equilibrium rate of accumulation is not explained on the basis of whether such investment activity achieves its final purpose or not, but on the basis of some conventional rule. So long as the degree of capacity utilisation remains fixed at a particular level, accumulation will carry on unchanged. This would not be very different from a situation where one keeps feeding a baby with the same baby-food not because its nourishing value can be checked on the basis of the performance of the baby, but because medical advice or advertising make everyone feel confident about it. A conventional argument underlies such behaviour: medical advice, or something else, is viewed as an appropriate principle to acquire the knowledge *about* the proposition implying the goodness of the baby-food.

Similarly, a conventional argument underlies investment behaviour: a principle of knowledge founded on the degree of capacity utilisation is adopted. The proposition whose knowledge is sought concerns the correct amount of capacity which needs to be established in the economy. To this end the degree of capacity utilisation can be usefully employed as it helps to attach some degree of rational belief to that proposition. It follows that action can be confidently taken and investment decisions made in a way which is not

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entirely capricious, despite the fact that no direct knowledge[1] can be obtained of the proposition concerning the correct amount of capacity.

It must be stressed that what is being studied here is not an isolated action, but one which is repeated through time. We are trying to make sense not of an isolated act of investment, but of the *rate* of accumulation. It is implicitly assumed, therefore, that the behaviour considered is of that particular nature, that is a behaviour which, provided the underlying conditions remain invariant, is repeated through time. Thus failing the possibility of checking one's behaviour against material reality, investors will fall back on a conventional rule to guide their behaviour through time.

5.5. *Beyond the medium term*

The interpretation of the capacity utilisation model given in the previous section is not the only possible one. It was associated with what can be called now the core of the capacity utilisation model, which is best represented by Amadeo's model. The medium-term nature of that model is apparent through the explicit recognition that the equilibrium degree of capacity utilisation is generally different from any predetermined normal degree. Such recognition, however, is not necessary to all reconstructions of the model.

As illustrated in the previous chapter a number of versions of the capacity utilisation model have been offered. Most of these versions can be viewed as elaborations of ideas already suggested in the work of J. Steindl. Steindl took great pains to distinguish "between those shifts to or from profits which are due to effective demand, and those which result from changed price-cost relations independent of demand".[2] The main implication of this distinction is that two different sources of profits are identified and put on the same level. Overall profitability, therefore, comes to depend on two fundamental factors, the state of income distribution and the state of demand. While in the previous

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[1] In the *Treatise on Probability* Keynes distinguishes between direct and indirect knowledge: "Now our knowledge of propositions seems to be obtained in two ways: directly, as the result of contemplating the objects of acquaintance; and indirectly, *by argument*, through perceiving the probability-relation of the proposition, about which we seek knowledge, to other propositions." (C.W. VIII, p. 12)
[2] See quotation on page 73.

interpretation medium-term profits and long-term profits signalled, respectively, the required alteration in the average scale of capacity and the required rate of growth of capacity,[1] now both categories of profits would signal the growth potential of the economy.

This idea has gradually made its way in the literature on the capacity utilisation model. In Taylor (1983) the similar role played by profits and utilisation is already clear. "Investment will rise with both the profit rate r and the index of capacity utilization u as indicators of future profitability." (Taylor, 1983, p. 17) Here profits and utilisation might affect investment through different parameters, but both are viewed as indicators of future profitability. Two sources of profits are therefore available: distribution and demand, and both together determine whether a given investment project is worth pursuing or not. The role of demand in determining how attractive an investment project is has been pointed out also in Dutt (1990). There it is argued that "the level of output (as a ratio of capital stock) may signal to firms the strength of the market, exciting animal spirits as in accelerator models" (Dutt, 1990, p. 58). A direct connection is thus established between the strength of demand as measured by the degree of capacity utilisation and investment. Normal utilisation no longer mediates the relation between current utilisation and investment demand. In fact one can do away with normal utilisation altogether. This is precisely the conclusion reached by Dutt:

...rather than introducing a desired capital-utilization ratio into our model, it is more meaningful to have an investment function which simply says that higher utilization rates, other things constant, raises investment. Note also that the utilization rates can enter the investment function for accelerator type reasons, which have nothing to do with the difference between actual and desired rates of capacity utilization, ... (Dutt, 1990, p. 59)

The strength of the market, as measured by the degree of capacity utilisation, will not indicate, therefore, what is the necessary alteration in the dimension of the economy. Rather, it will indicate how quickly accumulation can proceed: a high degree of capacity utilisation and, thus, a high rate of profit will signal that a higher rate of growth is possible and, at the same time, will provide the inducement for that. More investment will

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[1] An alteration in the average scale of capacity implies some growth of capacity, too. However, such growth of capacity is designed to take the economy onto a different long-term growth path (see Chapter Four).

be forthcoming because a higher rate of profit, resulting from a higher degree of capacity utilisation, is expected. At equilibrium, since profit expectations will be realised, it will turn out that the higher growth requirement signalled by the higher utilisation rate was entirely justified.

The similarity in the treatment of profits and utilisation can be found also in Marglin and Bhaduri (1990). There capacity utilisation stands on the same level as the profit share in determining the expected profitability of a given investment project.[1] It is worth following Marglin and Bhaduri at some length.

In our model, the expected rate of profit depends upon the actual profit share and the rate of capacity utilization, as in Equation (3)

$$g^i = i \, (r^e \, (\pi, z))$$

The first of these variables measures the return to capitalists on condition that goods can be sold; the second, an 'accelerator' variable, reflects the impact of demand conditions. The partial derivatives of expected profit with respect to each variable can plausibly be argued to be positive: a higher profit share and a higher rate of capacity utilization can each be argued to induce higher profit expectations, the first because the unit return goes up, the second because the likelihood of selling extra units of output increases. (Marglin and Bhaduri, 1990, p. 163)

The more or less explicit recognition, typical of all these contributions, that normal utilisation no longer plays any role in the capacity utilisation model marks the final step in the process referred to in the previous chapter. There, models such as Rowthorn's, Dutt's and Taylor's were presented as not having entirely abandoned the medium-term/long-term dichotomy. As pointed out at the time, despite the analytical irrelevance of normal utilisation, the utilisation term in the investment function was explained as arising from the need to restore normal utilisation. Therefore, any equilibrium implying a deviation from normal utilisation could not be treated as a long-term equilibrium in the traditional sense.

In fact, reference to normal utilisation was quite unnecessary in that context. It only showed that the model was actually concerned with medium-term issues. So the next question to address is what kind of model one gets when the notion of normal utilisation is discarded altogether, and when demand and distribution are placed on the same level as sources of investment profitability. One possible answer is that the medium term is absorbed into the long term. In other words, medium-term profits would lose their

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[1]The same approach is followed in Kurz (1991). See in particular p. 431.

medium-term character and become part, alongside normal profits, of long-term investment profitability. Thus the same rate of profit could result either from high utilisation and a low profit share or from low utilisation and a high profit share. It would be difficult, however, to describe such a model as a long-term model. One cannot escape the following questions: why, given the profit share, could investors not aim at obtaining as a high degree of capacity utilisation as possible through the disposal of excess capacity? or, why should investors count on profits above normal being permanent, while the creation of new capacity is still a possibility? The answer is that the equilibrium solution of the model implies a conventional equilibrium, that is an equilibrium where decisions are made on the basis of accepted conventions. It is to the study of these conventions that we now turn.

5.6. *Another conventional equilibrium*

In the model where long-term and medium-term expectations are clearly kept apart the propositions whose knowledge is sought concern, respectively, the long-term growth potential of the economy and its appropriate average dimension. As pointed out before, the knowledge of the first proposition is simply (and implicitly) assumed and no mechanism is suggested whereby it is reached. Decisions are then made accordingly. With respect to the knowledge of the second proposition, a mechanism is spelled out and assumed to be based on a variable endogenous to the model. This variable was the degree of capacity utilisation.

Such use of the degree of capacity utilisation is not the only possible one, however. The variable could also be used to acquire knowledge about the first of the propositions mentioned. It could be used, that is, to acquire knowledge about the growth potential of the economy. This means that the degree of capacity utilisation would be used, alongside the share of profits in income, to determine the rate of accumulation that the economy could sustain in the long term, i.e. regardless of capacity adjustments. Thus, instead of reaching that knowledge through some theoretical model, predicting for instance the

restoration of normal utilisation, a different route would be taken. Such route would imply that, as far as some economic variables are concerned, current values give a reliable indication of future values. In this particular case, current utilisation would give a reliable indication of the degree of utilisation which can be expected in the future. It is on the basis of this knowledge that action is then decided.

When discussing investment, Keynes refers precisely to this practice[1] and presents it as a conventional judgement, i.e. as a judgement which is not properly grounded:

> It is reasonable, therefore, to be guided by a considerable degree by facts about which we feel somewhat confident, even though they may be less decisively relevant to the issue than other facts about which our knowledge is vague and scanty. (CW, VII, p. 148)

The context in which such judgements are formed is one of uncertainty, that is, one where no rational basis exists for attaching any degree of belief to a given proposition. Failing the possibility of acquiring conclusive knowledge of the future levels of some particular variable, individuals fall back on conventional judgements which are often grounded on evidence which may not be immediately relevant. Assuming that the future values of some variable will conform to the current values is an example of this kind of judgement. In the case of the degree of capacity utilisation, some degree of belief will be attached to the proposition that the future degree of capacity utilisation will be established at a particular level, with this level being determined in accordance with the current one. Thus, current capacity utilisation will be taken as an indication of what to expect when new capacity comes to be installed, with the result that investors provide themselves with a guide to action. The main implication of this is that no degree of belief is attached to the proposition that some normal degree of capacity utilisation will be eventually established, which was the piece of knowledge guiding long-term investment when medium-term and long-term investment were kept separate.

The conventional nature of the equilibrium implied in this particular interpretation of the capacity utilisation model should now be clear. What explains it is the uncertainty sorrounding the establishment of *a* normal degree of capacity utilisation and the need to

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[1] "...our usual practice being to take the existing situation and to project it into the future, modified only to the extent that we have more or less definite reasons for expecting a change". (CW, VII, p. 148)

resort to some rule of knowledge to form an expectation about the future degree of capacity utilisation. Such rule of knowledge is not designed to discover the "true" model of the degree of capacity utilisation. Such knowledge in a non-deterministic world is unattainable. It has a far narrower purpose, which is that of providing individuals with a guide to action. Since this rule is based on a variable endogenous to the model, an equilibrium can be constructed where expectations turn out to be realised.

So long as investors carry on believing that current utilisation is the best indication of future capacity utilisation, capacity utilisation itself will keep adjusting until saving and investment become equal. When this equality is obtained, it means that the degree of capacity utilisation which justifies a particular growth rate of capacity turns out to be precisely the degree which equates saving and investment. Expectations are fulfilled: the conventional way of extracting knowledge from a not entirely adequate evidence proves effective. However, fulfilment of expectations may not be enough to keep the system going once equilibrium has been reached. Only when hypotheses have to be tested against experience can individuals assume, having seen their expectations confirmed, to have discovered the "true" model of the economy. In this approach hypotheses are validated by a process of knowledge which may have nothing to do with empirical verification. The crucial question is whether there exists any ground for believing that some variable will assume a particular value in the future. The consequence is that the ground for rational belief can change regardless of whether expectations are fulfilled or not. This means that equilibrium is maintained only as long as the convention holds good.

5.7. *Uncertanty and normal capacity utilisation*

The final question to address is what is left of the concept of normal capacity utilisation once an approach like the one above is followed. So long as the distinction between medium-term and long-term investment and profits is retained, normal capacity utilisation still plays a role. It determines the highest profit rate which can be expected

once the correct amount of capacity has been installed. If any positive degree of belief is attached to the proposition implying that this rate of profit is eventually established, decisions can be made on its basis. Such decisions are, on the one hand, those concerning the adjustment of the scale of capacity, on the other, those concerning the provision of capacity for the growth of the system. In both cases the normal degree of capacity utilisation indicates, given income distribution, the rate of profit which can be expected from the moment when capacity becomes adjusted to demand.

When the proposition implying that normal utilisation will be eventually established is not granted any degree of rational belief, an important reference point is lost and no guide to action is therefore offered. This basically implies the recognition that the degree of capacity utilisation may be subject to limits due to demand-related factors. In other words, capacity cannot be generally expected to be used to its full extent, with the result that in making investment decisions investors have to take into account not only the rate of profit they would get if capacity were fully utilized, but also the extent to which capacity can be expected to be effectively used. Recalling the discussion carried out in the previous chapters, this means that all the difficulties which exist in the process of re-establishing normal utilisation are taken into account by decision-makers.

When no reliable indication exists as to the future value of the degree of capacity utilisation, observed values might come to some use. This means that expected (or normal) utilisation ceases to be determined according to some theoretical model of the economy predicting some value or other, and comes to be determined according to observed values. It must be remembered, though, that this is still a conventional judgement and no assumption is being made implying that the "true" model of the degree of capacity utilisation has been discovered.

5.8. *Conclusion*

We have finally reached a point where the two aspects of investment which have been carefully kept apart throughout are, so to speak, re-united. Now the investment which

was previously designed to alter the average dimension of the system, while the long-term growth potential of the economy was taken for granted, is carried out to provide precisely for that growth potential. This implies that the degree of capacity utilisation ceases to signal variations in the average scale of the economy, and goes on to signal the long-term capability of the system to grow over time.

The analytics of the two models might be the same, but the interpretation is quite different. This is particularly true because the notion of equilibrium growth assumed here is not associated with the ontological steady state. What is assumed here is that the set of economic relations represented in the model are held together by appropriate institutional and conventional arrangements, with the result that change can come from within as well as from without. It is one thing to assume that long-term investment is determined by factors other than those made explicit in the model, and quite another to explain it mainly on the basis of a variable endogenous to the model. The implications as to the sustainability of the equilibrium rate of growth are obviously different according to which is the case.

It must be appreciated that whenever long-term investment is explained by the endogenously determined degree of capacity utilisation, the issue of the average scale of the system inevitably falls out of consideration. It is no longer possible to say, for instance, that the economy is investing more, with respect to the existing capacity, because its average dimension has grown. If more capacity is being created, following an increase in the degree of capacity utilisation, it is because the capability of the system to grow over time is perceived as increased. What has happened, in fact, is that the process of growth designed to modify the average dimension of the economy has been incorporated into the economy's long-term growth, which has now an additional determinant. What was supposed to be only a process of adjustment is captured by a different kind of process, which is thereby transformed.

The importance of identifying the underlying nature of the capacity utilisation model, before discussing the versions not based on the medium term/long term dichotomy, should become clear now. Since economies continuously experience adjustment, and

since at the same time there is a fundamental uncertainty about the long-term prospects of the system, adjustment itself, and its relevant pattern over time, could provide a guide to action. In this case, medium-term profits become part of the long-term profitability of investment and, as a result of this, guide long-term investment decisions.

As shown earlier, when this is the case, an equilibrium exists where the rate of growth resulting from investors following that rule of action coincides with the expected rate of growth, to which is associated a particular degree of capacity utilisation. This is an example where a conventional rule of behaviour provides the foundations to a growth regime. The medium-term regime of growth where long-term and medium-term investment are kept separate is another one.

CONCLUSION

The golden age is a "mythical state of affairs not likely to obtain in any actual economy". This remark of Joan Robinson was reported at the beginning of the thesis to convey the point that this is not a thesis about equilibrium economics. However, equilibrium models were presented and discussed. So a contradiction seemed to lurk behind this work. In fact, this contradiction was only apparent, as it is precisely the tension between stability and change that lies at the heart of this work.

While the golden age reflects a state of affairs where individuals' maximizing plans over time are all mutually compatible, the notion of equilibrium growth adopted in this work refers, rather, to state of affairs where nobody wants to change his behaviour. Since such notion can accommodate a situation where the rules of behaviour are provisional in character, a potentiality for change is embedded into the model. The sense in which rules of behaviour can be said to be provisional was discussed in the thesis, and reference was made to Keynes' theory of knowledge and to the role of conventions in economic analysis. In a state of fundamental uncertainty, knowledge is acquired by argument and cannot generally be claimed to be conclusive. This means that it cannot usually be tested against realised results or against a superior principle of knowledge. However, the grounds for rational belief can change, with the result that the same proposition may become associated with a different degree of rational belief or that a higher degree may be attached to a different proposition. If behaviour is based on that knowledge, it will change as well.

So it is the inconclusive nature of the knowledge acquired by argument that puts the equilibrium associated with the models discussed here in danger of being disrupted. And this is clearly a possibility which arises from within the model, not from the modification of one of its assumptions. This means that the equilibrium which results from the constant adoption of a set of behavioural rules cannot be credited with long-term stability.

The tension between stability and change does not result only from the immediate fact of fundamental uncertainty. Institutions, general conventions, habits, routines, all reproduce that tension. In a non-repetitive world institutional arrangements, or even ordinary ways of getting by, are by their very nature liable to be replaced. In some sense they are outdated as soon as they are in place. So they can be viewed as providing stability and order while change is being prepared. One could even say that they bridge the gap between two successive changes.

A model of growth which incorporates such institutions, conventions, conventional judgements, etc., is therefore a model of growth whose equilibrium cannot be said to be steady in the ontological sense. Such an equilibrium could be compatible with growing unemployment, with an other-than-normal degree of capacity utilisation, with an exogenous distribution of income, or with a number of other non-optimal behaviours. The very nature of this equilibrium, however, will prepare the ground for its replacement. Nothing could be farther from the golden age.

In order to make sense of each individual growth regime, the relevant institutional or conventional arrangements must be specified. In this work, even if a list of growth regimes was presented, attention was focused on a particular one, where the non-optimal behaviour refers to the use of capacity. It was argued that it is the immediate fact of fundamental uncertainty, and the related question of decision-making, that is relevant for the specification of the conventional arrangement underlying this growth regime. This is not to deny, however, that the fact of fundamental uncertainty is relevant in the specification of the arrangements underlying the other growth regimes. It only means that in the capacity utilisation model there is a more obvious problem of

decision-making than in the other cases. So what needs to be specified here is a conventional judgement, that is, how individuals acquire knowledge of the propositions relevant to the making of their decisions.

When the theory of economic growth is reconstructed along these lines, i.e. as a general model with different 'closures' each of which is associated with a particular institutional arrangement, one further question must not be overlooked. The question is whether the economic theorist is granted a power of knowledge different from that of the representative individual agent, whose behaviour is studied in the economic model. This question is particularly compelling with respect to an approach where the focus is on non-equilibrium situations. Since the process of growth is presented as a succession of growth regimes, without any necessary convergence to a golden age, should we expect agents to carry on representing the economy as ultimately tending to that harmonious state of affairs? Or should we expect them to turn the current growth regime into their favourite representation of the process of economic growth?

These problems are undoubtedly difficult to solve. One should recognize that sometimes a different power of knowledge between the economic theorist and the representative agent is realistic, sometimes it is not. The equilibrium studied in the final chapter, where medium-term profits are turned into a component of the long-term profitability of investment, is an example of how agents can turn a particular regime of growth into the best representation of the process of economic growth, and act accordingly.

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