CHAPTER VI: CONCLUDING OBSERVATIONS.

1. We will like to put together now some of the more important conclusions that emerge logically from above discussions and certain tentative ideas that seem to be suggested by them.

The method we have tried to develop and use is by now clear. It basically consists in parceling a long span of time into shorter intervals at the end of each of which there is a flow equilibrium. Investment has been identified for this purpose as the economic activity of which the plans change at discrete intervals, allowing for the time for its consequences to materialise and thus to form the basis of a new plan.

As has been often rightly pointed out, the identification of investment as governing the rest of the economic activities is itself a major contribution of the General Theory and constitutes one of its sharpest distinctions from the earlier traditions of economic analysis. What we have tried to argue is that this contribution is interwoven with a contribution in the methodology of economic analysis and this latter constitutes a major departure from the pre-Keynesian method of analysis as opposed to its substance.

The major distinction of this method from the general lay-out of the Pre-Keynesian analysis, in our view, is
essentially in proceeding from the short-period to the long-period. In Marshall, for example, the long-period equilibrium (or the stationary state) is logically prior or the starting point. Any discussion of dynamics arises at all only when such a long-period equilibrium is disturbed. This long-period equilibrium is taken as the norm, and is confidently expected by the agents. As we have discussed in Chapter I, above, this presupposes the stability of the long-period equilibrium. As a result when the short-period adjustment is discussed, it is in no sense an advancement of our knowledge about the working of the economy - since this dynamics is already implicit in the notion of stability of the long period equilibrium. In our view, this methodological problem arises mostly because the analysis extends, logically speaking, from the long-period to the short.

On the other hand, the method we have adopted proceeds from the short-period to the long- in the sense that the description of the long-period emerges only when the successive short-period equilibria are threaded together. The existence and the stability of a long-period equilibrium remains an open question - depending on the nature of the investment function as also the specific history of the economy - both regarding its objective variables and regarding its expectational past history. This frees us from the embarrassing circularity of the earlier tradition,
of having to presuppose a stable long period equilibrium of the system before even starting our analysis. This method, as a result, seems to be much closer to our intuitive notion of the short-run and the long-run, namely that our knowledge of the immediate future is more definitive while what happens in a remote future is the outcome of events in the intervening time.

2. A second but connected point in this regard is about the role of long period expectations in this type of models. In the Marshallian frameworks expectations did have a very definite role, namely of imparting to the agents the right kind of behaviour so as to eventually get on to the stationary state. It should be emphasised, even at the risk of sounding repetitive, that expectations could not be assigned any different role in the Marshallian framework, because they were to perform the task of legitimising the initial premise of the analysis, namely that of a stable long-run equilibrium state.

In the type of models that we have tried to present, the long-run expectations may be handled without any such prejudice. The choice of the particular type of long-run expectations to be used in a model is completely open and can be related to the empirical judgement of the model builder about the agents' present view of the distant future.
In fact, in these models much of the nature of the long-period path, including the possibilities of its convergence to some steady state becomes dependent on the nature of the investment function, and, therefore, in turn, on the nature of the long-period expectations. For example, the path described by equation (8), chapter III, would or would not converge to the steady rate \( u = 1 \), depending on whether \( f' < 0 \) or \( f' > 0 \). A similar statement is true about the equation (10), Chapter IV. Thus depending on whether the reaction to deviations from the long-period norm is stabilising or destabilising, the outcome of the long-period process will be very different.

We should point out here, that this feature is quite expected. The essential aspect of the method of looking at short-period processes as the outcome of given stimuli of investment, and seeking to thread together such single processes as investment gets redefined through the periods, is a vision that the successive investment decisions shape the long-period path of the system. Thus it is natural that the formal outcome of such models will be a path that is mostly determined by the specification of investment behaviour. This feature has come out quite strikingly in the analysis of the stability conditions of the model described in section 7, Chapter IV. We have demonstrated (Pages 71-72, Section 7, Chapter IV) that the stability condition for the long-period path, there,
can be stated in terms of the feed-back behaviour of one period's investment on the next, (via the change in utilisation it creates in the intervening short period).

3. A major point that emerges from the study is about the nature of the possible steady state. In Chapter V, we have seen that when we introduce short-period expectations explicitly, the question of the steady state becomes related to the initial conditions, both objective and subjective. In the model developed in section 4, Chapter V, the steady state configuration for the path given by equation (15), depends on the initial level of utilisation as well as the expectations held about the level of utilisation at the initial period. Likewise, the model described in section 5, Chapter V, yields a path (equation (20), Ch.V), which either converges to or explodes away from the steady state depending on the initial state of short-run expectations!

These results are certainly against the usual notion of a steady state which can be discussed independently of the initial conditions or the specific history of the system. Much of the analytical importance of the notion of a steady state derives from its independence of the specific initial situation of the system. Particularly so, if the steady state is also stable. In that case, since starting from any arbitrary initial situation, the system gets into a certain configuration eventually, this
configuration, by itself becomes an object of analytical interest.

In the models we have presented this is not so. The configuration at the steady state as also the condition of the convergence of the path to this configuration, in general depend upon (i) the state of the long-period expectations and (ii) on the specific objective and subjective history of the system. As a result, the steady-state configuration is not defined independently of the initial configuration of a path, and exercises like comparing the steady states of a model with different parameter values becomes meaningless.

4. We should note, however, that this feature, namely the steady-state configuration and its stability properties getting related to the specific history of a path, is not unique to our particular method. In fact such feature is likely to be displayed by any framework where the long-period outcome is not presupposed and is built up as the outcome of successive shorter-term processes. Our illustration in the appendix to chapter V, serves to illustrate this point, where the model framework used belongs to the Swedish tradition. We can check back, that the steady state value for $p$ as given in equation (15) of that appendix is completely determined by the specific initial (objective and subjective) configuration of the path and the elasticity ($b$) of short-run expectations.
We should conclude our observation on this point by remembering that the loss of a notion of a steady state configuration independent of the path of the system need not be altogether regrettable, when we adopt a method of proceeding from the short-run to the long-run. The importance of the notion of a steady state independent of the path of the system mostly derives from the pre-Keynesian method of starting the analysis from the long-period equilibrium end. Since, there, the long-period equilibrium virtually defines the starting point of the analysis, the notion of a steady (or stationary) state completely independent of the specific history of a particular path becomes a necessity.

In our case, since the starting point is the other end, and it is the stability of the short-period adjustment process which serves as the basis of the analysis, it is not of much importance if the steady state configuration is or is not independent of the past history of the system. In this connection, we should note the crux of the analytical difference that is imparted to the long-period path by this method. In the usual models involving a steady state configuration independent of the path, if we are analysing the time profile of a vector \( x_t \), we have the condition:

\[
\lim_{t \to \infty} (x_t) = \bar{x}
\]
Where $t$ denotes time and $\bar{x}$ is the steady state value of the vector $x_t$.

If we have any initial configuration $x_0$ at $t = 0$, we can define a sufficiently large period $T$, such that:

$$|x_T - \bar{x}|$$

can be made insignificant. Since in the limit all paths would converge to $\bar{x}$, for all practical purposes the configuration $\bar{x}$ can be examined as an interesting characteristic of the system.

It has been repeatedly observed\(^1\) that such formulations fail to capture the essence of certain economic phenomena where the actual calendar date or the regime in which the model is posed makes a lot of difference for the path of the system. Phenomena involving economic hysteresis, learning, irreversibilities etc., where the experience and expectations during the path would severely affect the outcome of the process are impossible to analyse in such a framework.

The awkwardness of this kind of formulation becomes clear if we note that the vector $x_t$, in this system can always be described in the form:\(^2\)

$$x_t = f(t-t_0; x_0(t_0))$$

\(^{1}\) See for example: Joseph A. Schumpeter: History of Economic Analysis (New York, 1954); p.965, n.5; A more recent example is in Joan Robinson: History versus Equilibrium: Thames Polytechnic 1974, or N. Georgescu-Roegen: Analytical Economics: Ch.3,(Harvard, 1967).

As a result, given the initial configuration \( x_0 \) at \( t_0 \), the vector \( x_t \) is completely described by the lapse of time \( (t-t_0) \) and not by the actual calendar date, \( t \). Thus a configuration \( x_0 \) at two initial dates very distinct in terms of, say, social expectations, experience and learning, will lead to the same configuration \( x_t \) after equal lapses of time \( (t-t_0) \).

This awkwardness has been partially removed in the framework we have used in this work. The particular configuration of a vector \( x_t \) at time \( t \) in this method will bear the distinct mark of the initial period, \( \beta^{(t)} \) to the extent that the initial subjective state of expectations, partly capturing the historical features of the initial calendar date, will influence the value of \( x_t \) at any \( t \). We should hasten to add, that this is neither the best, nor the only way of modelling a long-period path distinguished by the characteristics of the initial period.

6. We should however conclude this review of the study with a critical note. We should note that the entire framework of the analysis that we have tried to develop, rests on looking at the flow equilibria in the single short periods. The investment behaviour used in the models of course can be rationalised on the basis of some stock-adjustment principle. But we have not explicitly worked out the relation between the extent of stock disequilibrium and the level of investment at the beginning...
of each period.

This opens up one quite serious drawback of the method. The idea that the short-period adjustment behaviour can be described without any reference to the actual amount of stock-disequilibrium, must be based on a presupposition that the nature of the short-period adjustment process is completely insulated from the extent of stock-disequilibrium. It has been pointed out\(^1\) that an assumption of excess stocks must always accompany the usual Keynesian quantity adjustment story of the single short-period. In our method, since the same type of short-period adjustment behaviour is repeated over the long-period path, irrespective of the nature of the stock disequilibrium, nothing short of an assumption of complete independence of the short-period adjustment process from the actual stock position and the extent of stock-disequilibrium, would make our framework viable.\(^2\)

As a result, despite the look of realism imparted by the investment functions used in the models discussed

\(^1\) See. J.R.Hicks: The crisis in Keynesian Economics: (Basil and Blackwell, 1975) Ch.1.

\(^2\) Very similar observations were made by Hicks in: Capital and Growth (Oxford 1965): Ch.XI.
in the text, they cannot be assigned the status of realistic models of any actual growth process. As we have pointed out even as early as in the introductory chapter, the purpose of these models is illustrative of certain methodological points and they do not purport to capture any real growth process of the economy.