STUDIES IN THE THEORY OF MONEY AND CAPITAL

Erik Lindahl

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by
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This book is the outcome of a desire expressed by some of my friends in England to have an English translation of some of my earlier works. While this idea was being carried out, the plan was slightly modified, since I wished to add a contribution from my later studies in the central field of economic theory. For this reason I have limited the selections from my earlier writings to two papers concerned with the same theme. The present volume therefore consists of three relatively independent parts, written at different times. Each part may be read by itself, but, since the three parts deal with related problems of economic theory seen from different angles, they may be considered as forming a connected whole.

An inverse chronological order has been followed in the book. Part One has not previously appeared in print. Part Two contains the more important sections of the work *Penningpolitikens Modell* (Methods of Monetary Policy), printed for private circulation in 1939 and published in Swedish in 1940. Part Three is a translation of a study entitled *"Prisbildningsproblemen uppdraget från kapitalteoretisk synpunkt"* (The Pricing Problem from the Point of View of Capital Theory) which appeared in the *Ekonomisk Tidskrift* in 1929. A compressed version of another paper printed in the *Ekonomisk Tidskrift* in 1935, dealing with a much-discussed problem of public finance, has been added as an Appendix.

In the translations accuracy has been the principal aim. The main differences from the Swedish versions are the insertion of additional subheadings, and certain regroupings, compressions, and deletions, the purpose of which is

* Except in the case of the Appendix.
to make the argument easier to read. A few additions have also been made at some points in order to bring out the intended meaning more exactly. In the "Algebraic Discussions" of Part Three, the more elegant notation used by Professor Bowley and others has been substituted for the Walrasian notation used in the Swedish original. Passages which do not agree with the author’s present views have been retained, with the addition either of new explanatory paragraphs, or of new notes. These are indicated by square brackets.

Differences of method between the two later parts and the first are the inevitable consequence of the development of the author’s thought over the last ten years. It should nevertheless be possible for the reader to tackle the parts in their present sequence, starting with the more general problems and proceeding to more special ones.

Taking the sections, for the moment, chronologically, Part Three may be described as an attempt to approach gradually a realistic economic theory, beginning with a simplified static analysis and introducing successively more complicated assumptions. In the two first chapters an endeavour is made to fuse together the pricing theories of Walras and Cassel on the one hand and the capital theories of Röhm-Bawerk and Wicksell on the other. Subsequent chapters introduce dynamic problems within the static framework, this being possible under certain simplifying assumptions. If perfect foresight is assumed, the dynamic problem can evidently be handled in a manner quite parallel to the Walrasian scheme. I believe that this approach is not entirely unrealistic, since people actually do anticipate correctly much of what takes place. The analysis then continues by introducing unforeseen events, which may also be pressed into the static scheme if they are assumed to cause discontinuous shifts from one temporary equilibrium position to another.
The treatment of monetary problems in Part Two is mainly based on the same simplified method of analysing a dynamic process as a series of temporary equilibria, between which there occur unforeseen events with consequent gains and losses. For the rest these problems are dealt with on Wicksellian lines. The price level of consumers' goods is principally determined by the relation between consumption and saving on the one hand and the relation between the volume of consumers' goods and that of capital goods produced, on the other. These relations are in their turn determined by the level of interest rates and by expectations concerning the future. This line of thought is illustrated by an analysis of cumulative processes on various assumptions, taking into account among other things the important distinction between short and long term rates of interest. Finally, the Wicksellian concept of a "normal loan rate of interest" is shown to be wanting in precision when more dynamic assumptions are made.

The first of the studies of Part One summarizes my present views. The traditional approach to realistic dynamic theory (used in Part Three) is not regarded as necessary or even suitable in all cases. Instead, economic theory should if possible be so framed as to be applicable to real conditions from the beginning. This means that we should proceed from general terms to more differentiated and complex terms. The main outlines of the reorganization of the systematic structure of economic theory that follows from the adoption of this view are briefly indicated. The "Algebraic Discussion" which concludes this part is an endeavour to give a general formulation of some basic economic concepts, in such a way as to make them directly applicable to real situations; and to give a systematic account of the relations between these concepts. Although the task may seem elementary, it is
of fundamental importance, and my exposition shows that it presents certain difficulties. It is my hope that I have been able, by utilizing the distinction, now well established in the Swedish school, between ex ante and ex post estimates, to find a simple solution of the much-debated question of the relation between saving and investment. It has not however been possible to include in the present volume that full analysis of the working of the economic process which is needed in order to complete the discussion.

Mrs. U. K. Hicks has with never-failing interest and patience followed the work from beginning to end, and if the result is a book worth publishing, this is due to her tireless efforts, extending down to the smallest details, and to her valuable advice concerning the planning and execution of the work. Professor J. R. Hicks has also followed the development of the book with interest from the start, and has in addition read the page proofs and given me much helpful advice. I wish to express my deep-felt thanks to them both. I am also indebted to Dr. P. N. Rosenstein-Rodan, who has aided me by word and deed throughout. Among my Swedish colleagues I desire to record my gratitude to Dr. Dag Hammarskjöld of the Finance Department for various improvements made as a result of my discussions with him concerning the contents of Part One, and for his kindness in reading the page proofs, and to Fil. lic. Tor Fernholm, who has not only translated the greater part of the book but has also, by his sound judgment, valuable suggestions, and keen criticisms, materially improved its contents.  

ERIK LINDBLAD

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JUNE 1939
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PART ONE
THE DYNAMIC APPROACH
TO ECONOMIC THEORY
INTRODUCTION TO THE STUDY OF DYNAMIC THEORY

1. THE AIM OF ECONOMIC THEORY

The final aim of Economic Science is either to explain the economic phenomena of the past or to forecast the economic events that will, under given conditions, probably occur in the future. In the first case we are concerned with problems of Economic History, in the second with problems of our actual life, especially those referring to the domain of Economic Policy.

In both cases scientific treatment of the questions involves, not only the collecting of empirical material and its appropriate arrangement, but also the demonstration of causal connections between the phenomena studied. The first step in this analysis is to explain a certain development as a result of certain given conditions prevailing at the beginning of the period studied. These given conditions must be stated in such a way that they contain in some way the whole subsequent development. Thus they should embrace not only the external facts and the plans in existence at the initial point of time, but also, as latent propensities of the economic subjects taking part in the system, their subsequent reactions to what happens during the period. If all this is known, it will be possible to give a theoretical construction of the development in question.

But the analysis should not stop there. We do not fully understand the importance of the initial conditions for the resulting development, unless we have undertaken a comparison with hypothetical developments that might be the result of an assumed variation of these conditions. We
may elucidate this further by the aid of the following scheme:

<table>
<thead>
<tr>
<th>Given conditions at an arbitrary point of time</th>
<th>Resulting developments during a following period of arbitrary length</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a')</td>
<td>(A')</td>
</tr>
<tr>
<td>(a'')</td>
<td>(A'')</td>
</tr>
<tr>
<td>(\ldots)</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>(b')</td>
<td>(B')</td>
</tr>
<tr>
<td>(b'')</td>
<td>(B'')</td>
</tr>
<tr>
<td>(\ldots)</td>
<td>(\ldots)</td>
</tr>
</tbody>
</table>

The treatment of a historical problem includes first the description of the development in question \((A')\), then the ascertaining of which initial conditions \((a')\) can be assumed to be the joint causes of the said development. In order to obtain an idea of the importance of each separate condition, we must make a further investigation as to the possible connections between initial conditions and subsequent developments, on the lines indicated in the scheme above. Thus if we can prove that a development of the actual type, \(A\), can be occasioned either by our original set of conditions, \(a'\), or by some other combinations of conditions, \(a''\), etc., and that a development of another type, \(B\), can only be the result of certain other combinations, \(b'\), \(b''\), etc., we can draw the following conclusion: the fact that our original set of conditions is of the type \(a\) instead of the type \(b\), is the cause of the fact that the actual development has been of the \(A\)-type instead of the \(B\)-type.

Similar reasoning can be applied to the treatment of practical and political problems. In some cases a future development of a certain type \((A)\) is given as a desirable end for our activities, and we have to find out the best means for attaining this end. The solution of this question involves firstly the statement that initial conditions of the \(a\)-type must be established, and, secondly, an investig-
of the consequences of the alternative lines of action
\((a', a'', \text{ etc.) between which we then have to choose. In other cases the task of the economist may only be to make clear what developments will be the probable result of certain lines of action. He has then also to rely on a scheme showing the connections between initial conditions and resulting developments.

The purpose of this introduction is to make clear the aim of Economic Theory: to provide theoretical structures showing how certain given initial conditions give rise to certain developments. The structures are to be used as instruments with which to analyze historical and practical problems. Economic theory has thus no end in itself; it is only a servant of those parts of economic science which are devoted to the treatment of concrete economic problems. But it is an indispensable servant. Even the arrangement of empirical material must be based on a system of concepts, elaborated by economic theory. And if we wish to go deeper and make judgments regarding the causal connections between the phenomena studied, it is, as we have seen, necessary to work with hypothetical cases in the form of theoretical structures.

The conclusions contained in these structures are of a

* This point of view is supported also by the authority of Professor Pigou: "None the less, the thought-tools of the economist are, I think, in themselves and for their own sake of little interest and importance. The pure mathematician would protest—and rightly—if anyone should regard his structures as merely tools for physics and other applied sciences. But then those structures—if one who knows them by report may venture to speak—constitute immense and imposing triumphs of the human intellect. They are much more than tools; they are themselves works of art. No claim of that kind can be made for the structure of pure economics. These are tools only. Those of them that cannot be made to work in elucidating the problems of the real world must be scrapped; there is no place for them in the gallery of art. But, though they are only tools, as tools they are real." Pigou and Robertson, Economic Essays and Addresses, p. 8.
purely formal nature, stating what series of events must
be the consequences of the assumptions made about the
situation at the start.* It is questionable whether proposi-
tions of this type should be honoured by the term of
"economic laws," since their relevance to the real world
cannot be determined from the content of these structures
temselves. It is of course essential that the assumptions
which are the data of the theoretical system should be
related as much as possible to empirical phenomena.
Only in this way can the theoretical structures acquire
relevance for the solution of actual problems.

If a historical case is analysed, the structures used should
be based on assumptions that are in accordance with the
real situation at the time. And if we have to deal with a
problem of practical life, to explain the probable effects
of possible alternative actions of a person, a firm or a
public body in a certain situation, the data of our struc-
tures should correspond to this situation. Ideally the
system of economic theory should include all the struc-
tures—showing the connections between different sets of
data and the resulting developments—that could be of
any relevance to the treatment of those historical and
practical problems, the solution of which would be of
interest, now or in the future.

In view of the infinite variety of economic phenomena

* Cf. L. Robbins, An Essay on the Nature and Significance of Economic
Science, 2nd ed., pp. 78-9: "The propositions of economic theory,
like all scientific theory, are obviously deductions from a series of
postulates... The truth of the deductions... depends, as
always, on their logical consistency. Their applicability to the
interpretation of any particular situation depends upon the existence
in that situation of the elements postulated." Cf. also G. Mackenroth,
Theoretische Grundlagen der Preisebildungsforschung und der Preispolitik,
Berlin, 1933, where a good exposition of this and other methodo-
logical questions is given.

† Cf. the discussion of this problem in Cairnes, The Character and
in the real world, it is of course impossible to reach this
aim. As economic theory can contain only a limited
number of structures, the working out of the special
theories, needed for the analysis of actual problems, must
to a large extent be left to the investigators of these prob-
lems. The claim that can be made on economic theory
in its proper sense can therefore be formulated in the
following way: it should give as much assistance as possible in
the elaboration of the special theories. This means that the
body of pure theory should be based on data which are
of general relevance to the actual cases considered, so
that it can be easily adapted for application to these cases.

2. General Concepts and General Theoretical
Structures
From this point of view we may draw some conclusions
on two methodological questions that are of fundamental
importance for the elaboration of economic theory. The
first concerns the degree of generality of systematic theory,
the second the use of typical simplified structures as a means
of dealing with the complex problems of reality. The
primary distinction is between general theories on the
one hand and special and concrete structures on the other.
As a cross-classification* we can also distinguish between
simplified theories, which may be more or less concrete,
and complex or differentiated structures. The mark of
a simplified theory, such as that of a “stationary state,”
“free competition,” etc., is a certain uniformity in the
data and the conceived developments. In the next section
we return to the use of such simplifying assumptions but
we will now take up the question of general versus
special or particular structures.

If we use comparatively abstract terms which will

* Cf. the diagram below, p. 30.
cover many cases, the theory expounded becomes more generally important than if it is based on more concrete terms having reference to particular cases. On the other hand, a theory that may be used in a concrete case and which will thus be based on relatively determinate assumptions as to the content of the concepts used, can of course be carried much further than a theory referring only to an abstract and more indeterminate case.

Take for example the theory of capital itself. If we start from a very general definition of capital in its real sense, as including all external goods of economic relevance, and make no further assumptions about the attributes of these goods, our theory can be applied to all real cases but its content will be relatively poor. If we make more particular assumptions with regard to the form of the capital goods—and let them consist, e.g. of casks of wine of certain defined qualities, if we are studying circulating capital (Wicksell), or if we are especially interested in durable capital, a certain type of machine (Gustaf Åkerman)—we can of course obtain more definite results, but then the question remains how far these results are applicable when we are dealing with the more complicated cases of the real world.

Which of these methods is to be preferred, if we are to build up a system of economic theory?

In answering this question we may first consider the case of theories framed with reference to concrete examples of a comparatively simple character. If such theories are relatively easy to construct, they may be all the more difficult to apply to the complicated problems found in the real world. We may, for instance, have a theory of price developments in a closed system; in that case no safe conclusions can be drawn from this theory concerning the actual course of events in a country with foreign trade. We must instead first elaborate a more general theory
valid both for open and closed systems, and then proceed to apply this generalized theoretical structure to our case. In other words, two logical processes are necessary, first the production of a broader theory, and then, with its aid, the interpretation of reality.

If we neglect to restate the simplified theory in a more general form, and proceed directly to utilize it in a real and more complicated case, we run the risk of drawing false conclusions. There is plenty of evidence to show the dangers of such superficial application of simplified economic theories to real conditions. Economists who are investigating concrete problems in the domain of economic history or economic policy have often not sufficient time or patience to undertake the necessary restatement of the basic doctrines. This exacting task should therefore be left to those who are dealing with pure theory.

Our conclusion is therefore, that the body of pure theory should if possible be developed in terms general enough for it to be at least approximately applicable to the actual cases which are to be analysed with its help. If the terms are generalized to this extent, we get a theoretical groundwork that can serve as an established basis for the further development of the particular theories necessary for the analysis of concrete problems.*

This does not imply, however, that it should be the endeavour of the economist to carry the process of

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* Cf. Myrdal, Prisbildningsproblemet och förändringen (The Pricing Problem and Change), Uppsala, 1927, p. 2, note 1: "The difference between the two types of theory becomes apparent when they are applied to concrete problems. If we start from a general theory, the particular data (referring to the special case) will fit into the scheme; the general theory is correct at the same time as the concrete conception. Any stage of intermediate theory may be expected to result in a general theory, if the additional data are properly restated; otherwise it will have more terms. If on the other hand the theory is built on approximating conceptions of the said character, the inductive data that are introduced into the analysis will modify the scheme."
generalization as far as is logically possible. The urgent need is only for structures general enough for application to our present problems, not for constructions of a still more general character that might apply to other possible but at the moment irrelevant cases. If we carry the abstraction too far, the content of the theory will be too much diluted. It is therefore quite natural that the character given to economic theory in every epoch and in every country will be that which is suited to the economic institutions of the particular community.

Even with this restriction, it is not always feasible to generalize so widely that all actual cases are covered. Instead, we may frame alternative theories for different sets of conditions. Our theoretical system will then contain a set of alternatives, which between them embrace the entire subject-matter.

It can hardly be asserted that economic theory in its present stage fully satisfies the claims thus implicitly made on it by the investigators of historical and practical problems. The theoretical economists have hitherto, in the construction of their systems, shown a predilection for the method of treating concrete and simple cases; this is quite natural, especially when we realize that economics is a relatively young science. But we have now come to the point when it is necessary to supplement this procedure with the method of generalization. It can be regarded as an important task for the present generation of economists to restate and develop existing theory in this direction.

3. The Use of Simplifying Assumptions

We may now turn from the consideration of generalized structures to the role of simplifying assumptions in economic reasoning. Such assumptions are, as every economist instinctively feels, in many cases indispensable
and in other cases very useful. In passing under review the various arguments brought forward in support of them it is convenient to distinguish between general and special theories.

(a) It must be noted that it is not always possible to develop the general doctrines that should represent the groundwork of economic theory, without a certain amount of simplification of the basic assumptions, as will appear later in this essay. The value of the resulting theory will depend on its degree of approximation to reality, i.e. on the ease with which the transition to real problems can be made without essential readjustments of the theoretical structure.

In other cases the simplification of our theories, even if not absolutely necessary from a logical point of view, will make the exposition very much easier without correspondingly diminishing its range of application. Thus the treatment of simple typical cases can be of great pedagogic value in the exposition of the central part of a theory. It is especially when we have to explain economic problems to readers who are not themselves economic experts, that it becomes necessary to simplify them to a certain extent, in order to evade clumsiness of exposition.

In this connection the following question presents itself: When we have to develop a general theory, would it not be an appropriate procedure to begin with comparatively simple structures and then progress successively to higher and higher degrees of abstraction?—In answering this question, we must distinguish between the working out and the exposition of a theory. Broadly it may perhaps be asserted that the method of beginning with simple cases is more justified in constructing a theory than in stating it. In other words, even if the construction of a theory has been the result of a laborious process, it is not always suitable to expound the results in the same heuristic manner. In any case, the common opinion that it is
a logical necessity to begin with the simpler and concrete cases, must be confuted. The main defence of this very usual method of exposition should be based on its possible advantages from a pedagogic point of view as mentioned above. In a more systematic exposition it is preferable to begin with the general case and then to proceed to the more specialized ones. However, the question is not of first importance from a strictly scientific point of view.

(b) The great number and variety of special theories necessitates a choice among them. It is then wise to begin with simple and typical instances. In this way we also obtain useful approximations. For example the simplified exposition in static theory of the higher level of wages due to an increase in the quantity of capital is found to retain important relevance under dynamic conditions also. These simplified theories are also valuable in that they enable us to make comparisons between actual and conceived developments. They then function as instruments of analysis, with the aid of which we discern the special elements that are causally operative in a given case, and trace the complications due to these elements.

Furthermore, simplified theories are in familiar practice often expanded to greater complication through a step-by-step process, e.g. from a barter to a money economy, from a one-commodity to a two-commodity community, and so on. In such a procedure there is usually an implicit ascent to a more general theory covering both the old and the new cases, as explained above. It should especially be emphasized that the transition from a simplified case to a more complicated one does not obviate the necessity for the general theories already discussed. But if we are in possession of a general theory, covering the complicated cases of the real world, is it then necessary to begin with the simpler applications before proceeding to the more complicated real cases? No, from a logical point of view
it is not necessary, but it can often be justified on the
same pedagogic grounds as those mentioned above. The
consideration of simple cases gives the reader the mental
training that prepares him for a better understanding of
the actual and more difficult cases.

Our reasoning has thus led to the conclusion that both
general and simple structures are required in economic
theory, but that, for the time being, there is an especial
need for generalization of the concepts and assumptions
used by theorists.

4. Dynamic versus Static Theory

Before proceeding further, we may illustrate the signifi-
cance of our thesis by a question that is of primary
importance, not only for this essay, but for the whole
foundation of economic theory, namely the relation
between Statics and Dynamics.

We have already said that the aim of economic theory
is to explain the connections between certain given condi-
tions and the corresponding developments. In mathe-
matical phrasing, the object is to determine certain
variables as functions of time (or time curves) with the
help of equations, based on what is known as to the initial
value of these variables and the conditions which deter-
mine their fluctuations. A theory of this type must be
called dynamic. If our definition of economic theory is
accepted, it is then impossible to avoid the somewhat
perplexing conclusion that all economic theory that fulfills
its purpose must have a dynamic character.

We have given dynamics here such a broad sense that
it also includes the static problem.* Properly interpreted,

* Cf. the instructive little work by Rudolf Streller, Statik und
Dynamik in der theoretischen Nationalökonomie, Leipzig 1926, where (pp.
68, f. 131) an apparently contrary view is supported, namely, that
statics represents a higher degree of abstraction than dynamics. This
may hold true of the relation between static and special dynamics,
Static theory also has for an object economic developments taking place in time, only the variables studied do not change their values with the lapse of time. The corresponding time curves have thus the nature of straight lines parallel with the time-axis. Only one value must therefore be determined for each variable, which of course considerably simplifies the solution of the problem. A community that is thus characterized by a repetition of the same economic processes is called a stationary community. Thus we may conclude that static theory represents a special application of general dynamic theory for stationary conditions.

The application of general dynamic theory to communities that are not stationary, but changing or evolutionary, may be called dynamics in a more special sense. It is a theory of this type, namely one that cannot be simplified in the same way as the static theory, that is in the first place required for the analysis of the actual problems of the real world.

In relation to special dynamics, statics represents a simplification and general dynamics a generalization, as illustrated by the following scheme:

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Footnote continued from p. 31:

If by abstraction is meant merely the dropping of special complications. But if the abstractions are made with a view to finding the most general structures, then the opinion expressed in the text holds.
In accordance with our previous argument, we should in point of principle begin with (A) and from there proceed on different paths, both to (B) and to (C), when we set out to construct our theoretical system. The usual method, however, is to begin with (B) and then continue to (C); (A) is generally entirely neglected. As a supplement to the exposition given above, we should now point out the disadvantages which seem to be connected with this latter procedure.

In the first place we cannot fully understand the true character of the static simplification, if we do not begin with a broad formulation of the problem. As in mechanics the concept of equilibrium can be defined only on the basis of a theory of forces, so the significance of a reiterating process which, as stated above, is the central concept of the static theory in economics, can be explained only on the basis of a more general theory of economic development. If we begin with the static assumption as an isolated premis, formulated as "abstraction from the time factor" or something of that sort, we are easily led astray, as is shown by the laborious but not always very successful attempts "to introduce the time factor in the Walrasian system of equations." Secondly, special dynamic problems are more difficult to grasp in the right way, if our assumptions at the start have been of a static nature. The seemingly very natural construction of a "theory of variations" as a complement to a "theory of equilibrium" is thus not without its dangers, as it easily leads to the idea that the variations centre around a certain equilibrium, an idea that, as is now commonly admitted, is not generally true, even if it can be applied under certain special

* As the present author has made a serious effort to work on these lines, in the third part of this book, he has some experience of the difficulties associated with the static method as a first starting point in theoretical analysis.
conditions. Thirdly, also as a basis for the development of a general dynamic theory, the static structures seem to be rather inappropriate, because a theory of that kind must be founded on a new and broader basis. When this groundwork is prepared, it is comparatively easy to introduce more special assumptions, either static, or dynamic in the narrower sense.

But, if we thus take it for granted that the systematic exposition of economic theory should begin with general dynamic structures and then proceed to more particular assumptions, we may ask: Have the static premises any very important relevance for the treatment of the particular dynamic problems of the real world? What is the use of this whole body of beautiful doctrines, grouped around the concept of a stationary equilibrium? That is the real problem concerning the relation between statics and dynamics.

In answering this question, we have to examine how far the arguments advanced in the previous section as a justification of simplified assumptions can be used for defending the static premises.

In the first place we can often use the static structures as approximations to the real phenomena. This holds true especially with regard to the solution of more special problems. Even in the real world, all factors do not alter continually. There is always a good deal of invariability. In some fields, fairly stationary conditions may prevail for a comparatively long time. Static structures are also very helpful for the explanation and exposition of economic motives, expressed in the planning activity of business men and consumers. Secondly, we need the static structures as instruments of analysis. If we can state under what conditions the variables studied do not change, we can better understand the course of their actual fluctuations. Such comparisons between real and hypothetical
cases are often very instructive. Finally, if the static structures are only conceived as referring to developments of a certain simple kind, they can with great pedagogic advantage be used as an introduction to the treatment of more difficult dynamic problems. We may therefore conclude that in this manner most parts of the traditional static theory can be incorporated in a system of essentially dynamic character.

5. The Structure of General Dynamic Theory

The study of economics is largely concerned with human actions or the result of human actions. Leaving aside the question whether man can exercise free-will or not, it is of course not possible to determine the causes of his behaviour in the same way as those of the events of the external world. We cannot prove that certain human actions will necessarily be the result of a definite situation at a given point of time. We can only state that they do probably result from it and that a variation of the data will probably cause the individuals to act differently.

There lies in this a serious limitation to the possibilities of our analysis of historical and practical problems in the economic field. This deplorable inexactitude, however, affects only the application of economic theory, not the theory itself. In the construction of economic theories whose aim, as already indicated, is to determine certain developments on the basis of certain data, all inexactness can be avoided by explicit assumptions about all those phenomena which in the real world cannot be definitely determined. We can thus assume that individuals, under given conditions, do act in a certain manner, and the adoption of this assumption makes it possible to determine exactly what results will develop from any given situation.

Such assumptions used in economics concerning human behaviour, should correspond as much as possible to our
knowledge of reality. The value of the theoretical structures as instruments in the analysis of the actual problem depends, as we have pointed out above, very much on the realistic character of the assumptions made. Most theoretical controversies on the economic field have arisen over questions of this type. It is sufficient to be reminded of the dispute as to the correctness of the psychological assumptions on which the theory of marginal utility is based. When we are dealing with concrete problems, it is always possible and appropriate to make alternative assumptions in a doubtful case. But when we have to outline the basic constructions that should be most generally applicable, it would be too laborious to develop them along alternative lines. We must then try to work with a few generally acceptable assumptions.

In the following statement of the general dynamic problem we have only made use of one basic assumption about the behaviour of the individuals concerned, namely that their actions, for a shorter or a longer period in the future, represent merely the fulfillment of certain plans, given at the beginning of the period and determined by certain principles which it is possible to state in one way or another. These principles should in general state that the plans are made for the attainment of certain aims (for business firms for instance the attainment of maximum net income) and that they are based on individual expectations concerning future conditions, expectations which in their turn are influenced by individual interpretation of past events.

The question whether such planning by the economic subjects is a realistic assumption or not will constitute a test of its suitability. In some important cases the planning is quite obvious. The state and other public bodies furnish us in their budgets with examples of definite plans. Private enterprises usually outline similar plans for their
activity though they are generally not divulged; first
there is a general plan for a comparatively long period
of time and then there are more detailed plans for the
immediate future. Even individual consumers do not
infrequently draw up some plans for their economic be-

haviour during a longer or shorter period. In certain other
cases our assumption that economic actions are the result
of planning activity may seem more difficult to apply.
It can hardly be pretended that every individual has a
clear conception of the economic actions that he is going
to perform in a future period. Nevertheless, in the greater
number of cases it will certainly be found that underlying
such actions there are habits and persistent tendencies
which have a definite and calculable character com-
parable to the explicit plans already mentioned. We may
accordingly without danger proceed to generalize our
notion of "plans," so that they will include such actions.
Plans are thus the explicit expression of the economic
motives of man, as they become evident in his economic
actions. The variations among economic motives may be
introduced as special assumptions concerning the content
of the plans. Our general dynamic assumption will thus
be seen to be a fairly good approximation to reality.

The assumption just stated has important consequences
for the more definite formulation of the general dynamic
problem. The statement of "the given conditions" that
represent the data for the explanation of the development
can now be made more explicit. If we know (1) the plan
of the economic subjects concerned at the initial point of
time, if we further know (2) how these individuals are
likely to change their plan in the future under different
assumptions, and if we have (3) enough knowledge of
external conditions to be able to make definite statements
with regard to future changes in plans, and the results of
the actions undertaken then it should be possible to

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provide a theoretical construction of the developments that will be the outcome of the initial position. Our basic assumption will thus give a definite character to the data underlying the dynamic problem and to the entire structure of the theoretical system.

The plans of the economic subjects at any given point of time are neither fully consistent with one another nor with the external conditions, and therefore they must be successively revised. The construction of the development that results from the endeavours to realize all these successively revised plans, is therefore a complicated problem. Its given factors are the three indicated above, and the general procedure in its solution should be as follows:

Starting from the plans and the external conditions valid at the initial point of time, we have first to deduce the development that will be the result of these data for a certain period forward during which no relevant changes in the plans are assumed to occur. Next we have to investigate how far the development during this first period—involving as it must various surprises for the economic subjects—will force them to revise their plans of action for the future, the principles for such a revision being assumed to be included in the data of the problem.

And since on this basis the development during the second

* A good exposition of this problem that is quite in harmony with the ideas developed in this essay, has been given by Professor Hayek in his interesting paper on "Economics and Knowledge," in Economica 1937, pp. 33 ff.

† If all the economic subjects in the community considered had a perfect knowledge of the future, the problem of economic theory would be enormously simplified. Such an assumption implies that all plans prevailing at the starting point are based on expectations in conformity with reality, and that they will undergo no change with the lapse of time. The actual development will thus be the same as has been anticipated in all plans, and the only task for the theoretical economist is to describe the content of these plans. In the third part of this book it is shown that this problem can be treated in essentially the same manner as the equilibrium of static theory.
period is determined in the same manner as before, fresh deductions must be made concerning the plans for the third period, and so on.

This is the general scheme for the treatment of a development that takes place in a longer period of time, comprising many such shorter periods. But many methods of abridgment may of course be invented for the determination of such a development. A class of problems of a more formal character is related to questions of this kind.

From this formulation of the problem it follows that the construction of a dynamic process must be based on an investigation into the character of the planning of the economic subjects. And this latter investigation must evidently be founded on certain assumptions regarding technical, institutional and psychological conditions, which of course should as much as possible approximate to reality.

A systematic exposition of a general dynamic theory of economics can therefore conveniently be divided into three parts:

(1) The exposition of the technical, institutional and psychological conditions with regard to which the economist must make certain definite assumptions in explaining the principles of planning and the effects of the endeavours to realize the plans. The investigation of the relations between input and output (the so-called productivity laws) and of the economic motives of man, his "valuation attitude," etc., may be cited as examples of theories belonging to this branch.

(2) The theory of economic planning, dealing with the contents of the plans at a certain point of time and also explaining the principles valid for the alteration of plans with the lapse of time.

(3) The theory of economic development that, as has just
been said, is to explain the dynamic process on the basis of certain assumptions regarding planning and external conditions made in accordance with the theories developed in the two first parts of the system.

In this connection there is no reason to dwell upon the well-known theories of the first part of the system. We shall therefore proceed directly to the second and third parts, adding to our observations on them some discussion of alternative methods of attacking the theory of price.

6. The General Theory of Planning

(i) Planning at a Given Point of Time

In the activity of economic planning two phases can be distinguished: first the intellectual prognosis of future developments under alternative assumptions as to the actions of the individual making the plan, now and in the future; secondly the valuation and decision whereby a choice between these alternatives is made. The actions of the individual prescribed in the selected alternative represent the "plan" in the strict sense.

In the first phase the planner explores the causal relationship between his future actions and the aims he desires to attain. The purpose of this exploration is in the first place to show the consequences of the possible actions between which he has to choose in the immediate future. But these consequences can in general not be fully clarified, if he makes no assumptions regarding his actions during later periods also. Therefore, the analysis should in principle investigate all the relevant paths in the "field of choice" that displays itself to the view of the individual at the given point of time.

Now it should be observed that the actions undertaken by an individual in a certain period may constrain his
future behaviour in certain respects. If for example a producer has made a contract to deliver certain goods at a future date, this contract will govern his scheme of production in the meantime. At any given point of time, it can be assumed that the planner has through his previous actions in various ways imposed certain limits on his immediate behaviour. For more remote periods, however, the apparent possibilities of varying his actions are greater. The alternatives to be investigated will therefore rapidly to an increasing extent as more distant periods are envisaged.

This would also be true if the anticipations of the individual were "single-valued," that is, if he were convinced that he could exactly estimate the course of future events under different assumptions. In general anticipations must be assumed to be increasingly "many-valued," i.e. comprising a greater number of alternative possibilities the more distant the future to which they refer. Therefore, both in respect of the future situation in which the individual is about to act and to the consequences of each path of action, various alternatives with different probabilities have to be taken into consideration. The prognosis in its entirety will thus be a very complicated scheme.

The practical solution of the problem implies broadly that in each case a judgment concerning these relative probabilities is first made, and that attention is then con-

* Here a general reference should be made to a recent work of a young Swedish economist, Dr. Ingvar Svennilson, Ekonomisk Planering (Economic Planning), Uppsala 1938, which contains a very thorough investigation of the theoretical and methodological problems connected with planning. This author has especially been interested in the "interpersonal aspects" of planning, and the question of "the binding of the parameters of action" for future periods, to which we refer above in the text, is examined at length (pp. 31 ff.).

† Cf. A. G. Hart, "Anticipations, Business Planning and the Cycle," in Quarterly Journal of Economics, vol. li, No. 2 (February 1937). The clear exposition of the problem given in this paper has been of relevance for the present study in other respects also.
centrated on the most probable alternative, subordinate estimates also being made concerning other less probable alternatives. The crux of the problem will lie in the calculation of the probability values, but this can of course be carried out more or less summarily.

In the second phase of planning a valuation of the relative advantages of these different alternatives is made, with due regard to the uncertainty factor in each case. The so-called "valuation-attitude" of the individual, underlying this comparison, can usually be expressed as a system of indifference-curves, displaying both his reaction to the uncertainty factor* and to the combinations of different phenomena between which a choice is to be made. We need not go into the complication of this point here however. It is sufficient to have made it clear that the outcome of the co-ordination of the anticipations described above, and of the individual valuation-attitude, forms the outline of a programme or "plan" governing the future actions of the planner.

The diagram on page 43 illustrates the content of such a plan in a simplified schematic form. The planning is supposed to be undertaken at a given point of time, \( t_0 \), and to cover an arbitrary number of future periods, \( t_1, t_2, \ldots \). The division of the planned development into definite periods has deep-lying grounds in the imperfection of human knowledge. Man cannot continuously register all that happens around him. He can only take account of it intermittently, observing the total result obtained for certain time periods, or registering more important events that can be referred to definite points of time. Since the points of registration are taken as the boundary points between the periods, the length of these "individual periods of registration" may vary within wide limits.

* Cf. I. Svennilson, loc. cit., chap. 5.
sented by the lines moving along the time-axis in the diagram, their distance to this axis indicating their degree of "advantageousness," as measured in the way prescribed by the individual valuation-attitude. (If a business firm is under discussion, the Y-axis can conveniently be assumed to represent its subjective capital value.) Since the future is uncertain, the planner has to allow for different possible effects of the actions undertaken in each period (in the diagram only two such possibilities are indicated). These effects are supposed to be registered at the end of each period, and they determine the line of action for the next period. We therefore get an increasing ramification of the system. For more remote periods the scheme must be assumed to become more and more diffused.
Since each line of action is the best of the possible alternatives between which the individual (under the given conditions) has to choose, it can be characterized as the upper limit of the field of choice in each case (the dotted lines in the first period). For all other (and lower) alternatives in this field of choice a similar diagram can be drawn whose main divergence from that given here is that the effects of the lines of action selected must be judged to be less advantageous. The line of action chosen for the first period will thus determine the planned lines of action for succeeding periods also. But it should be observed that the first line of action is also determined by the later ones. For the advantageousness of the selected course cannot be ascertained, unless the process is followed through—under various assumptions as to the result of the actions undertaken in each given case. (The upward slope of the line of action during the first period is conditioned by the expectation of two alternative possible effects, here represented by the points $a'$ and $a''$, and these points are in their turn conditioned by the succeeding alternative lines of action, and so on.) Only by taking account of this whole complex of alternatives and their respective probabilities, can the individual fully realize the consequences of his immediate choice. As a matter of fact, the primary purpose of the whole scheme is merely to provide a rational basis for this immediate choice, since the actions required in future periods can be determined by new or revised plans. Only if the anticipations turn out to be correct and if the valuation-attitude is unaltered, will the original plan retain its relevance for the succeeding periods.

From what has just been said it follows that, if we take a given plan as a whole, there exists a mutual interconnection between the present and future actions included in the plan. The equilibrium analysis of traditional static theory can therefore be applied to the present problem,
although the question now concerns the intertemporal relations between expectations and planned actions, which are included in a certain individual plan.

Plans may be further differentiated with regard to their degree of definiteness by making the following distinctions:

(a) The actions planned are unconditioned, if their realization does not depend on what happens in the intervening period, and they are conditioned in the opposite case when they are performed after the realization of a certain condition, either immediately or with a certain time lag. All alternative planning is concerned with conditioned actions, since the realization of each alternative is dependent on the previous realization of certain definite conditions.

(b) The plan is uniquely determined, if it indicates what concrete actions the planner is going to perform, and it is determined between limits, if a certain choice is left open to the individual. In the former case we may speak of "lines of action" and in the latter case of "field of actions" as the content of the plan.

(c) The plan is unalterable, if the individual has bound himself in some way or other to perform the planned actions, and it is alterable, in so far as the individual is at liberty to substitute a new or revised plan for the old one.*

It can in general be asserted, that a programme of action is in all these respects more definite for the immediate future than for more distant points of time.

We have seen in Diagram II that for the first period the plan comprises only one single line of action. For this period it is thus assumed to be both unconditioned and uniquely determined. The individual is supposed to act immediately, and he must therefore have made up his mind how to act. This description of the situation requires,

* This distinction is of course quite independent of the fact, since both unconditioned and conditioned planning can be either unalterable or alterable.
however, some modification. Even in respect of the immediate future, the economic subject has not always a definite conception of the actions he is going to perform. Some of them may be determined only in as much as that they will be immediately performed after the realization of certain conditions.* We should therefore add to the unconditioned and uniquely determined actions those that are conditioned but are assumed to be realized without any relevant time lag, when we are describing the content of the plan for a short period immediately following.

All actions planned for later periods are conditioned by certain events which have already happened expressed in the diagram as results of the previous actions of the planner. They are thus conditioned, and can be supposed to be realized either with or without a time lag. It can also be assumed that the lines of action drawn in the diagram, will be replaced by fields of action to an increasing degree for more remote periods. We have made no assumptions in the present case concerning the alterability of the plan. But that it is easier to change a plan for distant periods than for the immediate future—for which the individual, as already said, has bound himself in various respects—is a familiar truth calling for no special comment.

(ii) Changes in Planning with the Lapse of Time

So far we have discussed the planning process and the resulting plan, with reference to a given point of time. As time passes the plan will not be retained in its original

* The plan of a shopkeeper, for example, who plans his behaviour for a certain period forward from a given point of time, might contain nothing more than the determination to sell as much as possible of certain goods at a certain price. Since the quantity he is going to sell depends on the demand of his customers, the planned transactions may be said to belong to the conditioned category, though following immediately after the realization of the condition.
form. Though each plan is in principle designed for the entire future, it thus has immediate relevance only for the periods next in time. The actions undertaken in later periods will be determined by new or revised plans. The second and more difficult part of the theory of planning will therefore be concerned with the important question of the principles according to which this alteration of plans take place.

Four independent distinctions may be applied to the changes taking place in planning with the lapse of time:

(a) If the explanation of planning given above is correct and we may thus characterize it as a combination of anticipation and valuation, we can first distinguish between the changes in planning due to altered anticipations and those occasioned by an altered valuation attitude. It is hardly necessary to mention that changes of the former type are the commonest, both in actuality and in economic theory. The latter changes are usually of a more irregular character, and hence they present a more difficult subject for theoretical treatment.

(b) We may further distinguish between changes occasioned by economic events that in some way or other appear in the system of the economist, and other changes of a non-economic character which are the outcome either of events not included in the economic system or of mental processes of a more spontaneous kind. This distinction is of theoretical importance, since only changes of the former type can be explained by the economic development which has taken place in preceding periods.

(c) We may also draw a distinction between immediately relevant changes affecting the actions planned for the nearest periods and other changes referring only to more remote periods. Since the plan can be altered many times before these more distant periods are reached, this part of
the planning is of importance only in so far as it facilitates the understanding of the plans actually put into practice.

The economist is of course primarily concerned with plans of immediate relevance.

Finally we may point out that some changes fall within the framework of the previous plan, while other changes are not in conformity with it but result in a new plan. Of the former changes we can discern two kinds: (i) conditioned actions will become unconditioned through the realization of the condition in question, and (ii) fields of action will be restricted and finally transformed into paths of action. The effect of these processes is merely that with the lapse of time a given plan becomes more determinate in respect of future periods.

On the basis of this classification we may conclude that the economist is primarily concerned with immediately relevant changes in plans (those which are more fundamental than the mere increase in definiteness of earlier plans) when they have their ground in changes in expectations, occasioned by the course of events during earlier periods.

The different links in the chain of events to be analysed are the following: (i) the actual development of the factors relevant to the planner, (ii) the latter's view of this development, (iii) the resulting changes in his anticipations of future conditions which are of importance for his actions, and (iv) the resulting alterations of his plans of action for the nearest period ahead.

The first link in this chain can in the present case be assumed to be known. Only when it is our task to construct a complete theory of development is it necessary for us to determine these data also. With regard to the second link, it should be noted that even in cases where the course of actual development is continuous, it cannot usually be assumed that our planner's apprehension of them also
changes without discontinuity. As already pointed out (p. 42) it can be stated as a general rule that individuals register external events which are relevant for their planning only intermittently.

The general deficiency of human knowledge, therefore, has in this case the important result that we must take account of certain discontinuous alterations in the economic subject's view of the past and his anticipations for the future. The interval of time that lies between the points when the individual registers what has happened has been termed his "period of registration."

The relation between the second and third links of the chain, i.e. the influence of registered past events on the expectations of the individual, naturally varies greatly in different circumstances, and hence the economic theorist must make alternative assumptions. It seems suitable here to deal first with three simple cases which may be regarded as typical: (a) the change (e.g. the raising of a price) is assumed to continue at the same rate (an equal rise is expected for the next period), (b) the new conditions are expected to continue (the higher price is expected to remain unchanged), and (c) the change is regarded as temporary, so that in the next period a return to the original position is anticipated (here the rise is assumed to be followed by an equal fall in price).*

Finally, on the question of the influence of anticipations on the plan of action, the circumstance to which we have already alluded must be taken into account—that a

* The term "elasticity of expectations" suggested by Professor J. R. Hicks in Value and Capital, p. 605, may perhaps prove useful in this connection. It should be observed that Professor Hicks does not interpret the term as "the ratio of the expected proportional change for the next period to the actual proportional change during the past period," but as "the ratio of the proportional rise in expected future prices of \( X \) (in relation to the price at the base point) \( \text{to the proportional rise in its current price} \) (in relation to the same base)."
plan is usually to some extent binding for a certain time ahead owing to measures that have already taken effect. It may happen, therefore, that events which have been registered affect plans only after some delay. Also, since it is reasonable to assume that the individual will not make frequent alterations in plans that do not refer to current periods but to more distant ones we may conclude that the intervals between relevant changes of plans, that is, the "periods with fixed relevant plans," will usually be considerably longer than the "periods of registration." This conclusion, as we shall see immediately, is not without importance for the construction of a theory of development on the basis of relevant plans.

The considerations set forth here on the general theory of planning have been entirely formal in nature. The question of what plans will be the result of certain given anticipations has not been considered. It is probably impossible to treat this subject more comprehensively in a general way. Instead, it will probably be necessary to distinguish between different categories of economic subjects and between their different valuation attitudes. These more special theories, which of course cannot be discussed here, may be divided into the following three main groups according to the categories of planners concerned:

1. The planning of private individuals, in their capacity of owners of labour and capital and with regard to the utilization of their incomes;
2. The planning of business firms, as owners of capital, aiming (usually) at maximizing net profits in the long run;
3. The planning of public bodies,* covering the whole

* From certain points of view it may be advisable to group together the two last types, perhaps under the general heading of "firms," which can then be contrasted with private individuals. Cf. below, p. 54.
economic policy of the state, which even in a community based on private enterprise is of central importance for the entire course of economic development within the society.*

7. THE GENERAL THEORY OF DEVELOPMENT

As has already been stated in section 5, the problem here is to determine a particular development on the basis of certain data: (1) the initial plans of the economic subjects, (2) how they are likely to change their plans in the future, and (3) the external conditions of relevance for the future changes in plans and the results of the actions taken. We shall confine ourselves to some general comments concerning the nature of the data and what this determination of the development involves.

If we wish to study a development as a result only of the actions of a single economic subject—that is, if we are concerned only with so-called micro-economic developments—not much of essential importance need be added to the theory of changes in plans, the main elements of which were outlined in the preceding section. We should require in addition, firstly, certain functions stating the connection between the individuals' actions as planned, and their actual result, and secondly, certain other functions, necessary to determine the relation between this individual development and the total course of events which will exert an influence on the plans for coming periods. An analysis of the individual development as in part determined by the relevant plans belonging to each period, and in part determining the plans for the succeeding

* The great and growing importance of the study of this type of planning for the understanding of the economic development of the present decade has been well described by the Swedish economist Johan Akerman in his recent work, Das Problem der Sozialökonomischen Synthese, Lund, 1938.
periods must clearly be based on a subdivision of the development into periods, having the times when relevant plans are changed as the boundary points.*

* The first Swedish attempt to give a systematic account of the nature of an analysis of development on the lines suggested is contained in Dr. Dag Hammarskjöld's doctoral thesis, Expansion and Contraction (The Transmission of Economic Fluctuations), also printed as an appendix to the Report of the Unemployment Commission (Statens offentliga utredningar 1933:29). In the simple case when we are dealing with a planner whose acts are influenced only by a certain "strategic factor" in the total development (for a firm, e.g. the net profit), Dr. Hammarskjöld's reasoning may be summarised as follows (cf. op. cit., pp. 53-56): Owing to the fact that the changes in the strategic factor are registered by the acting subject at certain intervals only, the alterations in plans will also take place discontinuously and probably at the same time as the registrations in question. In an analysis of the development, therefore, it will be necessary to make a subdivision according to the periods lying between these points of time when past events are registered and plans are altered. (The choice of periods will thus be determined by the intervals of registration.) For each period the strategic factor can be determined as a function of the entire development, i.e. it may be taken as the unknown in an equation covering all the other factors entering into this development. Assuming that the active reactions of the economic subject to this strategic factor are known, his acts and their influence on the entire development during the next period can be determined. With a series of equations covering successive periods of registration, and formulated in such a way that, firstly, the acts of the economic subject and their results in each period are expressed as a function of the size of the strategic factor in the immediately preceding period, and, secondly, that the size of the factor itself in the current period is determined as a result of these acts and the other data referring to the period, we evidently obtain a complete analysis of the acts of a certain subject as being on the one hand determined by and on the other hand to some extent determining the total course of the economic development.
production of each commodity, the amounts of goods and services produced and consumed, the prices demanded by entrepreneurs and factor owners and the volume of various transactions carried out at these prices. These macro-economic magnitudes may usually be found by the summation of the corresponding micro-economic terms, or, when dealing with prices and other relations, by calculating an average of one kind or another.

All these variables can be regarded as functions of time. But it should be observed that they cannot conveniently be determined as continuous functions of time. Some of the actions considered, for example the announcement of prices and sales and other transactions, have, strictly speaking, no time dimension. They must therefore either be correlated with definite points of time or with certain time periods for which the total result is calculated. Other variables, e.g. the amounts of services put into production, have undoubtedly a time dimension. But even in this case only the total result for certain definite periods is usually of interest, and not the continuous variation from moment to moment. In the case of macro-economic phenomena also, the economic development should thus be divided into time periods for which only the total results obtained are calculated. If in certain cases the value of a variable is to be determined with reference to a definite point of time, it seems most convenient to let this point be the boundary between two such periods.

A period of this type, the shortest taken into account in any given case (since only the total result and not its distribution within the period is of relevance) may be

* Of I. Svennilson, op. cit., p. 8: "The selection of a certain period involves a choice, as elementary variables in the system, of the total (integral) for the entire period of the streams of income and expenditure, between which there must exist certain relations of identity. Only these sums are determined by the assumptions made, whereas the development during the period remains undetermined."
called the "period of registration" with respect to the variables studied by the economist. From the point of view of the theorist it is naturally desirable to make these periods relatively long, since the analysis of what happens during each period will then cover a greater number of relevant events. The limit for lengthening the period lies in the fact that the explanation of an economic process is after a certain point dependent on the registration of what has happened, and this registration may relate either to the total result achieved during the past period, or to an event occurring at a definite moment, which is then taken as the dividing point between the periods. Such registration is necessary in so far as it must be assumed to influence the planning and future actions of the economic subjects.

In dealing with micro-economic developments, the "period of registration" in respect to the variables chosen can be made long enough to correspond to the period with fixed relevant plans applicable to the economic subject in question. Here also the period of registration of the variables chosen should not be longer than the interval during which the relevant plans, determining the actions performed during the period, can be assumed to be unchanged. If all the members of the group were to alter their plans at the same time, we should have agreement between the period of registration and of planning for each individual in this case also. In reality, however, the synchronization is very incomplete, and the period during which the relevant plans of all members of the group are retained unchanged, must therefore be taken to be fairly short. In the greater number of instances studied we then find in operation a great variety of plans that have been drawn up, not only by public authorities and individual consumers, but also by private and more or less independent entrepreneurs who do not know very much
about one another's intentions. One cannot count upon all these plans being kept wholly unaltered during any long period. The attempts to realize the plans must quickly reveal that they are more or less incompatible. The actual course of events cannot correspond to all the anticipations of the individuals about the behaviour of the others. The result must therefore be a modification of some of the plans.

On the other hand it should be noted that it is not necessary to regard the modification of the plans as a continuous process. As stated above, since the decisions to apply new plans can be allocated to certain moments, some time must always elapse between these moments in any given case, during which all plans are unaltered (just as a finite period can be regarded as the sum of an infinite number of moments). Our scheme can therefore, even from a strictly logical point of view, be directly applied, as long as the time periods used are made sufficiently short.

It should further be observed that, in applying our scheme to practical problems, it is quite a justifiable simplification to assume that the intervals elapsing between alterations of plans are not impossibly short, but long enough to be of practical interest. This represents only a slight modification of what really happens, and it helps us to get a clearer insight into the nature of the economic process.

We now turn to the question of the data required for the determination of the variables entering into a macro-economic development, subdivided into time periods of this nature. It will be convenient to distinguish between the development (i) during the first period and (ii) in succeeding periods.

(i) For the determination of the development during the first period we require firstly some knowledge of the contents of the relevant plans, and secondly some knowledge of the external conditions affecting the development.
With regard to the plans, we want to know:

(a) The totals of all unconditioned and uniquely determined plans that are supposed to be realized during the period. It is, therefore, not necessary to have a knowledge of each individual plan; we can deal in sums (for example the total demand for a certain commodity at a certain price) or averages (e.g. the average selling price of a commodity). How far the summation and averaging may be carried, naturally depends on the degree of differentiation of the variables that are to be determined.

(b) The totals of the unconditioned plans, valid for the period in question, that are determined within limits, as found by an application of probability calculus. Even though the acts of each individual may be supposed to vary within a narrower or wider margin, the probable result of the totality of their acts may be deduced by means of the law of large numbers.

(c) The totals of the conditioned plans, the realization of which is bound up with some definite condition, derived either from the unconditioned acts referred to above or taking place during the period or else from external factors belonging to the data of the problem (see below). The realization of these plans may be supposed to take place either immediately upon the fulfillment of the condition or, if the latter is realized at the beginning of the period, with a time lag which may not exceed the length of the period.* The conditioned plans must evidently enter into the data as functions of the conditions valid in each given case.

To these data concerning the plans we should add the

* A demand curve may be named as an example of conditioned plans. The size of the actual demand will depend on the announced selling price. If this price is established at the beginning of the period, the demand must appear with a time lag smaller than the length of the period, if it is to have relevance for the developments during the period.
following, which apply to the external conditions affecting the development:

(d) The relations between the actions that take place during the period and which are determined as described above, and the variables entering into the problem, when there is not identity between the actions and the variables studied, but the latter refer to the result of actions. For example, if in a given case the acts consist of certain kinds of inputs of productive services, and the output resulting from these inputs is included among the variables studied, we must naturally know the true relation between input and output.

(e) Concerning other ("non-economic") events during the period, enough must be known to make it possible to calculate (on the basis of the functional forms mentioned in (c) above) the conditioned actions that follow therefrom. Here we may have to deal with climatic or political conditions. For instance, if we know that the members of the group are prepared to act in a certain way on a sunny day and in a different way on a rainy day, the determination of their actions presupposes knowledge of which alternative is realized.

If all these data are available, it must clearly be possible to determine the variables constituting the economic development during the first period.

(ii) In order to determine the development during subsequent periods, we must have knowledge of the following types:

(a) The variables for the first period (determined as just described).
(b) The other ("non-economic") events that influence plans and actions during the second period.
(c) The disposition of the individuals to alter their relevant plans for the second period in consequence of the factors mentioned in (a) and (b). The data of (a)-(c) are
therefore sufficient to determine the relevant plans for the second period by the same method as described for the first period, and the actions carried out during this period will then also be determined.

(d) The relations between these actions and the variables studied for the second period.

For the determination of the development during a third period, analogous data are required, and so on.

We have now given a general account of the data that must be available in order to enable us to construct unequivocally an economic development, expressed by means of certain variables which change their values with the lapse of time. A theoretical treatment of the problem may of course be facilitated by the use of various simplifying assumptions. Thus if "non-economic" events are neglected and we also assume constant relations between actions and their results, between the unconditioned and the conditioned actions in a certain period, and also between the variables in a period and the plans which will be unconditioned in the next period; for the determination of developments for an indefinite time ahead we require a knowledge only of (i) the unconditioned actions during the first period, (ii) the functions necessary to determine the conditioned actions consequent on the unconditioned ones, (iii) the functions required for determining the results of the actions, and (iv) the functions showing how the unconditioned actions in each period are determined on the basis of the variables from the preceding period.*

* Cf. I. Svennilson, op. cit., p. 11, where it is clearly shown "that certain variables not affected by events occurring during the period but only by earlier events govern the development during the new period, while the other variables are functionally dependent on the governing variables. The realized development of the governed variables is assumed to influence the governing variables only intermittently, i.e. by their sum as accrued at the end of the period." The distinction made here between governing and governed variables...
It would lead us too far to inquire how the setting of the problem varies under more specific assumptions.* In this connection we may confine ourselves to two observations.

In view of the fact that the scientific treatment of a macro-economic development must, for reasons already put forward, be based on a subdivision of the development into fairly short periods, it is of course impossible for the economist to follow it in detail from period to period. In spite of this, it is quite feasible to give a picture of the course of events during a fairly long stretch of time. If by the analysis of certain selected typical periods, one can determine the directions of movement during these stretches, the character of the intervening periods may also be understood. It may sometimes be necessary to modify the actual character of the periods selected so that they may adequately represent the active tendencies during the phase in question.

In general it is impossible for the economist to give a complete analysis of a complicated course of development in one and the same exposition. He must usually be content to discuss the total developments from some special point of view, i.e. he must make a selection among the variables entering into the development. He must then assume that the other variables connected with those selected are given in one form or another, and must leave their study to other branches of the science. In this way separate treatment can be given to specific economic problems, thus corresponds to that made by us between unconditioned and conditioned plans and actions.

* Dr. Erik Lundberg, in his book Studies in the Theory of Economic Expansion, has given the first exposition in English of Swedish dynamic theory and has also made an important contribution to the theory of economic development, or as he calls it, "Sequence Analysis." Of special interest are the model sequences constructed in his ninth chapter to illustrate the different phases of an expansion under various simplifying assumptions.
permitting a certain division of labour, not only between economics as a whole and the other social sciences, but also between the various branches of economics itself.

8. **Disequilibrium and Equilibrium Methods in the Theory of Price Movements**

(i) *The Disequilibrium Method*

The pricing problem is often treated under the assumption of free competition, whereby the prices operating in a certain period can be regarded as the result of the operation of certain given demand and supply functions during the period. This construction is quite appropriate when used for the analysis of the equilibrium position of a price or a system of prices. But it is not always so appropriate when the pricing problem is analysed from a more realistic point of view. In an actual dynamic case, there is no necessity for equality of demand and supply. But the opposite concept of price as continuously changing under the influence of the demand and supply factors is equally not correct. For the analysis of the pricing process a more careful study of its elements is required.

From a dynamic and realistic point of view we must distinguish between two kinds of action which are the foundation of the pricing process: firstly those actions whereby prices (referring to specified goods or services of a determined or indetermined amount) are offered by the sellers or buyers, and secondly those actions, whereby these offers are accepted by the other party (often to a greater or a lesser extent than expected by the supplier). Both these actions take place at definite moments of time (but the offers are valid for a certain period of time or until further notice). The pricing process is thus not a continuous one. If described graphically, the supply and demand prices appear as lines parallel to the time axis,
with discontinuous movements at the points when prices are changed. The transactions performed at these prices appear as lines perpendicular to the time axis at those points of time at which the terms have been agreed.

We must now try to indicate how these price phenomena can be most appropriately fitted into our scheme.

In consideration of the fact that an alteration of the prices offered by sellers or buyers is usually combined with, or is the expression of, some modification of the general plans of business, the most natural procedure is to assume that price changes take place at the transition points between periods (as defined above). In accordance with this assumption, no price movements occur during the periods themselves. The central pricing problem as it concerns the determination of the prices offered by sellers and buyers, is thus not directly related to what happens during the periods, but to the more complicated events occurring at the transition points between periods.

The announcement of new prices, for example, by certain sellers, will generally induce other firms or persons who for some reason (as buyers or competing sellers) are directly interested in these prices, to modify their own plans of action, and eventually the prices they themselves offer. In applying our scheme we must assume that either these alterations follow the original price changes immediately and can therefore be allocated to the same points of time,* or that they are allocated to a transition point between certain later periods. For our present purpose the first assumption is the more convenient.

* This assumption involves of course a simplification, as in reality some time must always elapse between the moment when a seller alters his price and the moment when a buyer decides for that reason to buy more or less of the article in question. But if no bargains are transacted during this short interval (which is quite a reasonable assumption, as the buyer may be waiting for the new price before he decides how much to buy), this is of no economic importance.
The second element of the pricing process, that is, the acceptance (by buyers) of the prices offered (by sellers), can be allocated either to the time period immediately following the announcement of the price offered, or to a later period. If these transactions are not in accordance with the anticipations (of sellers), they will in many cases lead to a fresh modification of the business plans based on the anticipations. But it seems reasonable to assume that these reactions are usually not very sudden. A seller will generally sum up the result of all transactions during a certain period, before he decides to alter the price of what he is selling. Thus if we suppose that transactions of this type always occur within a definite period and that the reactions resulting from them are allocated to the end of the period (or to some later date), it will be well in accord with the course of events in the real world.

To sum up the above reasoning, our method is the following: the dynamic process is divided into fairly short time periods, e.g. days; all decisions about the business and consumption plans to be adopted, and all price changes, take place at the transition points between these periods. Within the periods all transactions, by which the prices offered are accepted by the buyers or sellers, are carried out, and the more or less continuous processes of production and consumption take place.

In order to illustrate the significance of our method, as applied to a society with private entrepreneurship, we may complete our analysis with the following example. The starting-point is the morning of a certain day. It is assumed that all sellers have already announced their prices and that all entrepreneurs and consumers, guided by these prices, by other known circumstances and by their expectations of the future, have taken their decisions as to the necessary modifications of the plans for their own economic activity during the day. Each producer has thus decided
what and how much he will produce, which services, raw materials and capital instruments he will buy, and each consumer how he will spend his income. During the day all these plans are carried through as far as possible.

On the evening of the same day, each individual sums up his experiences and reflects upon his actions for the immediate future. The producers and traders look over their stocks and orders. If a producer has received more orders than he expected, he will want to raise his prices. Another producer will, for the opposite reason, lower his prices. The former will perhaps expand and the latter restrict his production. On the morning of the next day, the new prices are announced, plans are modified, and then the process will continue in the same way as on the preceding day.

An analysis of price development on these lines has recently been greatly facilitated by the adoption of the distinction between calculations made ex ante and ex post, or between prospective and retrospective estimates in Dr. Marschak’s terminology. This method has been found to be fruitful and to provide a simple solution of a number of disputed points particularly in the explanation of general price level movements, as determined (among other things) by the relation between saving and investment. We are indebted to Professor Myrdal for having originated the suggestion and indicated its consequences for the analysis of price movements.* The method has since been further

* In this connection the following quotation from Professor Myrdal’s work *Der Gleichgewichtsbegriff als Instrument der geldtheoretischen Analyse* (Beiträge zur Geldtheorie, ed. Mises, Vienna, 1933), is of interest: “In the foregoing I have pointed to the discrepancy between Volume of Capital and Total Volume of Real Investment as the distinguishing feature of a Wicksellian process; but this is only valid as long as one is considering the tendencies as work as at a given moment of time, in which the quantities in question (Income, Saving, Con-
developed by Professors Frisch and Ohlin,* and by other economists in England and America.

In the detailed study of the relations between important economic concepts in the next essay I have dwelt at some length upon the significance of estimates made ex ante and ex post. I have tried to give an analysis of a perfectly general nature, international relations being also taken into account. My aim has been to increase the usefulness of the concepts and their applicability to the complicated conditions met with in reality.

(ii) Two Equilibrium Methods

The foregoing analysis of the pricing process as a series of disequilibria, rested on the realistic assumption that the prices quoted in the market are regarded as the supply, demand, Investment, etc.) are represented by price expectations for future periods, discounted to the present period. But if one turns to the actual development during a period, and compares ex post the value of the capital accumulated during the period and the value of the real investment used to accumulate it, it will be found that they are equal. This final equality clearly stems from gains and losses. . . . In a Wicksellian upward process certain gains (the so-called “Ertrags-und Kosten-Gewinne”) are regularly greater than losses, and in so far as they do not give rise to any alteration in consumers’ demand, they must be included among savings calculated ex post. These therefore receive an increment in the ex post calculation in comparison with that made ex ante. The increment covers the difference between the capital or real investment ex ante and invested capital or real investment—which is higher in an upward process, and vice versa, in a downward process. In a downward process losses predominate, and free capital ex ante is larger than real investment ex post. The difference in this case is covered not through losses but gains. Here again the result is that the amount of invested capital ex post agrees with the real investment during the completed period."  (op. cit. p. 247 f.)

prices of sellers (or in certain exceptional cases as the demand prices of buyers). These prices are, it is true, based on sellers’ anticipations of the magnitude of demand at different prices, but the anticipations are often more or less false. It is the deviations between the transactions anticipated by sellers and those actually carried out, and the associated changes in stocks and orders, which are the most important factors influencing the decisions of sellers to alter their prices from one period to the next. The method thus has the advantages of being realistic and of clearly displaying the motive forces behind price movements, namely the excess or deficiency in demand anticipated by sellers when fixing their previous prices.

It is, however, clear that when the process of price formation has proceeded in this manner for a number of periods, a situation may conceivably be established which the sellers see no reason to alter under prevailing conditions. The situation thus constitutes a temporary equilibrium in a first sense—one in which the market price is adjusted to the demand and supply factors as they appear currently in the market. The price is therefore in a sense an independent factor, which can be determined from the supply and demand conditions prevailing during the period, conditions commonly presented graphically by means of certain supply and demand curves conceived as independent of the price to which they lead. These conditions are then regarded as unaffected by the price established in this period.

Not until a subsequent period are costs and incomes affected by the market price established. New demand and supply curves may be required and they in turn will lead up to a new price determined by them, and thus the process may continue from one temporary equilibrium to the next. Under certain conditions a position may conceivably be reached at which we have not only equilibrium
between demand and supply brought about by price, but also obtain income and cost relations (on which the curves are based) that agree with the current price. Here we evidently have a temporary equilibrium position in a second sense, characterized by interdependence between prices and the supply and demand functions during the period. This equilibrium position is therefore of the Walrasian type, although it is not permanent but is valid for the period only. This situation may be conceived to have originated through all buyers and sellers having found by negotiation at the beginning of the period, those prices which satisfy the conditions of equilibrium, due account being taken of the reaction of prices on the cost and income situation and accordingly also of the forms of the demand and supply curves.

The first of these two equilibrium methods is the one ordinarily used in the treatment of price formation in a particular market. But it can also be used in an analysis of total conditions directed to the explanation of movements of the general price level, whether this problem is attacked by means of the cash balance approach, or by way of saving and investment. In the latter case, the price level for consumers' goods is conceived as wholly determined by the relation between the purchasing power directed to the purchase of consumption goods and services (Income — Saving), in relation to the available quantity of such goods and services. This is the method underlying Keynes' well-known Fundamental Equations in his Treatise on Money.

* These equations, as is well known, have been set out in a form in which they are applicable only under very simplified assumptions (among others that “the net increment of investment,” which in reality is the value sum obtained by subtraction from the value of gross output of investment goods of the depreciation of the old ones can be regarded as consisting of certain concrete goods). It is not difficult however to express the same line of thought in a completely
uses a similar method for analyzing a complete dynamic process. He proceeds to transfer the gains arising in each period from the pricing process, to the purchasing power of the next period.*

This method is very useful for the determination of general tendencies in the formation of prices for a some-
general form. Applying the definitions and notations used in the following "Algebraic Discussion" we denote income by \( E \), saving by \( S \), value of real investment by \( I \), all calculated net and ex ante, and let \( B \) and \( C \) indicate the purchases (planned and realized) for productive and consumption purposes respectively, \( P_0 \) and \( P \) the corresponding expectations of the producer sellers, \( P_0 \) the price level for consumer goods anticipated by sellers, \( P \) the price level for consumer goods realized during the period, \( Q \) the quantity of consumer goods that was expected to be sold and also actually sold. (This last assumption naturally limits the possibility of applying the reasoning to real conditions). We can then set up the following equations:

\[
P_0Q = C - E - S
\]

\[
P_0Q = E - (P - B) = E - (E - I) \quad \text{(as will be seen in the following essay, we have by definition}
\]

\[
P_0 = P - I - (P - B - I) = P_0 + I - E
\]

We thus see how a divergence between saving and investment ex ante can bring about a shift in the realized price level in relation to that anticipated to sellers. The expression in brackets denotes what producers expect to sell for productive purposes minus the excess of actual sales over the value of planned net investment (the amount that buyers do not regard as net investment, e.g. replacing worn out capital, that being deducted), or, as the matter may also be expressed, the value of planned net investment plus the difference between expected and actual sales for productive purposes. It corresponds to what Keynes has called the "cost of investment."

* In \( ex \) \( ante \) and \( ex \) \( post \) terms the assumption may be interpreted as that each period's income \( ex \) \( ante \), on which the actual demand during the period is based, is assumed to be equal to the income \( ex \) \( post \) of the period immediately preceding, which income includes the gains that arise as a result of the formation of prices during that period.
what longer time ahead. The conclusions drawn by Keynes from his formulae (conclusions which agree in many respects with the lines of thought developed in the second part of the present work) may therefore in general be accepted. But the method involves a certain limitation, arising from the basic assumption that the quantity of consumers' goods sold is independent of the prices received for them. In reality this quantity can at least partially be adjusted to the price through changes in stock holdings. In a realistic analysis of current price movements, therefore, it is more correct to follow the disequilibrium method outlined above.

The second interpretation of the concept of temporary equilibrium, according to which a general interdependence is assumed to exist between prices and the demand for and the supply of factors during each short period, would seem to correspond to Marshall's "short period equilibrium."* The significance of this method of conceiving a dynamic process as consisting of a series of such equilibrium positions has recently been very clearly illustrated in Professor Hicks' important work, *Value and Capital*, where it has been extensively used. Since it also underlies the study of the theory of price movements in the second part of the present work, it seems appropriate to indicate its relation to other methods.

The advantage of this method is that the entire static apparatus may be employed in the analysis of a dynamic sequence. It thus bridges the gap between statics and dynamics. The cumbersome *ex ante* and *ex post* terminology becomes superfluous, for the individuals are assumed to have knowledge at the beginning of the period of all the transactions and of the relevant prices valid for the period. On the other hand, this method has an even more limited

* Marshall, Principles, v, vi; cf. also Hicks' comments in *Value and Capital*, p. 115 f.
field of usefulness than the previous one, and a narrower range of application to real conditions. In a real dynamic development such equilibria are probably found only sporadically. Especially unrealistic is the assumption that the dynamic development presents an abrupt transition from one such equilibrium position to another. Further weakness lies in the fact that the dynamic element is not overtly present in the equilibrium equation in each period, unless the equation is made so complicated that it also includes anticipations referring to future periods. The dynamic element itself lies in the incompatibility of these anticipations, and this becomes manifest at the beginning of each period when the parties undertake the commitments valid for the period. In other words, during each period there is present a latent disequilibrium, and that is the reason why the equilibrium achieved during the period is found to be only temporary. The driving force in the dynamic process thus lies entirely in the sphere of expectations, and this curtails the usefulness of this method as a basis for the construction of exact model sequences.

These disadvantages, however, are less apparent when we aim at a description only of the main lines of a dynamic development. It then seems to be justifiable to concentrate our study on such possible temporary equilibria in different phases of the development. By comparing such equilibrium positions, as the analysis in Part II will show, we obtain a picture of the essential characteristics of the development that is both simple and clear.

9. A Note on the Pricing Problem in a Community with Centralized Planning

In the foregoing analysis we made no special assumptions as to the political organization of the community considered. We had primarily in mind a community where free entrepreneurship exists since it is the most relevant f...
us. It may therefore not be inappropriate to add a few remarks on the pricing problem in a community where the productive activity is mainly directed by a supreme Central Authority. This problem presents many interesting features, varying with the degree to which the Authority limits the initiative of the individual members of the community. Some alternative assumptions on this essential point are therefore necessary.

(i) At one extreme the organization of both production and consumption is determined by the Central Authority. This means that the members of the community receive their income in kind, or that consumption is controlled in some other way. If incomes are paid in money, the payment may be combined with various licences to buy specified goods and services at certain definite rates. The characteristic and very interesting feature of the economic life of such a community is, from our point of view, that for a certain definite period it can be regarded as the result of attempts to realize one single plan, that drawn up by the Central Authority for the community’s activity during the period in question. In order to explain its working we have to analyse the content of the current plan and the conditions under which its realization is attempted. And if we take a longer period into consideration, we must observe how the plans of the Central Authority are modified from time to time as a result of past experience. The longer period is thus naturally divided into shorter periods during which each plan is kept unaltered. In this case, however, these shorter periods may be of a considerable length, possibly several years. This follows from the fact that there is only one single plan in force and that disappointments can therefore arise only from the influence of unforeseen external events on the conditions of production and consumption. Our general scheme for the treatment of economic development can be applied in the simplest possible manner in such a case.

(ii) The next type of community is that in which the members receive their income in money and have free disposal over it for consumption purposes. This freedom of consumers’ choice must render the Authority’s task of
planning more difficult. In the former case its choice
between alternative combinations of goods and services to
be produced with the given quantity of productive
resources, could be based on its own valuation of the needs
of the consumers. In the present case the planning entails
an estimate of how the consumers themselves value their
needs. On the basis of this estimate the problem of produc-
tion has to be solved in conjunction with the pricing
problem.

If we assume that money incomes are given (as a result
of a valuation made by the Authority, of the same kind as
that on which the distribution of real incomes was deter-
mined in the previous case), the solution of these problems
entails, on the one hand that the prices of the different
goods and services should be fixed in such a way as to
secure equality between demand and supply in each case,
and on the other, that the value of the whole output,
calculated at these prices, cannot be increased by employ-
ing the factors of production in some other way. If these
two conditions are not fulfilled, it must be possible to
increase the total satisfaction of the consumers (as valued
by the Authority, who determines the incomes of the con-
sumers) through a modification of the production plan.

Planning is thus concerned with an equilibrium problem
of the same character as that treated in static theory.
But here the equilibrium refers only to the planning.* It

* There are also other differences between the two cases. In the
stationary equilibrium there is a mutual interdependence of the prices
of products and the prices of the services of factors determining
individual incomes. In the present case, there is no necessary relation
between the incomes of the individuals and the value of the services
rendered by them, calculated on the basis of the value of the produce.
It is thus possible to assume (as we have done above), that the basis
for the distribution of income is determined before the solution of the
production and pricing problem. But it is also a possible assumption
that the individual incomes are determined in relation to the pro-
ductive value of the services, as estimated on a marginal analysis.
(They need not be equal to these values. If we suppose that the total
income of the capital owned by the state is employed in the first place
to pay all expenses that would otherwise be covered by taxation and
that any necessary increase of capital must also be provided from it,
a surplus or a deficit may arise, causing a raising or a lowering of the
payments made for services.)
seems probable that the carrying out of the plan (even if we disregard the possible occurrence of unforeseen external events) will involve a disequilibrium in several respects, owing to the fact that actual demand will deviate more or less from that anticipated by the Authority.

Whenever the demand is discovered to have been greater or less than was expected, the Authority has to modify its plan of production, if it desires to do its best to satisfy consumers’ needs. The duration of each plan will thus be comparatively limited and in any case much shorter than under the previous assumption. This arises from the fact that the activity of planning is no longer concentrated in the Central Authority. The various plans of the consumers are now relevant and must also be taken into account in the solution of the problem. When different plans, drawn up by independent planners, come into operation, the results cannot be satisfactory from all points of view, as the plans are bound to be incompatible with one another to some extent.

In the two cases now examined, genuine monetary problems are absent, if we disregard the possibility of hoarding in the second case. The total money income will in principle be kept equal to the total value of the output available for sale to consumers. The problem is concerned only with the fixing of relative prices so that the total amount of money paid by the state to consumers will flow back as payment for the goods and services delivered to them.

(iii) If we now take a third type of a socialist community, and assume that private saving is allowed and that the members of the society can invest money in state securities, or deposit it in the state bank, interest being paid on these investments and deposits, a new problem presents itself. When the Central Authority has to decide how to apportion productive resources between consumption and capital industries for a certain period ahead, it must make an estimate of the probable amount that consumers will save during this period. The sum of this expected private saving, and the saving performed by the state itself should be equal to the planned increase of capital. This means that the total value of the consumption...
goods offered for sale to consumers should correspond to the non-saved part of their incomes. If the consumers dispose of their incomes in a different way from what the Authority has anticipated, the result will be either a shortage or an excess of consumption goods. This will not necessarily, as in a community with free entrepreneurship, lead to a corresponding rise or fall in the prices of these goods, since they are fixed by the Central Authority, but it will nevertheless represent an important deviation from the plan of the Central Authority and cause it to be modified for the next period.

Thus we see that in this case the Central Authority will have to solve a problem of exactly the same nature as the Central Bank in a community with free entrepreneurship. In both cases the task is to direct the productive resources of the community to production for present and future needs so as to correspond to the consumers' wishes. In both cases the problem must be solved on the basis of an anticipation of these wishes. But the practical solution is perhaps a little simpler in the socialist than in the capitalist state, since the distribution of productive resources is carried out by authoritative measures. In the capitalist state the Central Bank must try to direct the activities of entrepreneurs by monetary measures, especially by changes in the rate of interest.

As a result of this investigation it appears that our method of analysing dynamic processes may be particularly appropriate for the study of socialist economics.