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MODERN MACROECONOMIC THEORY : AN OVERVIEW

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"If I say that the world around us shows all the
signs of being chaotic, this is not as despairing
a conclusion as it might seem, since it is possi-
ble for a system to be chaotic at one level and
regular at another: thus we may have to abandon
hope of making detailed predictions of the motion
of microscopic elements in a fluid, yet still find
we can make reliable predictions ot its motion on
a coarser scale".

Sir Brian Pippard (1980)

"Explanation of macroeconomic phenomena will be
complete   only when such explanations are consist-
ent with microeconomic choice Theoretic Behavior
and can be phrased in the language of general equi-
librium theory".

Drazen (1980)

General equilibrium theory and keynesian economics have
always maintained an ambiguous relationship founded on a superiority
complex about theory on the part of the one and a conviction of
greater empirical relevance on the part of the other.[1]   But the
seventies have shaken this latter conviction by verifying Friedman's
(1968) and Phelps' (1970) famous prediction that any rate of in-
flation is compatible with a given unemployment rate. This has
given rise to hopes of the end of the keynesian reign and strengthened
the general equilibrium theorists in their assurance of superiority.

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1) An ironic illustration of such a view will be found for example
    in Hahn (1977a)!

Also, the reassertion of the crisis of (keynesian) macroeconomics
is paralleled by new research whose scope and diversity gives the
impression of great richness.

Two axioms constitute this theoretical revival and, even when
rejected en bloc (e.g. Davidson 1977), they are only exceptionally
discussed per se:

Axiom 1: "The existence of a metalanguage": macroeconomic relations
must have microeconomic foundations. This proposition establishes
from the outset the subordination of the macro to the micro approach,
and, at the same time, it ranks economic arguments in implicitly
acknowledging that microeconomics is itself well founded. Yet it
is not clear that macroeconomic relations can be derived in this
fashion. If one considers a sufficiently large number of agents
the structural properties of the excess demand functions, apart
from budgetary identity and continuity, vanish (Sonnensheim, 1973;
Debreu, 1974). This implies that the qualitative properties of
macroeconomic relations remain indeterminate. The practical sig-
nificance of this result is that macroeconomic theory should set
itself up as an autonomous discipline and seek also other foundations.

Axiom 2: "The existence of a metatheory": there exists a class
of models which yield macroeconomic propositions while rendering
explicit their microeconomic foundations; namely general equilibrium
theory which by virtue of this axiom is given the status of a meta-
theory, a common structure within which all other theories must be
expressed. In this framework the "no-bridge" problem is spurious
for it is theoretically possible to represent a system at as de-
tailed a level as one wants. The level of aggregation chosen
depends on the problem one is given to analyze. In this sense
general equilibrium theory is not to be identified with a particular
model - that of Arrow-Debreu - but should be considered as a method
which allows the choice of the states of a model where individual
decisions are mutually consistent. "The type of consistency that
is assumed to exist between individual decisions is specific to
each equilibrium theory" (Malinvaud, 1977, p. 7) which explains the
proliferation of concepts of equilibrium.

General equilibrium, thus freed of its normative connotations, constitutes the common base of all theoretical developments. Since keynesian macroeconomics has a traditional leaning towards explaining the short term, the reference model will be that of temporary equilibrium theory. In this framework the typical economic agent resolves an optimisation problem which differs according to alternative theories by the nature and number of constraints taken into consideration rather than by the theoretical justifications of the constraint. In all models expectations are generated by functions whose specifications can be different; in particular, expectations can be rational. This latter assumption, when considered within the theoretical framework of temporary competitive equilibrium, produces radical implications for economic policy.

The existence of a common frame of reference, then, does not lead to the allaying of doctrinal quarrels. It is of little use to say that there are wide (theoretical) divergences on the very possibility of economic policy. In spite of the uniqueness of the scientific research programme, paradigms concerning the mode of cooperation between public and private agents remain radically divergent.

The new theoretical developments, their theoretical structure and the language in which they are expressed imply, therefore, that <u>rational behaviour</u> is the absolute criterion for the evaluation of macroeconomic propositions. Thus the major questions which modern macroeconomic theory seeks to answer can be formulated in the following way:

- Can rational behaviour be reconciled with the existence of voluntary unemployment?

- Can rational behaviour be reconciled with the existence of macroeconomic fluctuations?

The nature of these questions puts the debate back onto the terrain where Keynes had placed it - the theoretical plane - and

marks the end of an illusion: that there is a consensus over the representative model of the economy, produced by the similarity between Friedman's theoretical framework (1970) and the neokeynesian analytical framework.

The first part of this essay will be a broad outline of the evolution which has led to questions of this type. Then in the second part the attempt, in recent literature, to answer these questions will be discussed.

I PROLEGOMENA: FROM EQUILIBRIUM TO DISEQUILIBRIUM OR THE LOGIC OF A COUNTER-REVOLUTION.

The existence of an underemployment equilibrium represents a major challenge to what Keynes called the classical theory. Either Keynes took as a starting point a model different from that then prevailing or he was simply discovering states of that model which had so far not been studied. A reading of the General Theory gives support to both of these interpretations thus guaranteeing the continuation of controversies on the nature of the keynesian revolution.

However, it is clearly the second interpretation which was immediately favoured since it made it possible to express two doctrinally opposed positions in the terms of a common language (Hicks, 1937). Here the keynesian message appeared as specific to a situation, as dependent on restrictions imposed upon a more general proposition; price rigidity, monetary illusion, liquidity trap, the non-inter-section of functions on a positive plane etc.... In short, a whole series of factors implying either the introduction of arbitrary (free) parameters[1] or an ad hoc specification of the functions

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1) Modigliani, for instance, seems to, support such an interpretation: "The ability of the model set out in the General Theory to explain the persistence of unemployment could be traced primarily to the assumption of wage rigidity". (Modigliani, 1944)

of the model.[1]   The keynesian system is then perceived as a mal-
functioning walrasian system - and the study of some pathological
states of a walrasian model is called keynesian economics.

The way is thus open for the reintegration of the keynesian
message into a more general system of interpretation: the neo-
classical synthesis. First Pigou, then Patinkin, have shown that
the reference to an underemployment equilibrium was an abuse of
language since the real balance effect would ensure that even a
proportional prices and wages fall would lead to the re-establish-
ment of full employment. Even if this is an extremely painful way
back to equilibrium and even admitting its slowness, its very exist-
ence is sufficient to qualify the keynesian situation as "under-
employment disequilibrium".[2] Also the differences between neo-
classical theory and keynesian economics, which previously had
been strongly underlined, are not really structural differences,
but sui generis: "It now becomes possible, a quarter of a century
having passed, to consider the General Theory as an important
episode in the continuous development of the general neoclassical
system" (Kuenne, 1963, p. 347). The merit of John Maynard Keynes
has been to draw attention to the length and weakness of the
adjustment processes generated by disequilibrium in contemporary
economies; "but in the field of static general equilibrium theory
where the existence of countervailing forces, though weak, is
sufficient to produce full employment, its performance has been
essentially deficient" (Kuenne, 1963, p. 361).

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1)   cf. L. Klein (1966).

2)   For a complete discussion of the real balance effect see
     Tobin (1980, Ch. 1). But Tobin himself, and in spite of the
     lack of empirical relevance which he assigns to the real balance
     effect - by virtue of a probable asymmetry between the propensi-
     ties to spend of debtors and creditors - seems to fall in with
     this interpretation of keynesian economics.

This reinterpretation does not seem to call into question anything
substantial. The persistence of disequilibria leaves economic policy
with its raison d'être. The spontaneous tendency towards equilibrium
can be speeded up by appropriate budgetary and monetary policies,
which will also allow the avoidance of the various vicissitudes
associated with deflation (bankruptcies, entrapment of debtors, the
self fulfilment of pessimistic expectations, etc....). Therefore
nothing essential is called into question if a dynamic adjustment
relation expressing the rate of change of prices as a function of
disequilibria is added to a keynesian type model. The model
becomes sufficiently eclectic as to be able to produce both keynesian
and monetarist results, monetarist in the long period and keynesian
in the short period.

The Phillips curve should then be considered as the missing
equation of a macrosystem, more than as a theory of inflation. Its
introduction allows the solution of the problem of dividing changes
of nominal income into price and quantity changes. But if an
adjustment relation determining the rate of inflation as a function
of the deviation of the actual employment rate from its natural
level - or between the production level and its full employment
level-is added to an IS-LM model, the model then undergoes a
structural mutation. Full employment becomes the stable equilibrium
position (assuming that the equilibrium position is unique) and
the structure of the model is altogether similar to that of a
standard neoclassical model (Lipsey, 1978). The different points
on the Phillips curve must also be considered as distinct moments
in the same adjustment process. But "the adjustment process itself
has not in general been successfully described as optimizing be-
haviour, the only paradigm that carries theoretical conviction in
our profession. This failure neither surprising nor discreditable
in view of the intrinsic difficulties of the task is the root of the
chronic crisis in macroeconomics" (Tobin, 1981, pp. 36-37).

How should the Phillips relation be interpreted? As a rule
applied by the market auctioneer? But then what is the duration

of the process in real time? The study of the stability of a static
model gives to it no definite dynamic properties. It is then argued
that only by taking into consideration economic agents' expectations
can this task be accomplished. And there is no longer anything
keynesian in a short period neoclassical model which explicitly
considers expectations (Lucas, 1981). We are back at our starting
point: either the existence of an underemployment equilibrium,
consistent with individual rationality, can be established, or the
keynesian message will be lost in ad hoc specifications, not only
because of the intrinsic difficulty of building a dynamic model,
but because the persistence of disequilibria in a walrasian model
contradicts the most elementary rationality axioms. By accepting
the theoretical supremacy of the competitive equilibrium model
and its immediate import - that keynesian theory is the eco-
nomics of underemployment disequilibrium - keynesians have thrown
out the baby with the bathwater. This is the theoretical measure
of the macroeconomic crisis, if it is identified with the neoclassical
synthesis.

This would not be the case if it were possible to prove that
price adjustment ceases before fully accomplishing its function of
eliminating disequilibria: such a possibility can be discussed
in at least three non mutually exclusive ways. Individual rationality
would come up against the higher order rationality of the system
which would limit the possible range of price variations. The
system must have the ability to ensure its perpetuity, the permanence
of its institutions, which would be eroded by an excessive price
flexibility : the legal nature of the labour contract which gives a
time dimension to the wage labour relations, the establishment
of contracts in monetary terms, the protection of the production
apparatus which is sometimes linked to that of debtors, etc.
It is not surprising that these considerations are to be found in
different forms in the "general theory". The theory of a monetary
economy of production could not neglect the institutional structure
of our society. Moreover an embryonic economic theory of social
conventions exists (Ackerloff, 1979; 1980), but has not yet generated
much interest, though there are some exceptions (Solow, 1979, 1980).
This way of apprehending the problem gives some credibility to the
study of a general equilibrium with exogenous prices in the very short
period.

But the function of price adjustment can also be seen as a rule applied by individual agents - and not by the auctioneer - in an attempt to relax the quantity constraints which prevent the realization of their plan. Since these individual agents do not enjoy the auctioneer's ubiquity, it is perfectly possible that they will stop adjusting before a walrasian equilibrium is established, not perceiving any incentive to go further. They also exhaust the exchange opportunities, perceived or conjectured, for lack of knowledge of real opportunities. But this implies that at the point of underemployment equilibrium reached the economy is not perfectly competitive (in the walrasian sense of the term) and its structure can be approximated by that of a general equilibrium of monopolistic competition. This represents the third line of investigation to a reconciliation between the rationality of behaviour and the existence of involuntary unemployment.

Certainly the fluctuations are not and cannot be apprehended in the same way according to whether underemployment equilibrium is considered or not. The market equilibrium perspective generally leads to the uniqueness of that equilibrium being hypothesized - even if the theoretical framework used is far from warranting such a result. The variations in production and employment are then analysed as supply reactions to signals which are not easy to decipher.

For non-walrasian general equilibrium theory the task is simpler, although the fluctuation problem is not confronted: the theory effectively implies the existence of a multiplicity of equilibria whose real co-ordinates are different. The variations of production and employment are then perceived as the transition from one equilibrium to another.

Pure price adjustment, and pure quantity adjustment delineate a spectrum within which all combinations are possible. The major answers to what can well be called the challenge of short period dynamics have on the whole been placed at the extreme opposite

ends of the spectrum. This way of proceeding has certain advantages:
it allows the answers to be written and interpreted in the language
of a theory, viz., general equilibrium theory which at that point
in time seemed to have achieved the status of a scientific research
programme (Arrow and Hahn, 1971), while the standard macroeconomic
argument was being radically questioned (Clower, 1965; Leijonhufvud,
1968).

II THE COMMON STRUCTURE OF (QUASI-NON?) WALRASIAN REVOLUTIONS

Thus Macroeconomics has been questioned at first from within the
walrasian model. A better way of understanding   recent theoretical
developments no longer takes as a starting point macroeconomic
research as it had been identified by the very title of Keynes'
book - "General theory of employment, interest and money" - but
that of general equilibrium theory. The great achievement of this
research lies more perhaps in the questions it asks than in the
answers it gives. The reference model of microeconomics in effect
has been saddled with a list of fundamental questions on its own
validity. Its method of use is quite clear: the list of conditions
for its use is exhaustive or, which is the same, the situations in
which the model is not applicable are made openly explicit. For
example, it is clearly understood that the theory cannot be applied
if a complete set of markets for future goods does not exist or
if economic agents do not treat prices parametrically $\underline{/e}$.g. in
small economie$\underline{s}/$, or if institutions exogenous to the model which
guarantee the consistency of plans of microeconomic agents do not
exist, or if production is characterised by significantly increasing
returns to scale, etc. etc.[1]

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1) As Hahn notes, (1980c, p. 127): "Indeed, if it is the case that
    today General Equilibrium Theory is in some disarray, this is
    largely due to the work of General Equilibrium Theorists and
    not to any successful assault from outside". cf. also
    Arrow (1978, 1980) for a similar view.

How should the model be modified for it to apply to some of these situations? It is essentially with reference to the answers provided to this question that recent research on the foundations of macroeconomics must be evaluated.[1] Frequently these answers have a keynesian flavour with some relevance to the problems of our time. They elaborate concepts of equilibrium qualified as "quasi" or "non-walrasian" according to whether or not they are consistent with the underemployment of men or of production capacity. What diversifies concepts of equilibrium has nothing to do with the problem of "co-ordination" - the whole set of models being founded on the existence of a tatonnement process - but depends on the kinds of constraints which appear in the individual optimisation problems.

Microeconomic Foundations

Rationality simply means that economic agents take the best action open to them under perceived constraints. To demonstrate better the common links between theoretical approaches first all constraints will be described then later taken singly in order to reach a taxonomy of equilibrium concepts. [2]

Maximise $u_i(x_i, m_i, \sigma_i)$ subject to the following constraints:

1 $\begin{cases} x_i = \omega_i + z_i \geqslant 0 \\ m_i = \bar{m}_i - pz_i \geqslant 0 \end{cases}$

2 $\quad \underline{z}_{ih} \leqslant z_{ih} \leqslant \overline{z}_{ih}$

2' $\quad \underline{z}_{ik} \leqslant z_{ik} \leqslant \overline{z}_{ik} \quad , \; k \neq h$

3 $\begin{cases} p_h = \bar{p}_h \, , \; \underline{z}_{ih} \leqslant z_{ih} \leqslant \overline{z}_{ih} \, , \; h \not\in h_i \\ \underline{z}_{ih}[p_i \, , \; \theta_i \, (\sigma_i)] \leqslant z_{ih} \leqslant \overline{z}_{ih}[p_i \, , \; \theta_i \, (\sigma_i)] \end{cases}$

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1) The viewpoint defended by Weintraub (1979) is that when considered in this way, the "walrasian research programme" appears as a progressive one.

2) For reasons that will become clear later, the formulation used will be Benassy (1982).

where the r goods are indexed by h, the m agents indexed by i,
and x is the vector of consumption, w that of endowments, z that
of net demands, and P a vector of prices. $\bar{m}$, and m, are monetary
balances at the beginning and end of the period and σ, a vector of
current information from which expectations are derived. (The
barred variables will be defined at appropriate places). Constraints
1 obviously must always be satisfied. Their consideration alone
or, alternatively, with the other three allows at least four con-
cepts of temporary equilibrium to be defined.

Temporary competitive equilibrium

The absence of a complete set of future markets has many
implications, the most significant of them being to give money
something to do. [1]   Such absence implies effectively that exchanges
take place at all dates - and no longer at the beginning of time
as in the Arrow-Debreu model. The sequential nature of the economy
becomes then an essential characteristic of a monetary economy
(Radner, 1968, 1974), in the sense that it is a necessary condition [2]

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1) The majority of concepts to be used here have a Hicksian link
   and a Swedish connection. The concept of temporary competitive
   equilibrium in particular represented one of the major contribu-
   tions of "Value and Capital" (1939) and Hicks later devoted an
   important chapter to it (Chap. VI) in "Capital and Growth" (1965).
   The modern development of this concept is due to Grandmont who
   has shown in a series of articles that the idea of temporary
   equilibrium could lead to a monetary theory and how it allowed
   some of the results of the neoclassical synthesis to be called
   into question: such as properties of homogeneity, the role
   of monetary policy, etc. (Grandmont, 1973, 1977, 1982) - Grandmont
   and Laroque (1973, 1975).

2) It is not, however, a sufficient condition as will be seen in
   the discussion of a walrasian equilibrium with rational expecta-
   tions.

for the existence of an equilibrium where the value of money is
positive.[1] A further consequence is the introduction of a form
of uncertainty in the problem of decision-making by individual
economic agents. This uncertainty is relative not only to the
plurality of states of nature, but to the vector of prices which
will clear markets in each of those states. Economic agents must
also make forecasts and their expectation function will be one
of the important ingredients of the programme which they try to
resolve. This function makes expectations depend on present and
past information possessed by the individual on the structure of the
economy and which within the temporary competitive equilibrium
framework is limited to the series of current and past prices and the
rules of economic policy parameters used by the "government".

The utility function u_i must therefore be undersood as an
intertemporal index of utility which can be obtained as a solution
of a dynamic programming problem: future period consumption levels
are derived from the information vector by the mediation of an
expectation function. Only constraints 1 are evidently relevant
for this type of model; they imply that the individual is sure to
realise his current plan even if he has only faint confidence in
his future plans. A temporary competitive equilibrium, therefore,
is an equilibrium where present choices of agents are pre-reconciled,
while their future plans are not co-ordinated. But the existence of
an equilibrium is subject to severe restrictions and implies a
series of conditions on the structure of expectations.

The reasons for this can be easily understood. An elasticity
of expectation that is "too" strong produces an intertemporal sub-
stitution effect between goods whose direction can be opposite to
that of the real balance effect. And even a unity elasticity of
substitution can be "too" strong if the ratio between expected and
current prices is greater than the marginal substitution rate at

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[1] The difficulty of proving the existence of such an equilibrium
within Patinkin's model (1956) had been stressed by Hahn (1965)
and solved by Grandmont: "The price of money is positive in
equilibrium because people believe it will be positive with
some probability in the future" (1977, p. 551).

the point of initial endowments (Grandmont, 1982, Ch. 1). For the
same reason it is possible that monetary policy alone will be
unable to control the interest rate or the nominal supply of money.[1]

For a temporary equilibrium to exist where money has a positive
value, the expectations of some or all agents, relatively to prices
or interest rate, must be largely insensitive to current prices
and interest rates (Grandmont 1982). These conditions are unlikely to
be fulfilled in an inflationary environment. Thus beyond the intro-
duction of an element of disequilibrium into a walrasian model
(the non coordination of agents' future plans) the theory of tempo-
rary equilibrium reopens the controversy on the effectiveness of
regulation mechanisms in a competitive economy and, notably, on the
real balance effect: price flexibility is not a sufficient condition
for the re-establishment of equilibrium and an excess supply in
particular can exist at all positive prices. Keynes was "intuitively"
right. But the spirit of the model is more Austrian than keynesian
(Hicks, 1979) and the difficulties of establishing a walrasian equi-
librium do not imply in any case the existence of an underemployment
equilibrium.

What, according to Hicks, represents a problem in competitive
temporary equilibrium theory is the mutual interdependence of equi-
librium prices and expectations in the short period (a week).
Current prices are effectively determined taking expectations into
account and expectations taking into account equilibrium prices. This
simultaneous and mutual determination transforms a theory conceived
as dynamic into a "quasi-static" model.[2]

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1) Hicks (1965, pp. 71-72) had already stressed the limits of
monetary policy. Although he referred to the existence of a
"spectrum of interest rates", the reasoning was qualitatively
the same: the possibility of affecting the spectrum of interest
rates, controlling some of them depends on the behaviour of
agents' expectations.

2) cf.(Hicks, 1965 pp. 73-74; 1977 pp VI-VIII) Lindhall's method
on which the Hicksian approach is directly based implies that
the length of the period of temporary equilibrium is chosen so
as to be equal to the expectation lag. The chain of periods is
then naturally derived: each period leaves to that following
a capital stock and a determined value of expected variables.
When the expectation lag is reduced the length of the period
is also reduced. In the short period walrasian equilibrium
model the simultaneous determination of prices and expectations
implies an arbitrary choice of period length.

Starting from this proposition two lines of investigation are opened; the first seeks to substantiate Hicks' suggestion of introducing a lag into the model. Current prices partially determine expectations which in turn determine future prices. Obviously the simplest method of eliminating any feedback between prices and expectations in the current period is by assuming that prices are fixed at the beginning of the period (general equilibrium with rationing) or that expectations are exogenous. A second line of investigation on the contrary considers that temporary competitive equilibrium theory contains "too" many potential disequilibria. It should be possible to introduce greater co-ordination into exchange agents' future plans (walrasian equilibrium of rational expectations).

"Non-walrasian" equilibria with fixed prices

If prices do not change instantaneously to clear markets a convenient hypothesis is that of considering them rigid in the short period. The fixed price method (Hicks, 1965, Ch. VII) represents, therefore, the methodological justification of general equilibrium theory with rationing.[1] This does not imply that prices are invariant but are determined outside the model, and, more precisely, outside the temporary equilibrium period. During the period only quantities are free to change while prices are

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1) The fertile matrix of this class of models is the fundamental article by Clower (1965) on the keynesian counter revolution, in that it gave a theoretical content - in terms of the general equilibrium model -to the concept of effective demand. This concept is obtained by considering an additional constraint generated by imperfect wage flexibility in individual economic agents' optimisation problems. Thus emphasis was not put on the rigidity of one price but on the non-instantaneity of its adaptation. This course was very similar to that of Patinkin (1965, Ch. 13) which dealt in a symmetric fashion with optimisation by a firm. It remained for Barro and Grossman (1971; 1976) to synthesize the two contributions into a general disequilibrium model, while the existence of an equilibrium where only wages are rigid had been established by Glustoff (1968). Thus, originally, emphasis was put on all these circumstances where prices

subject to inter-period adjustment. The existence of disequilibria
(in the walrasian sense) implies, then, that in the determination
of his plans, the individual takes into account not only price signals
but also the quantity signals he gets from the market.

Suppose that these signals are objectively determined; the
economic agent thus resolves the optimisation problem defined by the
utility function u_i - where σ_i must now be interpreted as also
containing information relative to present and past quantity con-
straints - and constraints 1 and 2. $\underline{z}_{ih}$ and $\overline{z}_{ih}$ represent the
maximum quantities of good h which can be sold or bought. Taking
into account these signals, an optimum transactions vector can be
determined. The simplest way of describing the process leading to
equilibrium is to use a tatonnement procedure. Drèze (1975) chose
this method. Agents receive a vector of signals which establishes
the upper and lower limits to their exchange opportunities. They
then determine their constrained demands and supplies on all markets
and transmit this information to the auctioneer. The auctioneer
revises quantity signals until an equilibrium in transactions is
reached. A Drèze equilibrium is a fixed point in this tatonnement

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1) cont.
   were prevented from changing "freely". The information problem
   evidently appeared "en exergue" and the very absence of an
   auctioneer in a general equilibrium model seemed sufficient to
   produce keynesian results. Hence the apparent similarity between
   the path taken by Leijonhufvud and that of the new microeconomics
   of employment and inflation (Phelps et al., 1970), as shown by
   the numerous references to Alchian (1970) in Leijonhufvud's book.
   But obviously the similarity is only apparent for the methodolo-
   gical approaches are radically different. While a spill-over
   effect across markets underlies the effective demand concept à
   la Clower which cannot be understood outside a general equilib-
   rium model framework, the new microeconomics couched its argument
   in terms of a partial equilibrium analysis - essentially of the
   labour market - and could not conceive of unemployment other than
   as a transitory stage in an adjustment process (Phelps 1970) or
   an entirely voluntary phenomenon generated by a misperception of
   exchange opportunities (Lucas and Rapping, Mortensen, 1970).

process in the space of quantity constraints. Three hypotheses
are needed to reach this result: balanced exchanges, voluntary
exchanges, i.e. no individual can be forced to exchange beyond his
intentions; rationed agents all belong to the same side of the
market.

As Grandmont (1977) has noted, in the Drèze model there is no
exchange of information relative to the intensity of rationing
experienced by individuals, for individuals are limited in the
messages they send to the market. Exchanges only take place when
quantity constraints form a coherent whole, i.e. in an equilibrium.
It is in the nature of the method used that it cannot generate in-
formation on the divergence between intention and realisation: in
a general equilibrium model individual agents' plans are realised
at the equilibrium point. Hence the difficulty in giving a measur-
able content to the notion of involuntary decisions.[1] A possible
solution would be to seek a measure of disequilibrium by comparing
the solution vectors of (two) different optimisation programmes
by norming the relevant vector space. Call x the solution vector
associated with the programme s. And consider the programme s'
which differs from s only in the existence of a supplementary
constraint. The comparison between x and x' - the solution of
the second programme - provides an indication of the intensity
of frustration of economic agents as a result of the introduction
of an additional constraint. This, after all, is the method
underlying the Clower's dual decision hypothesis. In Clower's model,
however, s is the programme associated with competitive general
equilibrium theory and its solution x has only a notional character
in that it is not communicated to the market.

The hypothesis that an economic agent does not take into account
the constraint he perceives in the market where he expresses his
effective demand allows a generalisation of the dual decision theory.
By definition his effective demand for good h is the solution of the

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1) Refer in particular to the article by T. Haavelmo who presents
    an extremely interesting discussion of the notion of involuntary
    economic decisions.

optimisation problem defined by constraints 1 and 2'. z_{ih} is there-
fore obtained by considering the set of constraints except that
concerning good h (Benassy 1975a). The set of effective demands
z_{ih} is obtained by the solution of n different optimisation problems,
n being the number of markets. However, the transactions are a solu-
tion of the programme s' which simultaneously considers all the
constraints, like in the Drèze model. The comparison between effective
demand and transactions gives a measure of the intensity of the
rationing confronting the individual. Therefore markets are not
balanced in the space of effective demands. A system of rationing
schemes associates agents' transactions in a market with the set
of effective demands expressed in that market. It represents a
mechanism for allocating goods between incompatible demands, but
is not necessarily known to individuals. Therefore it has to be
supplemented by a perceived rationing scheme "which depicts the
way agent i views the relation between his actions and their con-
sequences" (Benassy, 1977, p. 149). The perceived rationing scheme
has the same properties as the objective rationing scheme and en-
compasses the latter at the point of effective exchange.[1] The two
relations represent data of the problem. An equilibrium in Benassy's
sense or K- equilibrium is a fixed point of the tatonnement process
in the space of effective demands.[2]

For a given system of prices the equilibrium allocations in the
Drèze and Benassy models are identical. However, the problem of

[1] These properties include to some extent the hypotheses formulated
by Drèze. Equilibrium of transactions; voluntary exchange. The
third hypothesis - rationing on one side of the market only -
is not a necessary hypothesis in a Benassy type model, since
markets can be characterised by the existence of frictions
(Benassy 1977; 1982).

[2] A K- equilibrium is a Nash equilibrium, where every agent con-
siders the actions of other agents as given. Therefore it is
possible to interpret general equilibria at fixed prices in
terms of non co-operative game theory. In particular the non-
co-operative equilibrium of Malinvaud - Younes (1977) includes
the notion of K- equilibrium when prices are fixed. The non-
co-operative behaviour is the source of the inefficiency found in
fixed price equilibria models. cf. also Böhm-Levine (1979);
Heller and Starr (1979).

utilisable information in the dynamic study of the sequence of
short period equilibria remains unresolved. Benassy's model cer-
tainly produces some information - the set of effective demands -
but it is not quite satisfactory because of the somewhat artificial
character of the process which determines it. An agent's effective
demand vector remains potential because it does not necessarily
satisfy his budget constraint. The disequilibrium measures thus
obtained cannot therefore provide the foundation of a price dynamics.
Certainly they always have the "right" sign (Benassy, 1982) but
their quantitative importance should be treated with caution.

Because of the distinction established between effective demand
and transaction, Benassy's framework is generally used in the
macroeconomic applications of general equilibrium theory with
rationing.[1] In general three goods are considerd but there are
only two markets (a good and labour) while money is considered as
representing one side of all transactions. It is then possible
to proceed towards a typology of disequilibria according to the
value of exogenous variables. Malinvaud (1977) by using an
asymmetric treatment of firms and households - because the good
is not storable, enterprises expectations were not taken into
account - distinguished three types of "disequilibrium": classical
unemployment (excess demand in the market for goods, excess supply
in the labour market); keynesian unemployment (excess supply on both
markets); repressed inflation (excess demand on both markets). The
reconciliation within the same theoretical framework of the classical
(Pigou) and neokeynesian approaches to unemployment represented a
fundamental contribution of general equilibrium theory with rationing,
even though the probability of classical unemployment was considered
low by virtue of a possible asymmetry of price adaptations. It
became possible to establish a one to one correspondence between the
type of disequilibrium and the constellation of exogenous variables
(prices and quantity of money) and to found a typology of economic

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1) cf. in particular Barro and Grossman (1971), Benassy (1977),
   Malinvaud (1977, 1980a and b), Mullbauer and Portes (1978).

policy rules adapted to each situation.[1]   It is important to note that the correspondence established between the type of disequilibrium and the structure of prices presupposes a relationship between the production sold and the current demand for input in the very short period of temporary equilibrium. It is difficult to find a foundation for such a relation because it implies a very particular structure of expectations. If stocks and expectations of enterprises are explicitly introduced into the model, the map of disequilibria becomes infinitely more complex. First of all, a fourth type of situation must be distinguished where enterprises are rationed on both markets (excess supply of product, excess demand for labour) qualified as "underconsumption" (Mullbauer and Portes, 1978) or as "overcapitalisation" (Fitoussi and Georgescu-Roegen, 1980). Second, the constellation of prices and monetary balances is no longer sufficient to characterise disequilibria from the viewpoint of economic policy. This characterisation will depend also on the profile of constraints expected in future periods. Here, the number of possible cases becomes very large to the point where it would be particularly difficult for economic policy to decipher the current period. For example, a situation which would be characterised as keynesian unemployment with regard to current period demands, could very well correspond to classical unemployment if demand expectations by enterprises were sufficiently optimistic. (Neary and Stiglitz, 1982; Benassy, 1980 ; 1982). When expectations are given by stochastic functions the map of current period disequilibria is not modified but the conclusions of economic policy can be inverted: for instance a fall (and not a rise) in wages would permit an increase in the employment level under keynesian unemployment, when production by enterprises is not limited by pessimistic expectations of future demand.

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1)   This correspondence has been questioned by Hildenbrand and Hildenbrand (1978). Fitoussi and Georgescu-Roegen (1980) have shown that there may not exist rationing rules to achieve a classical equilibrium and that the conclusions of economic policy derived from the Malinvaud model depended on the particular specification chosen for the utility function. In the general case a rule of economic policy directed at reducing keynesian unemployment cannot be deduced from the model.

This explains, perhaps, the exploratory nature of the dynamic
analysis of sequences of temporary equilibrium with rationing
(e.g. Böhm, 1978, 1981), and the need to base those analyses on simple
and specific models with relation to the matter under study.
This strategy has proven enlightening, notably in the study of the
medium term evolution of distribution variables and of the persistent
or transitory character of different types of unemployment. (Malinvaud,
1980a).

Thus, general equilibrium theory with rationing allows the
establishment of a typology of equilibria and bases its analysis
on rational behaviour in the sense of choice theory. Nevertheless,
a necessary condition for the existence of an underemployment equi-
librium remains the rigidity of one or several prices.[1] On this
point even Pigou would not have objected. Also, in fixprice models
the novelty is not in the initial hypothesis but in the detailed
and explicit discussion of its consequences. Therefore, the basis
of the hypothesis of exogenous prices is a major question. It is
true that a converging series of reasons which seem to militate
in favour of this hypothesis exist-and some of them have been noted
in the first part of this   paper - but they are not integrated
into a coherent theoretical analysis[2], and they are vulnerable
when questioned from an individual rationality viewpoint. Why do

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1) Therefore it should not be surprising that the real balance
   effect plays an important role in these models. When the
   real wage corresponds to its walrasian level, underemployment
   is generally the result of a "too low" level of the quantity of
   money.

2) The theory of implicit contracts does not justify the existence
   of market disequilibria, contrary to what Solow has said (1979,
   1980). This, on the one hand, implies the real wage rigidity
   (and not money wage rigidity) and on the other, is a theory
   of full employment. The existence of long term nominal contracts
   (Fisher, 1977, 1980) and of transaction costs (Howitt, 1979) is
   another justification. Keynes' invocation of the rigidity of
   relative wages is probably one of the most convincing explana-
   tions.

economic agents not exhaust their exchange opportunities? This
recurring question establishes the failure of this type of approach
(Barro, 1979; Kantor, 1979; Lucas, 1980a; etc....). But the criticism
is not as well founded as it seems in that it confuses the rationality
of an external observer endowed with powerful analytical instruments
with that of an economic agent who deciphers only part of his own
economic environment. There is no decentralised theory of price
formation and the assumption of their instantaneous adaptation
cannot be deduced from principles of individual behaviour. The
theory of price determination outside equilibrium still has a long
way to go (Fisher, 1981). So the two schools of thought confront
the same issue, but are solving it by diametrically opposite as-
sumptions. Hence the impossibility, contrary to what has been ex-
pressed by Lucas in recent writings (1980a), of eliminating "free"
parameters from theoretical structures: an impossibility which under-
lines the unavoidable ideological content of economics.

The theory of "disequilibria" had been presented at the beginning
as the theory of imperfectly coordinated systems[1] but the models
which have been discussed are all founded on tatonnement processes,
which ensure a perfect coordination through quantities. Hence the
allocation of goods in equilibrium depends on the rationing scheme,
which cannot itself be deduced from agents' behaviour. In some sense,
therefore, fix-price models do not really present a theory of
quantity determination: the above critical remarks concerning the
assumption of the instantaneous adaptation of prices applies, pari passu,
to the case of instantaneous adaptation of quantities.

Non-walrasian equilibria with endogenous prices

If price determination were the object of individual decisions
the beginnings of a solution to the preceding problem could be

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1) cf. Leijonhufvud (1968; 1981). The coordination problem cannot
   generally be treated in models favouring microeconomic founda-
   tions because it is, in essence, macroeconomic.

offered. Price rigidity would no longer be a cause but a consequence
of underemployment equilibrium. The most general solution consists
of supposing that an economic agent adapts his prices to explore the
more or less constraining character of the quantity signals he rec-
eives from the market. Out of walrasian equilibrium, as Arrow had
noted (1959), agents are no longer confronted with infinitely elas-
tic demand curves. Monopolistic competition, more than perfect
competition, would then constitute the reference model of macro-
economics. In such a structure microeconomic agents determine
their prices on the basis of conjectured supply and demand functions.
The existence of a general equilibrium of monopolistic competition
has been established by Negishi (1961) but until recently had not
been linked to the problem of the microeconomic foundations of
macroeconomics.

Benassy's model (1976, 1982) accomplished this. Consider the
optimisation programme defined by constraints 1 and 3. Goods are
distinguished by the markets where they are exchanged and by the
individuals who control their prices. For example individual i
controls the subset of good h_i, while the prices of other goods
are viewed as rigid ($p_h = \bar{p}_h$, $h \neq h_i$). The conjectured functions
of demand and supply are represented respectively by $\underline{z}_{ih}$ and $\bar{z}_{ih}$
p_i, θ_i (σ_i) ; where θ_i are their parameters estimated from the
information set (σ_i). The conjectured curves obviously pass
through the observed point. The solution of this programme gives
a price vector P_i^x considered as optimal taking into account the
agents' conjectures. The formulation adopted here is rather gen-
eral in that it allows the simultaneous consideration of fix-price
and flex-price markets. A non-walrasian equilibrium with endogenous
prices is a K- equilibrium where economic agents do not perceive
any incentive to modify their price. That is to say a K- equilibrium
at the optimal price vector P^x. [1] [2] If one considers a

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[1] A problem stressed by Benassy (1982, p. 140), similar to that found
here in the study of competitive temporary equilibrium is that
the determination of p_i and θ_i is simultaneous, while θ_i is also
a function of p_i via σ_i. Another concept of equilibrium with endo-
genous prices has been defined by Grandmont and Laroque (1977).
There prices are fixed by entrepreneurs at the beginning of the
period and are not subject to revision within the period .

[2] The proof of the existence of a K- equilibrium with flexible
prices requires, however, beyond all the usual assumptions,
a certain number of supplementary assumptions (Benassy, 1982).

macroeconomic model, classical unemployment disappears as a category of the analysis insofar as it is always optimal for an entrepreneur who determines his price to satisfy demand at the current price. But it would seem that keynesian unemployment would also disappear unless wage rigidity is assumed, or a special concept of underemployment is used : an equilibrium E (Z, P) of the model would be characterised as an underemployment equilibrium if another equilibrium E' (Z', P') existed such that the employment level would be higher. This is the concept used by Hart (1979) in a model where agents have monopoly power but know their true exchange possibilities. "Unemployment" is then the result of monopolistic behaviour by trade unions. [1] The spontaneous equilibrium of the model can therefore be character- ised by a low level of employment and activity. Fiscal policy by virtue of a process analagous to that of the multiplier would allow a higher level of employment. This definition of a state of under- employment does not seem convincing insofar as it could also be applied to a walrasian model. In such a model, if equilibrium is not unique, and if an equilibrium where the level of employment is maximum existed, any other state of the model could be characterised by underemployment equilibrium. Furthermore, it is possible to show that in the walrasian model the level of employment and output dep- ends in equilibrium on the importance of the (balanced) budget of the State (Tobin and Buiter, 1976).

A possible way out is to assume that the existence of monopoly powers is not intrinsic to the model but simply reflects the exist- ence of disequilibria (Hahn, 1978). The full employment walrasian equilibrium always represents one of the solutions of the model. The structure of the economy is thus competitive, but price determination is decentralised and is the subject of individual decisions. To reconcile these two contradictory characteristics, Hahn assumes that agents' monopoly powers are not exogenous to the model. An agent who does not meet any quantity constraint could accept the market price. If no agent receives quantity signals,

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1) "The trade union" determines the wage rate in an optimal fashion. But generally economic agents could wish to work more at the wage so determined.

walrasian equilibrium is reached. On the contrary if an agent is constrained in some way, he conjectures that altering prices would allow him to relax the quantity constraints confronting him. A conjecture function retraces the relation established by the agent between the price he announces and the quantity he thinks he can exchange in excess of his constraint. This formulation assumes that the conjectured supply and demand functions are kinked at the current price.[1] For the rest the model is formally similar to that of Benassy.[2] A conjectural equilibrium is a Drèze equilibrium where agents' conjectures are confirmed, i.e. a state of the economy where agents do not perceive any incentive to modify their responses to the market signals they receive. Hahn has proved the existence of a conjectural equilibrium where only one side of the market is rationed, in the sense that the conjecture functions of agents who are on the long side of the market are not infinitely elastic. This characteristic implies a particular structure of information; non rationed agents do not attempt to take advantage of the "rationings" of other agents. It would be interesting to know whether under the opposite assumptions, only a walrasian equilibrium could be achieved.

A conjectural equilibrium can be qualified as an underemployment equilibrium for the reasons stated previously, namely because a state of the model exists where the employment level is higher (walrasian equilibrium).

The assumption that conjectures are exogenous is considered by some (McCallum, 1980b) as an ad hoc assumption which would establish the vulnerability of this type of model. If perfect rationality is imposed onto agents' conjectures the walrasian

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1) A class of similar models, that begin from the very outset with the assumption that functions are kinked, has been presented by Negishi (1977; 1979).

2) The strong distinction established by Drazen (1980) between Benassy's and Hahn's model is very artificial. The processes of price and quantity determination are simultaneous in Hahn as they are in Benassy. It is thus not on this point, contrary to Drazen's analysis, that the models differ.

equilibrium would become the only solution of the model.[1] It has
already been stressed that this criticism rests on a confusion
between the concepts of rationality and centralisation. Strictly
speaking in a centralised economy an entity external to the market
can make experiments (assuming that the cost of those experiments
is either zero or independent of their number) so as to discover
the "true" parameters of excess demand functions. But to
stipulate that in a centralised economy every agent - who special-
izes in information on his immediate environment - proceeds in
the same way, is a requirement that has nothing to do with rationality.

The study of non-walrasian models could lead the 'naif' to ask
certain questions: it has been proved unimpeachably that price
rigidity leads to unemployment and that an economy with monopolistic
structures generally functions at too low a level of activity. But,
these results give a strong impression of "déjà-vu" and, thus, one
is led to wonder whether improved solutions to macroeconomic problems
have been found. But it is not, it seems, on this question that the
evolution of recent theory must be judged.[2] The reconciliation of
macroeconomics and rationality is a precondition for progress in
the keynesian approach and this concern is the subject of the new
developments in macroeconomic theory.

Perhaps it is useful at this stage to reconstruct the story of
this reconciliation, as I see it.

The "general theory" could be interpreted as containing two de-
finitions of effective demand, which are generally confused because

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1) Hahn (1977b and c) has shown that for conjectures that are "local-
   ly" rational - the first derivatives of the conjectures functions
   are correct - an underemployment conjectural equilibrium would
   exist. For a discussion of the rationality of conjectures see
   Drazen (1980). But for reasons to be illustrated in the text
   this question does not seem pertinent.

2) Even if a positive answer could be given cf. notably Malinvaud
   (1977, 1980a and b).

of the keynesian assumption that short period expectations are always
realised. The first concept defines total demand as primarily
a function of income (for a given state of long term expectations).
A second definition considers effective demand as that value of
total demand expected by entrepreneurs, which corresponds to their
current decisions on prices, employment and production.[1] It seems
that the concept of conjecture applies particularly well to this
definition and that by assumption entrepreneurs in the keynesian
theory are in conjectural equilibrium. Now if households in their
capacity as consumers and labour suppliers are considered as "price
takers" they will adapt their behaviour to the price vector announced
by entrepreneurs according to a process analogous to that defined by
the fix-price models: their effective demand according to the
first definition is the constrained demand which they communicate
to the market. If the value of the constrained demand is equal to
that of expected demand, entrepreneurs will not have any incentive
to modify their decisions on price, employment and production since
their conjectures are confirmed by the market. In this "rereading"
of the general theory there is no reason for entrepreneurs to
modify wages, since once their employment decision is taken, the
real wage is the profit maximising one at the employment level
chosen: "The volume of employment is uniquely related to a given
level of real wages - not the other way round". (Keynes, 1936,
p. 30).

Walrasian equilibrium of rational expectations

A careful distinction must be made between the problem of
knowledge and that of rationality: to assert that a greedy agent
makes the best use of his perceived environment tells us nothing
of the difference between what is perceived and what is "true",
nor as to the conditions of their identity.

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1) This interpretation corresponds almost literally to Keynes'
   definition: "The value of D /The proceeds which entrepreneurs
   expect to receive/. At the point of the aggregate demand
   function, where it is intersected by the aggregate supply
   function, will be called the effective demand" (Keynes, 1936,
   p. 25).

The confusion of these two problems results in the disappearance of learning processes, that is to say the adaptation delays or, as some people prefer to call them, the "free" parameters. But in fact this procedure amounts to selecting a particular value of these parameters: a zero adaptation lag or an infinite speed of adjustment. It is difficult to understand the reasons why such restrictions should confer a greater generality to a theory. Certainly the argument is not of a theoretical nature and the empirical considerations which would justify it do not seem to be conclusive (Lucas, 1980, pp. 711-712);[1] unless it is demanded that the economy should be simultaneously in a state of temporary equilibrium (market clearing) and of stationary equilibrium (rational expectations), i.e. that one considers only situations where the learning process has ceased (Hahn, 1982).

The concept of competitive temporary equilibrium is a powerful analytical instrument, in that it allows a dynamic evolution to be accounted for without otherwise stipulating the existence of a disequilibrium. But it contains "too many" potential disequilibria: the absence of co-ordination of future plans makes the present configuration of the economy too dependent on the past and not enough on the future. The problem arises because the expectation function is specified in an ad hoc manner. By construction the model implies that agents are rational, know how to solve their optimisation problem and are able to exhaust their exchange opportunities. Why not apply the same rationality principle to their expectation behaviour? The expectation function in fact describes "the theory" of the agent as to the generation of future

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1) The following could be a justification: - all the parameters of the model would have to be derived from a programme of optimisation by microeconomic agents. The consideration of the adaptation lag or the adjustment speed is external to that programme. This is true but it does not allow the justification of any particular choice. Perhaps it may be necessary to recall that in a competitive model price determination does not proceed from "individual experiment" but from "market experiment" and that this is not the work of individual economic agents but of a totally disinterested institution, the auctioneer.

variables relevant to his current optimisation problem. If this
theory shows itself to be false in that it leads to systematic
forecast errors, the agent will have to revise it. Expectations
are rational when they lead to forecasts which, in comparison with
realisations do not induce the agent to modify his "theory". This
assumption implies that forecasting errors are not correlated with
any of the information available to the agent when he forms his
forecasts and that they are, therefore, serially independent and
distributed around a zero mean. This amounts to a steady state
equilibrium condition: expectations are rational when they lead
to agents taking actions whose results do not contradict their
expectations. To consider the rational expectation of a variable
as the "true" mathematical expectation of that variable conditional
on the information set available to agents[1], is a particular form
of the hypothesis, although generally used (Lucas, 1972b; Sargent,
1973; Sargent and Wallace, 1975; Barro, 1976).

Consider the optimisation programme defined by the utility
function u_i and constraints 1. Suppose, on the other hand, that
the information set σ_i contains everything agent i needs to know
to have complete information. Finally, suppose function u is
quadratic while excess demand functions are linear or log-linear. [2]
The perfect foresight equilibrium is, then, the certainty equivalent
of the rational expectation equilibrium. The model has the same
properties as the Arrow-Debreu model, the assumption of perfect
forecasts being a substitute for that of the existence of a
complete set of contingent markets. Of course this type of model
does not try to explain unemployment since markets are always in
equilibrium, but fluctuations. So far the introduction of uncertainty
leads only to random deviations around the path of perfect foresight.
This can hardly be considered a theory of business cycles. Something
else is needed for cycles to be generated.

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1) Adding a random variable not correlated to the information set
   to the conditional mathematical expectation gives a more general
   version (Sargent and Wallace, 1976) but this is rarely used in
   the literature.

2) Because functions are linear, solutions do not differ other than
   by a serially independent random term with zero mean.

Expectations are calculated by applying present and past data available to economic agents to the representative model of the economy. However the use of the relevant model with incomplete information can lead to some fluctuations. The reason is simple: in a sequential equilibrium model where technology and preferences are given changes in production and employment from one period to the next can only result from a change in the state of nature. Incomplete information can lead to perceiving what is actually a purely nominal perturbation as a change in the state of nature. The intertemporal substitution induced by a variation in current prices (wages) relatively to expected prices (wages) is supposed to be strong enough to generate sizeable supply changes (Barro, 1976; Lucas, 1977). Lucas (1972b) has shown, within the framework of an intergenerational model, that monetary shocks can generate real effects by confusing signals, thus aggravating the difficulty of distinguishing between absolute and relative price changes.

The possibility of cycles therefore rests entirely on a particular specification of the information set. As Tobin (1980; 1981) has noted, this possibility presupposes an asymmetry of information between sellers and buyers which really has no theoretical foundation. More generally, the set of models which try to explain fluctuations as equilibrium phenomena, presupposes that monetary aggregates are not observable in the current period. Now in most countries current monetary data are available. Therefore the assumption of incomplete information is as vulnerable from the viewpoint of rationality as the assumption of price rigidity (Barro, 1981). Thus equilibrium theory does not really provide a convincing explanation of economic fluctuations. The problem seems to be of the same nature as that of the rationality of conjectures: how should the optimum information set be determined? Which are the conditions necessary for this optimum set not to cover the complete set? I.e. what are the conditions for fluctuations to exist?

Works on this question are much less numerous than those on log-
linear macroeconomic models which assume the problem to have been
solved. The question is important though: on the one hand the
information behaviour of the individual agent must be rational for
expectations to be rational[1]: on the other hand the incompleteness
of information presupposes a certain irrationality or implies an
ad hoc assumption on the comparative costs of the acquisition of
information and of macroeconomic fluctuations.

This type of analysis gives particular importance to unperceived
monetary shocks as a primary cause of economic fluctuations. Therefore
a Phillips curve can exist in the short period, but does not offer
any opportunity for intervention to economic policy. This is the
well known proposition about the ineffectiveness of economic policy
which is derived from a set of equilibrium rational expectations
models. In general, this ineffectiveness rests on a particular
macroeconomic specification of the theory whose fundamental equation
describes the behaviour of suppliers on the labour market or on the
product market: total supply is the sum of a constant and of a term
representing the expectation error about the general price level.
If this term is zero, and its mean is zero from the assumption of
rational expectation, systematic policies of aggregate demand re-
gulation have no effect on the level of employment and production.
This equation is known as the Lucas supply function (Lucas and Rapping,
1970), and the intergenerational model presented by Lucas (1972b)
is considered as its micreconomic foundation. But, in fact, the
reduced form which it is possible to derive from the latter model,
is a relation between the equilibrium level of production, the equi-
librium level of prices and the probability distribution of the
price level (Azariadis, 1981). Moreover the only neutrality propo-
sition that can be derived starting from Lucas' model is highly
restrictive. This point deserves further analysis.

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1) This requirement of the model has itself been the subject of
    controversies (Taylor, 1975; Blanchard, 1976; B. Friedman,
    1979; Arrow, 1978; 1980).

In a temporary competitive equilibrium model, the excess demand
functions   are not generally homogeneous with respect to current
prices and money balances. The reason is simple: the absence of
money illusion which characterizes these models implies that an
equiproportional variation of the set of prices (current and expected)
and of the quantity of money leaves the excess demand functions un-
changed. For this property to apply in the short period a unit
elasticity of expectation would be necessary (Grandmont, 1977).
This restriction - expected prices always being proportional to current
prices - is an ad hoc assumption in that it cannot be deduced from
fundamental principles of rational behaviour. However, it is
possible to show that a particular category of monetary policy is
neutral on condition that agents believe in its neutrality (Grandmont, 1982). Suppose
that the government announces it will increase the quantity of money
in the current period by means of transfers proportional to monetary
balances held by each agent, with a proportionality coefficient equal
to λ. This kind of monetary policy is chosen to avoid distribution
effects which, of course, have real consequences. If agents believe in
the neutrality assumption their price expectations will be homogeneous
of first degree with respect to current prices and the λ parameter.
Therefore, this type of policy measure will be neutral. If monetary
policy consists of announcing a vector of λ parameters applicable
to current and future periods, the neutrality proposition is main-
tained.[1] But if the monetary authorities give advance notice of a
modification in the time profile of λ parameters, monetary policy -
it goes without saying perfectly anticipated - will have real conse-
quences. This is due to the liquidity constraints to which agents
are exposed in different periods.[2]

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1) Even if the government does not announce its monetary policy its
   effect will be neutral if all agents have a positive monetary
   balance. In fact it is sufficient for agents to look at their
   own balances to discover parameter λ. For a scalar change of the
   quantity of external money to have real effects, it is, on the
   contrary, necessary that some agents should not have monetary
   balances. Since in Lucas' model the new generations do not have
   an initial monetary balance this second condition is satisfied.
   This would seem the only source of non-neutrality in this type
   of model (See Grandmont, 1982, Ch. 1).

2) For a proof of this result cf. Grandmont (1982, Ch. 1). A similar
   line of reasoning is followed by Tobin (1980, Ch. 3).

If we consider a model with internal money, the neutrality proposition becomes even more specific: an equiproportional variation of initial monetary balances and of bank money is neutral if agents believe in its neutrality (Grandmont, 1982, Ch. II). Once again this proposition reaffirms the neutrality of a reform of the monetary unit: such a reform is neutral not just because it applies to monetary balances held but because it modifies in the same proportion the total liabilities and assets expressed in monetary units (Tobin, 1980, Ch. II). Contrary to Lucas' suggestion (1981), the analysis of this kind of policy measure does not exhaust the study of the consequences of monetary policy. Therefore the non-neutrality of monetary shocks is the general case even when they are completely expected.[1] What is clear, on the contrary, is that the proposition of ineffectiveness of monetary policy has been demonstrated within the framework of a very special model and for a type of policy measure which is also very special, a change in the scale of monetary unit. Certainly this is an interesting result but it could not constitute the basis for a general recommendation of economic policy in view of the extremely specific nature of the theoretical structure that generates it. Nevertheless this result has been without caution incorporated into a series of macroeconomic models (Lucas, 1973; Sargent, 1973; Sargent and Wallace, 1975, 1976; Barro, 1976; McCallum, 1978; etc...), which have become frames of reference for economic policy debates (McCallum, 1979, 1980a; Lucas, 1980b; Grossman, 1980). Now, it is worth repeating that in the general case it can be shown that a systematic monetary policy will always have an effect on the equilibrium level of production and employment because it influences the terms of trade between present and future. This proof has been produced within the framework of the very model that is the foundation of the general equilibrium theory of rational expectations: i.e. Samuelson's intergenerational model (Azariades, 1981; Hahn, 1982; Grandmont, 1982).

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1) There are a number of reasons why changes in the quantity of money should not be neutral. They are both theoretical and institutional (cf. Fisher, 1980). Generally they imply either that a change of monetary aggregates has distribution effects; or that it generates a change in the capital stock through its effect on the interest rate (Fisher, 1979; Fair, 1978).

At this stage in the analysis an important point deserves
particular emphasis. Even if previous criticisms are rejected,
the neutrality proposition of systematic monetary policy rests,
necessarily, on the assumption of the uniqueness of the equilibrium.
But, in general, the equilibrium of an Arrow-Debreu model is not
unique. For example, this is true when production is characterised
by constant returns to scale. An increase in the quantity of
money, then, can lead to an equiproportional increase of production
and employment or be divided between price change and quantity
change or, finally, generate only a price increase without any
modification of the real magnitudes in the economy. Any of these
consequences can be rationally expected and therefore be self-ful-
filling (Hahn, 1980 a and b; 1982). It goes without saying that
several equilibrium paths of rational expectations exist under this
assumption and that in the majority of them agents must also form
quantity expectations. Therefore the real coordinates of the
economy would not be invariant with respect to monetary policy.

Even if the assumption of uniqueness is accepted, the stability
and convergence problems are not resolved in the least. If the system
is globally stable an infinity of paths which converge towards
equilibrium exists. Each of these paths represents a rational expect-
ation. The dynamic evolution of the system therefore remains in-
determinate. If the system is globally unstable all the paths will
be divergent. Only under the assumption that equilibrium is a
saddle point is there a unique solution which allows the calculation
of a rational expectation path (Burmeister, 1980; Begg, 1982, Ch. III).[1]
The general case, therefore, seems to be that of the indeterminacy of
the dynamics of the system. Expectations rationally formed will be
divergent and no mechanism will ensure their return to a convergent
path, since the stochastic behaviour of variables remains indetermin-
ate (Burmeister 1980).

For all these reasons and more the proposition of ineffectiveness
of monetary policy in particular and of stabilisation policy in

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1) By definition an equilibrium is a saddle point if only one con-
   vergent path exists, all the other paths being divergent.

general remains extremely limited.[1] Of course it is always
possible to modify some relations of an elementary macroeconomic
model adding a variable here and a lag there, considering deviations
rather than levels, in such a way as to re-establish this proposition
(McCallum, 1980a). But the lack of foundation, both for the model
and for the modifications introduced, damages the credibility of
this undertaking. Nevertheless it would seem that this proposition
has been taken seriously and even been interpreted as representing
the basis of the policy of monetary discipline recommended by
Milton Friedman. But this is only one of the doctrinal contra-
dictions generated by the new classical school. In the singularly
limited domain to which it is applicable, the "theorem" of ineffect-
iveness of economic policy states that _any_ systematic monetary
rule, whatever its nature, has no real effect. No reason is given
as to whether an "open loop" rule should be preferred to a "feed
back" rule.[2] This result should generate consensus within the
profession since the supporters of the neoclassical synthesis
(e.g. Modigliani, 1977; Tobin, 1980) can be interpreted as advocating
the adoption of a systematic rule of aggregate demand regulation.

Nevertheless it is true that there is a general sense in which
the ineffectiveness proposition is well founded. In this case I
prefer to rechristen it the "uselessness of economic policy axiom".
If an Arrow-Debreu equilibrium is the certainty equivalent of a com-
petitive equilibrium with rational expectations any economic policy
without distribution effects will be much more than ineffective, it
will be useless. It would be particularly difficult to discover
the need for it. It is hardly a new proposition in economic theory
that there is no trade off between inflation and employment at full
employment.

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1) In fairness it should be recognised that these limitations
    have been generally admitted by the supporters of the new
    classical school, but in a manner and context whose purpose is
    to prove the superiority of their approach and the "fatal defects"
    of alternative approaches (e.g. Lucas and Sargent, 1979; Barro
    1981; McCallum, 1979).

2) Lucas' pleas for the Friedmanite programme (1980b) are difficult to
    understand. It is true that his model (1972b) leads to a
    preference for a systematic rather than an arbitrary rule and
    that the latter has effects only because of expectation errors
    which it provokes. But even from this viewpoint the result is
    not robust. Azariadis (1981) has shown within the framework
    of Lucas' model, that from the viewpoint of economic welfare
    an arbitrary monetary policy could be superior to one of monetary
    norm.

This axiom does not derive from the rational expectations assumption alone, but from its incorporation into a competitive temporary equilibrium model. It has already been seen that if the equilibrium is not unique, the rationality of expectations would not necessarily contradict the effects of monetary policy. A fortiori this is true if the framework of the walrasian model is abandoned for the more general non-walrasian models previously analysed. There, monetary policy will be especially more effective if it is rationally expected since it will modify the quantity constraints confronting economic agents.[1]

More generally the rationality of expectations is a useful working hypothesis and one of the merits of the new classical school is the stress on its consequences in the important field of economic policy evaluation. The argument is extremely simple (Lucas, 1972a, 1976; Lucas and Sargent, 1979). The simulation of the effects of different economic policy measures implies the identification of the structural form of econometric models. This identification implies a series of assumptions and a priori restrictions; restrictions as to the matrices of endogenous and exogenous variables; as to the matrix of random errors; the a priori classification of variables between exogenous and endogenous, etc. The identification problem is precisely that of never being sure of having correctly detected the structural form of the model. In particular macroeconometric "keynesian" models use a priori restrictions which are not generally consistent with the rational expectations assumption. If agents' forecasts are calculated starting from the whole model and all of present and past data, restrictions concerning the matrix of errors will be generally contradicted, in the same way as is the classification of variables into two categories (Lucas and Sargent, 1979). For in the majority of "keynesian" models the expected value of a variable depends only on past values of the same variable. The difficulty comes from structural parameters so identified not being invariant to those actions of economic policy whose effects are to be measured.

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1) A series of works are devoted to this question: Fisher (1977; 1980); Taylor (1979; 1980); Hahan (1982); etc...

If the estimate of these parameters depends on the economic policy rule previously chosen the evaluation of other economic policies will be generally mistaken. The right strategy should be to make economic policy explicit through a relation in the model and to establish a series of cross-equations restrictions, since a modification of economic policy rules will have a feedback on the parameters of other equations of the model. This critique, therefore, does not lead to a general condemnation of econometric models but to proposing statistical, econometric and theoretical strategies able to resolve the problem of economic policy evaluation.[1]

This criticism is regarded as fatal for keynesian economics however. It is in the nature of the General Theory that it leads to a priori restrictions starting from arbitrary rules of thumb instead of considering the intertemporal optimisation problem of economic agents as a whole. This leads to an arbitrary distribution of zeros in the Jacobian of the model. For example, this is the case with the consumption function or with the liquidity preference function. The structural form of a keynesian model will never be capable of being identified (Lucas and Sargent, 1979) therefore. What was only a specific and well founded critique of the current use of large scale econometric models in the majority of Western countries becomes the death certificate of a theoretical approach. And, as always, the excessiveness of a critique draws attention to its own weakness. At first it goes without saying that the generation of non-walrasian models is also based on problems of intertemporal optimisation. There is no reason why the "right" estimation strategy should not be applied to these models and that a feedback rule describing the behaviour of public bodies should not be explicitly introduced among the equations. Then the rational expectation assumption cannot be tested independently of the theoretical structure in which it is embedded (Schiller, 1978). By itself

1) The use of econometric models for short term unconditional fore-casts is not requeried by this reasoning since the problem of forecasting must be distinguished from that of simulation. In the case of simulation an external perturbation, i.e. the modification of statistical series representing one or many exogenous variables, implies a new series of decisions and the decision role of the agent is not invariant with respect to his environment.

this property establishes no hierarchy of alternative approaches. Finally, and above all, the general affirmation that it is impossible to discover the "true" structural form should not only be applied to a particular class of models. The identification problem can only be solved relatively. The reality approximated by our estimation methods is _always_ of a greater dimension than that of the models which we use. Any system of a lower dimension than that of the phenomenon it tries to represent is always vulnerable from the identification problem viewpoint. This is particularly true of a macroeconomic model which restricts the space of phenomena to a very reduced dimension. (And macroeconometric models built by the new classical school are generally much smaller than the traditional keynesian model[1].) But this is also true of any economic model.

The very concise and partial account of the "rational expectations revolution" (Begg, 1982) given here, can be seen as overcritical but the reader can also interpret it as underlining certain problems which deserve to figure in the research agenda of the new classical school. The equilibrium assumption, even when formalised within a dynamic model, does not yet seem to be able to produce a convincing explanation of macroeconomic fluctuations.

CONCLUSION

Of the two possible interpretations of the General Theory "modern macroeconomic theory" has essentially retained that which has a familiar look. This has led to a walrasian reading of macroeconomics. The theories presented here all have a common filiation and the same limits as the original model: the coherence of the system as a whole is presupposed instead of being explained. The auctioneer is still alive and well, the theory of price determination is evanescent, and the theory of quantity allocation is exogenous to the model. But perhaps it is not fair to quarrel with this. Since the study of equilibrium is given a special status, the reasoning is

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1) cf. e.g. Sargent (1976).

cast within the framework of perfectly co-ordinated systems. And
one of the major contributions of recent developments is to have
shown that within such a framework rationality does not necessarily
lead to full employment equilibrium or to the stationarity of that
equilibrium. Another positive aspect of recent research is that it
is expressed in a common language thus allowing a dialogue and
a cross fertilisation of different approaches.

But at the same time this establishes the partial characters of
the new developments. The theoretical structure chosen singularly
limits the range of relevant questions, i.e. the domain of macro-
economics. Perhaps the problem is not uniquely that of knowing
whether keynesian results can be deduced from a microeconomic ana-
lysis of general equilibrium or whether walrasian conclusions can
be obtained starting from the ISLM model. It would still be neces-
sary to build theoretical structures able to generate new questions
and/or pose other questions to existing structures. If a macro-
system as a whole has coherence perhaps it would be useful to study
directly the reasons which determine its coherence. This probably
is the course underlined by Keynes when he stressed his intention
of studying "the system as a whole". If a macroeconomic logic
partially independent of that which determines individual beha-
viour exists - an underemployment equilibrium is surely an equili-
brium relatively to the system and not to the individuals composing
it - perhaps that logic deserves to be analysed in itself. That
it has only rarely been analysed does not represent an impossibility
theorem. My conviction is that macroeconomics has its own dimension
which must be considered and not just alluded to. J.R. Oppenheimer
wrote: "common sense is only wrong if it requires that what is fami-
liar to us should necessarily reappear in what is not and if it
leads us to hope that every country visited should resemble the
previous one". Whether it has been wrong to visit the General Theory
with a walrasian guide remains an open question.

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