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The Keynesian Counter-Revolution: A Theoretical Appraisal


Twenty-five years of discussion and controversy have produced a large and surprisingly harmonious literature on Keynes and the Classics. Although the debate still has not converged to a point of universal agreement, the domain remaining open to dispute has contracted steadily with the passage of time. On one existential issue, however, contemporary opinion is still largely undivided; precisely what are the central formal differences, if any, between Keynes and the Classics? Perhaps the clearest symptom of our mediocrity is the continued lack of an explicit integration of price theory and (some) analysis. Equally significant, however, is the ambiguity of professional economists towards the Keynesian counter-revolution launched by Hicks in 1937 and now being carried forward with such vigour by Patinkin and other general equilibrium theorists (1-4). The elegance and generality of this literature make it most interesting. At the same time, one can hardly fail to be impressed—and disturbed—by the close resemblance that some of its central doctrines bear to those of orthodox economics.

I do not presume at this late date either to improve the views of previous writers on Keynes and the Classics, or to transform equations into certainties. Things are not that simple. However, I shall attempt to show that the more highly abstract, statistical presuppositions which led to Keynes's original attack

1. The counter-revolution to which I refer is clearly not a dialectic or a non-sense revolt against Keynesian economics, for all of the writers involved are in a critical vein, giving support of what they consider to be the Keynesian revolution, it is another question whether the same people are Keynesians in a theoretical sense. That is one of the issues on which this paper is intended to shed some light.

on orthodox economics continue to pervade contemporary price theory and that the Keynesian counter-revolutions would collapse without them. Unlike Keynes, who had to deal with doctrines of which no authoritative account had ever been given, we now have an extremely clear idea of the orthodox context of contemporary theory. We thus have a distinct advantage over Keynes in describing what has been said. However, our basic problem is to discover and describe what has not but should have been said—and here we are on all fours with Keynes. Like Keynes, therefore, I must begin by asking: 'forgiveness if, in the pursuit of sharp distinctions, my controversy is itself too keen' (7)?

1. Keynes and Traditional Theory

Our first task is to examine in modern idiom those aspects of orthodox economics which were of special concern to Keynes. This may be accomplished most conveniently by considering a two-sector economy comprising households on one side and firms on the other. Corresponding to this division into sectors, we distinguish two mutually exclusive types of commodity: (a) those which are supplied by firms and demanded by households; (b) those which are supplied by households and demanded by firms. Commodities in class (a) will be distinguished by numerical subscript $i = 1, \ldots, m$, those in class (b) by numerical subscripts $j = m + 1, \ldots, n$. Thus, quantities supplied and demanded by firms are denoted, respectively, by variables $x_1, \ldots, x_m$, $d_1, \ldots, d_m$, while quantities demanded and supplied by households are denoted, respectively, by variables $y_1, \ldots, y_m$. The prevailing market prices (expressed in units of commodity $x$) are then represented by symbols $p_1, \ldots, p_m$ ($p_1 = 1$), or a vector notation, $p$. For ease of exposition, we shall ignore aggregate problems and suppose that the preferences of all households in the economy are adequately characterized by a community utility function, $U$.

2. For this, we have merely to think the counter-revolutions, since it is their writings which have revived interest in general equilibrium theory.

3. Here and throughout the remainder of the paper, boldface symbols will invariably be used to refer to magnitudes that are to be regarded as endogenous from the standpoint of individual transactions.
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\[ U(\ldots, d_1; \ldots, a_n; \ldots, a_0) \] Similarly, we shall assume that technical conditions confronting all business firms in the economy are adequately characterized by an aggregate transformation function \( T(\ldots, a_n; \ldots, a_0) = 0 \). Needless to say, the functions \( U \) and \( T \) are assumed to possess all continuity and curvature properties needed to ensure the existence of unique extrema under circumstances to be specified below.

Dealing first with the orthodox theory of the firm, we obtain sector supply and demand functions, \( D(P, a, T) \) and \( A(P, a, T) \) as solutions of the problem:

\[
\max_{n} \sum p_n d_n \quad \text{subject to} \quad \sum p_n a_n \geq \sum p_n T_n \quad \text{as in economic theory.}
\]

Underlying both sets of solutions are transistor equilibrium conditions of the form

\[
p_i \frac{\partial T}{\partial a_i} = 0 \quad (i = d, a; k = 1, 2, \ldots, n).
\]

In particular, if \( n = 2 \) and we interpret \( a_1 \) as goods and \( a_2 \) as labour, we easily establish Keynes’ classical postulate 1, namely, ‘the ideal wage is equal to the marginal productivity of labour’. (General Theory, p. 5.)

In a similar fashion, the demand and supply functions of the household sector are obtained as solutions, \( D(P, a) \) and \( A(P, a) \), of the problem:

\[
\max_{n} \sum p_n d_n \quad \text{subject to} \quad \sum p_n a_n = \sum p_n T_n = 0 \quad (i = 1, 2, \ldots, n).
\]

The symbols \( \sum_{j=1}^{n} a_j \) and \( \sum_{j=1}^{n} d_j \) denote, respectively, the operations \( \sum_{j=1}^{n} a_j \) and \( \sum_{j=1}^{n} d_j \).

5. In this case, \( p_2 \) is the only exception, and we have not shown it as an explicit factor of the price variables included in the vector \( P \), but it is there all the same.

Thus, the demand and supply functions of the business sector are homogeneous of degree \( n \) in the \( n + 1 \) variables \( p_1, \ldots, p_n, a_0 \). Provided \( d_1 \neq 0 \), however, the same functions are not in general homogeneous in the \( n + 1 \) nonnegative prices which are contained in the vector \( P \).

\[ \text{the profit variable } r \text{ being treated as a fixed parameter in this context.} \]

Underlying these solutions are transistor equilibrium conditions of the form

\[
p_i \frac{\partial T}{\partial a_i} + p_i r_n = 0 \quad (i = d, a; k = 1, 2, \ldots, n).
\]

Thus, if we consider the case \( n = 2 \) and adopt an appropriate interpretation of the variables \( d_1 \) and \( a_2 \), we readily derive Keynes’ classical postulate 1, namely, ‘The utility of the [ideal] wage when a given volume of labour is employed is equal to the marginal productivity of that amount of employment’. (General Theory, p. 5.)

So much for the basic ideas of the orthodox theory of transactor behaviour. Let us turn next to the theory of price formation, again seeking to express matters as Keynes might have expressed them had he been less steeped in Marshallian habits of thought.

At least since the time of Adam Smith, the market mechanism has been regarded by economists as an ingenious device for reconciling the freedom of individuals to trade as they please with the ultimate necessity for individuals to accept the aggregate to buy neither more nor less of any commodity than is offered for sale. To accomplish this feat, the mechanism must be supplied with information about individual tastes and purchase plans, which is precisely what is supposed to be furnished by the supply-and-demand functions of orthodox theory.

Assuming that all business profits accrue to accounts in the household sector, we may assert first of all that the sale and purchase plans of individual transactors at any given instant of time depend only on prevailing market prices. We may then argue as follows.

6. The household demand-and-supply functions are homogeneous of order \( n + 1 \) in the \( n + 1 \) variables \( p_1, \ldots, p_n, a_0 \), but not in the \( n + 1 \) variables \( p_1, \ldots, p_n, d_1 \) (provided \( d_1 \neq 0 \)).

7. I have chosen to regard ‘time’ as a continuous rather than a discrete variable, and to confine discussion to matters of all magnitudes, in order to discourage both myself and others from playing merectices games with alternative assumptions. No part of the present or subsequent argument is attuned in any essential way if time is made discrete, less than infinite, etc.

8. Since we are performing market rather than individual experiments (Parsons, I, p. 15), the parameter \( r \) which appears in the household

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If prevailing prices are such that demand differs from supply in any market, this means that individual trading prices, taken as a whole, are mutually inconsistent, which, in turn, means that at least some individual prices cannot be carried into effect as prevailing market prices. In these circumstances, it is plausible to suppose that prevailing prices tend to vary over time, rising in markets where demand exceeds supply, falling in markets where supply exceeds demand. Accordingly, the economist may be said to be in a state of disequilibrium. On the other hand, if prevailing market prices at any given instant happen to be such that demand is equal to supply in every market simultaneously, this means that individual trading prices, considered as a whole, are mutually consistent, hence, that all transactions planned at prevailing prices can, in principle, actually be carried out. In these circumstances, it is plausible to suppose that these are no continuous forces at work tending to alter other individual trading prices or prevailing market prices, and the economy may be said to be in a state of equilibrium.

The only snag in this argument is the familiar one about the number of equations being one greater than the number of prices to be determined. From the theory of household behavior, however, we know that

\[ \sum p_i \Delta q_i = 0 \]

and from the theory of businessmen behavior, we know that

\[ \sum h_i \Delta \frac{p}{y} = 0 \]

Subtracting 2 from 1, therefore, we have

\[ \sum p_i \Delta q_i = \sum p_i \Delta \frac{p}{y} \]

Since in general the variables \( r \) and \( t \) refer to completely independent individual experiments, we cannot assume that \( r = f(t) \) in demand and supply functions is ever replaced by the function the value of

\[ r = \sum p_i h_i = \sum p_i \Delta \frac{p}{y} \]

which regards \( r \) as the new price vector \( P \).

774. \( \Delta \frac{p}{y} = \frac{p^0 - p}{y^0} \)

Regarding the case of market experiment, however, it does mean plausible to suppose that \( r = f(t) \) provided that the variables \( t \) and \( g_i \) in \( g_i \) have their equilibrium values. If this is granted, then \( t \) leads immediately to Walras' law (in the sense of Lange, 6, pp. 49-50):

\[ \sum p_i \Delta q_i = 0, \quad \Delta \frac{p}{y} = 0 \]

Walras' law obviously implies that the necessary value of one of the excess demands can be inferred from the values of the others, which rule is of the sort supply-demand equation. Written in the form

\[ \sum m_i = \sum m_i \Delta \frac{p}{y} \]

Walras' law might also be said to assert that "supply creates its own limit" (cf. General Theory, p. 10) — and we shall make more of this in the sequel. For the time being, however, it may merely be remarked that Walras' law must be valid under the circumstances assumed here.

This account of orthodox doctrine accords well enough, I think, both with modern analysis and with Keynes' conception of the theory. For the special sum \( n = 2 \), in particular, it is apparent that Keynes' views, as expressed in chapter 2 of the General Theory, are exactly equivalent to what is presented above. Granted that this is so, we may reasonably assert that orthodox economic provides a general theory of equilibrium states that, in an adequate account of the factors determining equilibrium prices and equilibrium association plans in a market economy. Moreover, the same analysis may be said to provide the beginnings of a theory of equilibrium prices and disequilibrium transaction plans. Clearly, however, orthodox analysis does not provide a general theory of disequilibrium states; partly, because it yields no direct information about the magnitude of realized or expected equilibrium transactions under disequilibrium conditions; secondly, because it tacitly assumes that the forces tending to each instant to change prevailing market prices are independent.

8. The distinction drawn by Leeson between Walras' law and Say's law is not relevant here, from a formal point of view, the two propositions are equivalent.
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of realized transactions at the same moment (this includes as a special case the assumption, made explicitly in all "slowsment", "reconcept" and "section" models, that no disequilibrium transactions occur). 10

It is instructive to compare these views with those of Keynes, as represented by the following assortment of quotations (not all of them torn out of context):

I shall argue that the postulates of the classical theory are applicable to a special case only and not to the general case... (General Theory, p. 3).

The question... of the volume of the available resources, in the sense of the size of the employable population, the extent of natural wealth and the accumulated capital equipment, has been treated descriptively... (Ornithological writings). But the pure theory of what determines the actual employment of the available resources has seldom been examined in any detail... (assuming not that the topic has been overlooked, but that the fundamental theory underlying it has been deemed so simple and obvious that it has been received, as the most, a bare mention. (General Theory, pp. 4-5.)

A theory cannot claim to be a general theory, unless it is applicable to the case where... such range within which money wages are fixed, just as much as to any other. Politicians are entitled to complain that money wages ought to be flexible; but a theory must be prepared to deal indifferently with either state of affairs... (General Theory, p. 276.)

...the classical theory... is wholly unable to answer the question what effect on employment a reduction in money wages will have. For it has no method of analysis with which to attack the problem... (General Theory, p. 260.)

Clearly, there is nothing very novel in any of this; up to this point, at least, the belief that Keynes is "saying nothing new" need not be confined to those... who are strongly wedded to... the classical theory... (cf. General Theory, p. 15.) Like us, Keynes does not in any way deny the reality of orthodox equilibrium analysis, the only denial that orthodox economics provides an adequate account of disequilibrium phenomena.

10. J. R. Hicks (7), note to ch. 9, pp. 1120. Also Pasinetti (1) supplementary note B, pp. 377-43. 276

II The Keynesian Indictment of Orthodox Economics

Grounds for theoretical controversy first begin to emerge when we come to the stage is Keynes' argument (General Theory, chapter 2) at which he seeks to isolate specific instances in orthodox economics of "lack of awareness and of generality" (General Theory, p. vi).

The first item in his bill of particulars is embedded in a lengthy discussion of wage bargains between entrepreneurs and workers (General Theory, pp. 1-15). Outwardly, this item represents little more than a vigorous attack on orthodox preconceptions about the stability of a market economy. For the burden of his argument seems to be that if labour is ever forced to move "off its supply curve" it may be unable to get back on again. If this is an accurate interpretation, we may say immediately that Keynes' criticisms are not of fundamental theoretical significance, for there is no reason to suppose that Keynes was more expert at stability analysis than his orthodox predecessors. However, the same argument might also be interpreted as a direct attack on the orthodox theory of household behaviour. This would certainly put labour off its supply curve and would also explain Keynes' categorical rejection of classical postulate II. But if this is what Keynes intended, i.e. to deny the validity of the orthodox theory of household behaviour, one can only say that he was singularly unsuccessful in providing a rationale for his attack.

The second item in Keynes' bill of particulars is essentially the same as the first: classical theory is charged with failure to recognize the existence of involuntary unemployment (General Theory, pp. 15-18). Again, the basic question is: Are involuntary unemployment and chronic disequilibrium synonymous terms for the same objective phenomenon, or is involuntary unemployment a special kind of disequilibrium peculiarly associated with the breakdown of the orthodox theory of household behaviour? Here there is somewhat clearer evidence that Keynes believes his objections to orthodox analysis go very deep indeed:

... if the classical theory is only applicable to the case of full employment, it is fallacious to apply it to the problem of involuntary unemployment - if there be such a thing (and who will deny it? The classical theories resemble Euclidean geometries in a non-Euclidean...
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world who, discovering that in experience straight lines apparently parallel often meet, relieve the lines for not keeping straight - as the only remedy for the unfortunate collision which are occurring. Yet, in truth, there is no remedy except to throw over the axioms of parallels and to work out a non-Euclidean geometry. Something similar is required for our economy. We need to throw away the second postulate of the classical doctrine and to work out the behaviour of a system in which involuntary unemployment is the strict sense is possible. (General Theory, pp. 16-17)

Again, however, we are given no compelling theoretical reason to think that the proposed reconstruction of orthodox economics is really necessary.

The third and final item in Keynes' indictment is a denial of the relevance of Walras' law (General Theory, pp. 18-21). Most later writers (e.g., Godin, p. 230, footnote; Goodwin, P. P. Patinkin, 1, 3, 269) have argued either that this portion of Keynes' indictment is correct, or that the proposition which Keynes attacks is not in fact the one he thought he was attacking. Most economists have opted for the second explanation (10, especially p. 113), partly in deference to Keynes' acknowledged intellectual powers, partly because they recognize that if Keynes seriously meant to question the validity or relevance of Walras' law, he would have to reject the Keynesian theory of household behaviour and propose an acceptable alternative - and the alternative would have to include orthodox theory as a special case, valid under conditions of full employment. Walras' law is not, after all, an independent postulate of orthodox analysis, it is a theorem which is incapable of direct proof on the basis of premises which are typically taken as given in contemporary as well as classical price theory.

III The Post-Keynesian Dilemma

The conclusion which I draw from all this may be put in one clause: either Walras' law is incompatible with Keynesian economics, or Keynes had nothing fundamentally new to add to orthodox economic theory. This may seem an unnecessarily brutal way to confront one sacred cow with another, but what other conclusion is possible? If Keynes' mind, at least, the three items in his bill of

11. But see H. Rose's note on Walras' law and the reply by Patinkin (11, 12).

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parts of all amount to the same thing in the sense that they all stand and fall together, any one of them logically involving the other two (General Theory, p. 12). As we have already seen, he could hardly hold this view seriously unless he regarded each of the three items as an attack on the orthodox theory of household behaviour. But suppose that this is not in fact Keynes' view; suppose that Walras' law is both unreservedly valid, relevant and compatible with Keynesian economics. In this event, the recent literature on monetary theory makes it perfectly evident that Keynes may be in error, on a special case of the Hicks-Large-Patinkin theory of identification economics, which differs from orthodox theory only in being more detailed and precise. We would then have to conclude that Keynes adds nothing fundamentally new to orthodox economic theory.

Thus, we are caught on the horns of a dilemma. If Keynes added nothing new to orthodox doctrine, why have twenty-five years of discussion failed to produce an integrated account of price theory and income analysis? If Keynes did add something new, the integration problem becomes explicitable; but then we have to give up Walras' law as a fundamental principle of economic analysis. It is precisely at this point, I believe, that virtually all previous writers have decided to part company with Keynes in their proposals to follow a different course. I shall argue that the established theory of household behaviour is, indeed, incompatible with Keynesian economics, that Keynes himself made tacit use of a more general theory, that this more general theory leads to market excess-demand functions which include quantifications as well as prices as independent variables. I shall argue that in this context, the excess-demand functions or market demand for factors are essentially Walras' law. In short, I shall argue that there has been a fundamental misunderstanding of the formal basis of the Keynesian revolution.

IV Disequilibrium Systems: A Preliminary View

Before attempting to deal directly with the issues raised above, we must say something more about the mechanics of disequili-

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tack assumption that market excess demands are independent of current market transactions. This implies that income magnitudes do not appear as independent variables in the demand or supply functions of a general equilibrium model; for incomes are derived in terms of quantities as well as prices, and quantity variables never appear explicitly in the market excess-demand functions of traditional theory. To be sure, income variables could be introduced by taking factor supplies as given parameters; but this work would exclude the formulation of a general equilibrium model containing supply functions of all marketable factor services. 12

The importance of these propositions for Keynesian economics can hardly be over-emphasized, for they imply directly that the Keynesian consumption function and other market relations involving income as an independent variable cannot be derived explicitly from any existing theory of general equilibrium. 13

The most lucid account of the role which current transactions might play in a general equilibrium theory has been presented by Professor Hicks in Value and Capital (1, pp. 119 ff.). The following passages are especially significant in this present connection (pp. 127 ff.).

Since, in general, traders cannot be expected to know just what total supplies are available on any market, nor what total demands are forthcoming at particular prices, any price which is fixed initially can be only a guess. It is not improbable that demand-supply equilibrium will actually be found to be offered at such a guessed price; if they are not, then in

12. This was apparently overlooked by Plautz when he formulated his "general disequilibrium" of macroeconomics (Money, Interest and Prices, ch. 4). It is instructive to notice that this chapter is not accompanied by a mathematical appendix. Some of the consequences of this oversight are evident in the later discussion, especially the argument beginning at p. 241, referring to sections in pp. 218 and 225. I do not mean to suggest that authors may not put such variables as their price into their models. My point is that such variables as can be shown to be functionally dependent on other should not then be measured independently.

13. Cf. Lange, Price Flexibility and Employment (4, ch. 9, p. 53). Lange's usage of the phrase "propensity to consume" is perfectly legitimate, but the concept invoked by him is not in any sense a consumption function of the sort Keynes worked with given, except on the Keynesian definition. It is not possible to talk about changes in consumption in response to changes in income without at the same time talking about changes in prices. 280

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the course of trade the price will move up or down. Now if there is a change of price in the midst of trading, the situation appears to violate the orthodox appearance of demand-and-supply analysis, for, while production, demand curves and supply curves give us the amounts which buyers and sellers will demand and supply respectively at any particular price, if that price is fixed at the start and adhered to through time. Earlier writers, such as Keynes and Pigou, also had supposed that demand-and-supply analysis ought directly to be confined to such markets as permitted of supposition, i.e., markets such that if a transaction price was not through a "true" price... could not be reached when the equilibrium price was reached, since such markets are highly exceptional, our offsprings of the problem if it can be called one was not very convincing.

In the general case... gains and losses due to false trading only give rise to income-effects, as effects, that is, which are the same kind as the income effects which may have to be considered even when we suppose equilibrium prices to be fixed straight away. We have seen... again that a certain degree of indeterminism is nearly always imparted by income effects to the theory of economic theory. All that happens as a result of false trading is that this indeterminism is somewhat intensified. How much intensified depends, of course, upon the extent of the false trading; if very extensive transactions take place at prices very different from equilibrium prices, the disturbance will be appreciable. But I think we may reasonably suppose that the transactions which take place at very false prices are limited in volume. If any intelligence is shown in price-fixing, they will be.

It is heartening to know that income effects can be ignored if they are sufficiently unimportant to be neglected; but this is hardly a solution to the problem at issue. The essential question is whether the supply-and-demand functions of traditional analysis are in any way relevant to the formation of market prices in situations where disequilibrium transactions cannot be ignored.

To answer this question, we must first define explicit theoretical measure of disequilibrium transactions. Perhaps the simplest way to define these measures is to suppose that actual transactions in any given market are always dominated by the "short" side of the market; that is to say, market transactions are equal to planned market supply if demand is greater than supply... to planned market demand if supply is equal to or greater than demand (17, p. 361; 14, l), pp. 157-8). This is, of course, the pro-
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couche which has been followed by all previous writers, is so far
as they have said anything at all on the subject.

Taken by itself, this addendum to traditional theory has no
logical implications; but it opens the way for further analysis.
For example, some writers have suggested the desirability of
influence on price adjustments via "spillover" effects — changes in
prevailing supply and demand conditions to adjust current dis-
crepancies between planned and realized purchases and sales.
The most recent expressions of this view have been voiced by
Patinkin (1, p. 197). His suggestion is to redefine the usual price
adjustment functions to make the rate of change of price in one
market a function not of excess demand in that market alone, but
also of excess demand in all other markets. That is not an
entirely satisfactory vehicle for expressing his basic views,
however, as indicated by three considerations.

Firstly, it is not consistent with established preference analysis

to suppose that transactors alter their sale and purchase plans
before prevailing market prices have already varied in response to
the presence of excess demand somewhere in the economy.
Secondly, his supposition that price movements in one market
are governed by excess-demand conditions in all markets is
totally equivalent to the supposition that individual traders
respond not merely to absolute levels of prevailing prices but also
to current rates of change of prices. This implies some basic
changes in established preference analysis to allow prices as seen
by transactors to differ from current market prices (17). Thirdly,
from Walras' law (obviously applicable in this instance), the
"money" value of potential "spillover" from any given market is
measured by the aggregate "money" value of the market excess
supply at all other commodities. Thus, if "spillover" effects from
a given market are fully reflected in other markets, we are left
with effective excess demand in the given market (and, by induc-
tions, in all other markets also) identically equal to zero; which is
to say that prices never vary. Patinkin does not go to this extreme;
he relies instead on a proposition of Samuelson (18, p. 472) and
14. Also see Hansen (13) and Entwhistle (16).
15. In fairness to Samuelson, it should be added that his discussion does
not refer to spillover effects, but instead to what I have elsewhere called
spillover effects in any given market are only

\[ \text{suppose} \] 

\[ \text{that goods which have actually been evaded rather than resolved.} \]

A more promising way to bring current transactions into
general equilibrium theory is by way of so-called stock-flow
models. Unless we suppose that all commodities traded in the
economy are highly perishable, it is clearly plausible to argue that:

\[ \text{the goods will accumulate or decline (or both) somewhere in the }
\]

\[ \text{economic system during periods of market disequilibrium. This }
\]

\[ \text{forces us to consider possible extensions of traditional theory to}
\]

\[ \text{deal explicitly with asset-holding phenomena.} \]

There is now a reasonably broad theoretical literature on
this subject, including a number of recent papers on monetary
theory and at least one important book on the theory of invest-
ment. I think it fair to say, however, that this literature has
made little impression on the profession at large; which is per-
haps another way of remarking that the equilibrium properties
of stock-flow models are essentially the same as those of traditional
pure-flow models and that few economists are deeply concerned
with anything else. Here, therefore, I shall merely observe that
the explicit introduction of asset-holding phenomena into traditional
theory entails a redefinition of market excess-demand functions
to include asset as well as price arrays among the relevant inde-
pendent variables and, along with this, an extension of the usual
equation systems to include stock-adjustment functions. As a conse-
quence, actual transaction quantities influence market
adjustment indirectly, via their impact on existing asset stocks —
which creates new sources of potential instability (24, 18).


16. Vernon L. Smith, Investment and Production (20). This book includes
a comprehensive bibliography on the "real" part of the stock-flow literature.
For further details of the "monetary" part, see George Horwich, "Money,
prices and the theory of interest determination" (21). The latest in this
series is the article by Archibald and Liner (22, October 1958), and Brumberg's
"Stocks, flows and monetary theory" (23). The general theory underlying
such models is developed at greater length in Barten and Clower (19).

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pp. 170-71. Even in this type of model, however, current transactions exercise an influence only after a certain time delay. As in some usual general equilibrium models, therefore, current income never appears as independent variables. Thus, this potential model to the General Theory also turns out to be a belated ally.

The preceding discussion probably does not exhaust the list of possible ways of introducing current transactions into evens-demand functions, but we have now gone far enough to reexamine that the problem is by no means so transparent as some writers might have us believe. At this point, therefore, let us return to the route which Keynes apparently travelled before us.

V Say's Principle and Walras' Law

In our earlier account of the theory of household behaviour, we did not distinguish between planned and realized magnitudes behaving to have done so would not in fact have been a meaningful procedure in the context of "symbolic" equilibrium analysis. However, if we adopt the view that states of transaction disequilibrium are, in principle, just as admissible as states of transaction equilibrium (and now can we otherwise?) (p. 277-8; M. p. 318ff, the distinction between plans and realizations becomes both meaningful and theoretically relevant. In this discussion that follows, we shall adopt just this point of view; accordingly, we shall henceforth interpret half-sided symbols δ and r as realized or actual magnitudes, hence, given previsions from the standpoint of individual transactors, planned or nominal magnitudes will be denoted, as before, by such symbols as δ̂, Ĵ, etc.

For any individual household (here, we are informally modifying our discussion to recognize that the household sector comprises a multitude of independent decision units), we can clearly assume that the realized numerical value of total purchases during a given interval of time is identically equal to the aggregate numerical value of total sales and realized profit receipts during the same interval:

\[ \sum_{t} (p_{t} - w_{t}) - r = 0 \]

Indeed, this is just a tacit definition of the concept of a transaction, since what it asserts is that commodities are acquired through market exchange rather than theft, gifts, heavenly favours, etc. The familiar household-budget-constraints, although similar in form to the trade, equation 5, asserts the explicit differential proposition that no transaction, consciously plant to purchase units of any commodity, will occur at the same time planning to finance the purchase either from profit receipts or from the sale of units of some other commodity. For a later reference, I shall call the last and very general proposition "Say's principle". This is essentially a rational planning postulate, not a bookkeeping identity, not a technical relation. Unlike the market principle known as Walras' law, moreover, Say's principle does not depend on the tacit assumption that values are calculated in terms of current market prices, or on the equally specious assumption that market prices are independent of individual purchases and sales. Neither does it presuppose that individual behaviour is in any sense optimal. Thus, Say's principle may indeed be regarded as a fundamental convention of economic science, akin in all relevant respects to many basic axioms of physical science as the second law of thermodynamics. Say's principle is not true in the nature of things; not unless we presuppose something of the sort, we have absolutely nothing upon which to build an account of individual decision processes.

Suppose now that we carry through the usual utility maximization procedure to arrive at households demand and supply functions, \( D(p, r) \), \( s(p, r) \), interpreting Say's principle to mean what it usually means in this context, namely:

\[ \sum_{t} p_{t} d_{t} - \sum_{t} s_{t} - r = 0 \]

Must we then assert that any reasonable declaration of market demand and supply magnitudes will necessarily make use of the functions \( D(p, r) \) and \( s(p, r) \)? Not necessarily, for the definition of these functions tacitly presupposes something more than Say's principle, namely, that every household expects to be able to buy or sell any desired quantity of each and every commodity at prevailing market prices (K. p. 232ff).

Now, the rationale of the last presupposition is hardly self-
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R. W. Clower

VI The Dual-Decision Hypothesis

For the moment, let us imagine ourselves to be involuntarily unemployed in the sense of Keynes. Specifically, imagine that we have a strong wish to satisfy our champagne appetites but that the demand for our services as economic consultants does not in fact allow us to gratify this desire without doing serious damage to our household finances. How do we communicate our thirstiness to producers of champagne; how can they be made aware of our willingness to solve their market research problems in exchange for copious quantities of their excellent beverage?

The answer is that we do so indirectly. We offer more favourable terms to potential buyers of our services (these may include some champagne merchants), leaving it to the market to provide us more employment and income and, in due time, more boone. Do we also signal our craving directly by disposing of money balances and savings accounts and sending our children out to work? In short, do we drink more even before we work more? Or do we become, at least temporarily, involuntarily abstentious and postpone our satisfaction to financially more propitious times? Clearly, this is to pose the question in a highly misleading way, for the issue is not, "Which do we do?", but "How much do we do of each?"

But if even this much is granted, we thereby affirm that the demand functions of orthodox theory do not provide relevant market signals. For if realized current receipts are considered to impose any kind of constraint on current consumption plans, planned consumption as expressed in effective market offers to buy will necessarily be less than desired consumption as given by the demand functions of orthodox theory.

A formal statement of the problem will clarify matters at this point. Following the usual procedures of traditional theory, suppose that the resistance function 1/(1 + a1 + ... + an) is maximized subject to the budget constraint

\[ \sum p_i d_i - \sum p_i y_i - t = 0, \]

and the resulting first-order conditions are used to define the rational demand and supply functions \( d(p, x) \) and \( s(p, y) \).
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Provided that realized current income is not less than notional current income, i.e., provided
\[ \sum p_i s_i \geq \sum p_i d_i, \]
we may suppose that the functions \( d_i \) and \( s_i \) constitute relevant market signalling devices. For this is just to say that current income receipts do not impose an operative constraint on house-
hold spending decisions.\(^{17}\)

In the contrary case, however, i.e., if
\[ \sum p_i s_i < \sum p_i d_i, \]
a second round of decision making is indicated: namely, maxi-
mize
\[ \sum d_i v_i \rightarrow \text{subject to the modified budget constraint} \]
\[ \sum p_i d_i - \sum p_i s_i - r = 0. \]

Solving this problem, we obtain a set of constrained demand functions,
\[ d(P, Y) \] (\( i = 1, \ldots, m \)),
where, by definition,
\[ Y = \sum d_i s_i + r. \]
The values of the constrained functions, \( d_i \), will then be equal to those of the corresponding notional functions, \( d_i \), if and only if
\[ \sum v_i d_i B_i - B_i = 0. \]

17. More literally, we might argue that an excess of current income over desired income does affect current expenditure directly; compulsory over-
time might be considered a case in point. But we shall not deal with situa-
tions of that kind here. In effect, we suppose that individuals are never forced to sell more factor services than they want to sell, though they may be forced for lack of buyers to sell less than they desire.

18. The constrained demand functions are not even defined, of course, when realized income exceeds desired income.
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transfer receipts. Indeed, it is this theory which is invariably presented in geometrical classroom expositions of the theory of consumer behaviour. It is only mathematical versions of preference analysis that we lose sight of realised current income as an upper constraint on effective demand.

It is another question whether Keynes can reasonably be considered to have had a dual-decision theory of household behaviour at the back of his mind when he wrote the General Theory. For my part, I do not think there can be any serious doubt that he did, although I can find no direct evidence in any of his writings to show that he ever thought explicitly in these terms. But indirect evidence is available in almost unlimited quantity: in his treatment of the orthodox theory of household behaviour, his repeated discussions of 'Say's law', his development of the consumption function concept, his account of interest theory, and his discussions of wage and price determination. It is also significant, I believe, that a year after the appearance of the General Theory, Keynes' own evaluation of the theoretical significance of the consumption function concept still echoed sharply from that of his reviewers (28):

'This psychological law was of utmost importance in the development of my own thought, and it is, I think, absolutely fundamental to the theory of effective demand as set forth in my book. But few critics or commentators so far have paid particular attention to it.'

Finally, it is important to notice that unless the orthodox approach to household behaviour is modified (exactly if not explicitly) to recognize the dual-decision hypothesis, the Keynesian notion of an aggregate consumption function does not make sense, the distinction between transactions and speculative balances is essentially meaningless, the liquidity-preference theory of interest is indistinguishable from the classical theory of loanable funds, fluctuations in the demand for physical assets cannot be supposed to have more impact on output and employment than fluctuations in the demand for securities, and excess supply in the labour market does not diminish effective excess demand elsewhere in the economy. In short, Keynes either had a dual-decision hypothesis at the back of his mind, or most of the General Theory is theoretical nonsense.

VII. From the Classics to Keynes

We remarked above that the dual-decision hypothesis already has an established position in the oral tradition of established preference analysis. We have also argued that it plays an important (if tacit) role in income analysis. Thus, it is only when we turn to contemporary general equilibrium theory that no trace of the hypothesis is anywhere to be found. Yet it is precisely in this area that the dual-decision approach is most clearly relevant and most damaging to orthodoxy.

Referring to our previous account of theoretical analysis (Part I, above), we recall that the business sector supply and demand functions may, from a market-point of view, be so defined as to depend solely on the price vector \( \mathbf{P} \), permitting us to write Walras' law in the form:

\[
\sum p_i \delta d_i (\mathbf{P}) - \delta (\mathbf{P}) + \sum p_i \delta d_i (\mathbf{P}) - \delta (\mathbf{P}) = 0.0^{*}
\]

In the context of the present discussion, the most interesting implication of Walras' law is obtained by calling the commodities \( 1, \ldots, m \) 'goods' and the commodities \( m + 1, \ldots, n \) 'factors'. We may then assert that excess supply of factors necessarily implies the simultaneous existence of excess demand for goods.

More generally, we may assert that in any disequilibrium situation, there is always an element of excess demand working directly on the price system to offset prevailing elements of excess supply.

According to the dual-decision hypothesis, however, the market relevance of the household functions \( d_i (\mathbf{P}) \) and \( J_i (\mathbf{P}) \) is contingent on the satisfaction of the condition that realized current income be no less than planned income.\(^{10}\) Suppose, however, that

\[
\sum p_i \delta d_i - \delta J < 0;
\]

10. Cf. equation 4, above.

20. Profit receipts do not concern us since we are still proceeding on the assumption that the condition \( 1 + \mathbf{P} \) is satisfied (this is no longer essential to the argument, but it is very convenient). What we are supposing, in effect, is that household receivers of profit income have perfect information about profit prospects (they may even be producers-consumers) and react to this information precisely as if corresponding amounts of numeraire profits were actually being received.
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Let us suppose that real aggregate demand for factors is less than aggregate supply (in the sense indicated). Then involuntary unemployment may be said to exist since realized factor income cannot exceed the aggregate money value of planned demand for factor inputs, that is to say,

$$\sum p_i d_i - \bar{y} \leq 0.$$  

In this situation, the dual-decision hypothesis requires that we replace the usual household demand function, $d_i$, by the constrained demand functions $d_i(P, Y)$, which, by definition, satisfy the condition

$$\sum p_i d_i(P, Y) = \sum p_i d_i(P, Y).$$

i.e. the aggregate money value of constrained demand for goods is at most equal to the aggregate money value of planned demand for goods in the sense of traditional preference analysis. It follows immediately that, if $y$ is a state of involuntary unemployment, Walras' Law must be replaced by a more general condition

$$\sum p_i d_i(P, Y) - y^*(P) \leq \sum p_i \bar{d}_i(P) - y^* \leq 0,$$

i.e. the sum of all market excess demands, valued at prevailing market prices, is at most equal to zero. Instead, since the equality sign applies with equality only in the absence of factor excess supply, the dual-decision hypothesis effectively implies that Walras' Law, although valid as usual with reference to national market excess demands, is in general irrelevant to any but full employment situations. Contrary to the findings of traditional theory, excess demand may fail to appear anywhere in the economy under conditions of less than full employment.

The common sense of the preceding analysis may be clarified by a simple geometrical illustration. Let the curve $T$ in the accompanying figure represent the business sector transformation function, let $U_1$ and $U_2$ represent alternative household sector indifference curves, and let $LP(p, y)$ represent, simultaneously, the profit function of firms and the budget constraint of households. In the situation illustrated, the real wage at time $t$, $p_t$/$\bar{p}$, is such that $y_t > \bar{y}_t$; hence, factors are in excess supply. Moreover, since $d_t > \bar{d}_t$, goods are simultaneously in a state of notional excess demand. If the real wage rate is assumed to vary inversely with notional excess demand for goods (as is assumed to be the case in orthodox analysis), $p_t$/$\bar{p}_t$ will tend to fall over time at time $t$, and the system over therefore be said to tend towards full employment (defined by reference to the point $(\bar{y}, \bar{y})$). However, if the real wage rate is assumed to vary inversely with 'effective' excess demand for goods, no adjustment of the real wage rate will tend to occur at time $t$ since, as indicated, constrained demand for goods, $d_t$, is equal to planned supply of goods at prevailing price and income levels.21

This illustration of how effective-excess demand may be insufficient to induce price adjustment, despite the obvious sufficiency of notional excess demand, says nothing, of course, about the stability of full employment equilibrium under alternative adjustment hypotheses. For example, if the real wage rate varies in response either to constrained excess demand for goods or excess demand for factors, then in the situation illustrated the system is unstable.

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may still tend towards full employment equilibrium. The point of
the example is merely to illustrate that, when income appears as an
independent variable in the market excess-demand function—more
precisely, when transactions quantities enter into the definition of
these functions—traditional price theory ceases to shed any light
on the dynamic stability of a market economy."

lack of analysis might be called a good deal farther; but
I think enough has been said to justify such conclusions as are
mentioned in the preceding argument.

Firstly, orthodox price theory may be regarded as a special case of
Keynesian economics, "valid only in conditions of full employ-
ment.

Secondly, an essential formal difference between Keynesian
and orthodox economics is that the market excess demands are in
general assumed to depend on current market transactions in the
present, to be independent of current market transactions in the
future. This difference depends, in turn, on Keynes' tacit use of a
diastic-decision theory of economic behavior and his consequent
verification of Walras' law as a relevant principle of economic
analysis.

Thirdly, chronic factor unemployment at substantially re-
stirring levels of real income and output may be consistent with
Keynesian economics even if all prices are flexible; this problem
has yet to be investigated within the context of a Keynesian model
of market price formation.

22. In an unpublished article "A Keynesian market equilibrium model", Dr. Wallander finds that a more realistic version of the
right wage case with non-merit that so far to anticipate the dual-section hypothesis on which the present argument depends at peak weights.

The following passage (p. 40, it is particularly significant):

"Suppose a market is permanently restrained from full adjustment.
Whereas in terms of the individual worker's terms of the
market it means that some or all of short-term contracts are in addition to the
productivity of the worker. For convenience, consider the Keynesian labour market.
A worker, faced with a certain real wage, can sell less labour than
produced with the same constructed equilibrium. In effect, he is in
equilibrium, but the boundary position imposed by a quantity constraint on
the labour market is not.

... A complete survey would outline a theory of the dynamic behavior of
economic units both in and out of equilibrium.

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VIII Conclusion

My original intention in writing this paper was simply to clarify the
basic formalism of the Keynesian revolution and its relation to
orthodox thought. This I think I have done. In a line, Keynesian
economics has current transactions into make theory which
traditional analysis explicitly leaves them out. Alternatively, we
may say that Keynesian economics is price theory without
Walras' law, and price theory with Walras' law is just a special
case of Keynesian economics. The bearing of my argument on the
Keynesian counter-revolution is correspondingly plain: contem-
porary general equilibrium theories can be maintained intact
only if we are willing to barter Keynes for orthodox.

This is not the end of the matter, for there is a choice to be
made. No one can deny that general equilibrium analysis, as
presently conceived, is a useful instrument for thinking about
abstract economic problems, and this would hardly be so if it did
not omit every realistic failing. The danger in using this instrument
to think about practical problems is that, having schooled
ourselves so thoroughly in the virtues of elegance simplicity, we
may refuse to recognize the crucial relevance of complications that do
not fit our theoretical preconceptions. As Keynes has put it, "The
difficulty lies, not in the new ideas, but in escaping from the old
ones, which rarely, for those brought up as much as we have been,
into every corner of our minds" (General Theory, p. viii).

I shall be the last to suggest that abstract theory is useless;
that simply is not the case. At the same time, I am convinced that
much of what now passes for useful theory is not only worthless econo-
(mics and mathematics), but also a positive hindrance to fruitful

23. It is a quite true, of course, that a proposition similar to Walras'
idea holds even in Keynesian economics. It defines the difference between
demand, sales and utility as not being determined by "money incomes".
But it is by no means clear that this is a necessary condition for it to remain
valid and meaningful. For instance, consider the following proposition:
A worker is given an exogenous wage. He is assumed to have a certain
amount of money, and he decides how much to buy. The consumer's}
constraint is of the form: utility = money - expenditure. The worker
will be satisfied if he is in equilibrium, but he will not necessarily be
justified in this assumption. The worker's utility function is unknown.

... A complete survey would outline a theory of the dynamic behavior of
economic units both in and out of equilibrium.
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theoretical and empirical research. Most importantly, however, I am impressed by the worth of Keynesian economics as a guide to practical action, which is in such sharp contrast to the situation of general price theory. As physicists should and would have rejected Einstein's theory of relativity, had it not included Newtonian mechanics as a special case, so we would do well to think twice before accepting as "useful" or "general", doctrines which are incapable of accommodating Keynesian economics.

References