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Source: *The American Economic Review,* Vol. 38, No. 4 (Sep., 1948), pp. 543-564
Published by: American Economic Association
Stable URL: https://www.jstor.org/stable/591
Accessed: 14-10-2019 16:52 UTC

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PRICE FLEXIBILITY AND FULL EMPLOYMENT*

By Don Patinkin

At the core of the Keynesian polemics of the past ten years and more is the relationship between price flexibility and full employment. The fundamental argument of Keynes is directed against the belief that price flexibility can be depended upon to generate full employment automatically. The defenders of the classical tradition, on the other hand, still insist upon this automaticity as a basic tenet.

During the years of continuous debate on this question, the issues at stake have been made more precise. At the same time, further material on the question of flexibility has become available. This paper is essentially an attempt to incorporate this new material, and, taking advantage of the perspective offered by time, to analyze the present state of the debate.

In Part I, the problem of price flexibility and full employment is presented from a completely static viewpoint. Part II then goes on to discuss the far more important dynamic aspects of the problem. Finally, in Part III, the implications of the discussion for the Keynesian-classical polemic are analyzed. It is shown that over the years these two camps have really come closer and closer together. It is argued that the basic issue separating them is the rapidity with which the economic system responds to price variations.

I. Static Analysis

1. The traditional interpretation of Keynesian economics is that it demonstrates the absence of an automatic mechanism assuring the equality of desired savings and investment at full employment. The graphical meaning of this interpretation is presented in a simplified form in Figure 1. Here desired real savings (S) and investment (I) are each assumed to depend only on the level of real income (Y). I_1, I_2, and I_3 represent three possible positions of the investment schedule. Y_0 is the full employment level of real income. If the investment desires of individuals are represented by the curve I_1, desired savings at full employment are greater than desired investment at full employment. This means that unemployment will result: the level of income will drop to Y_1, at which income desired savings and investment are equal.

Conversely, if I_3 is the investment curve, a situation of overemployment or inflation will occur: people desire to invest more at full employment than the amount of savings will permit. Only if the investment schedule happened to be I_2 would full employment desired investment and savings be equal. But since investment decisions are independent of savings decisions, there is no reason to expect the investment schedule to coincide with I_2. Hence there is no automatic assurance that full employment will result.
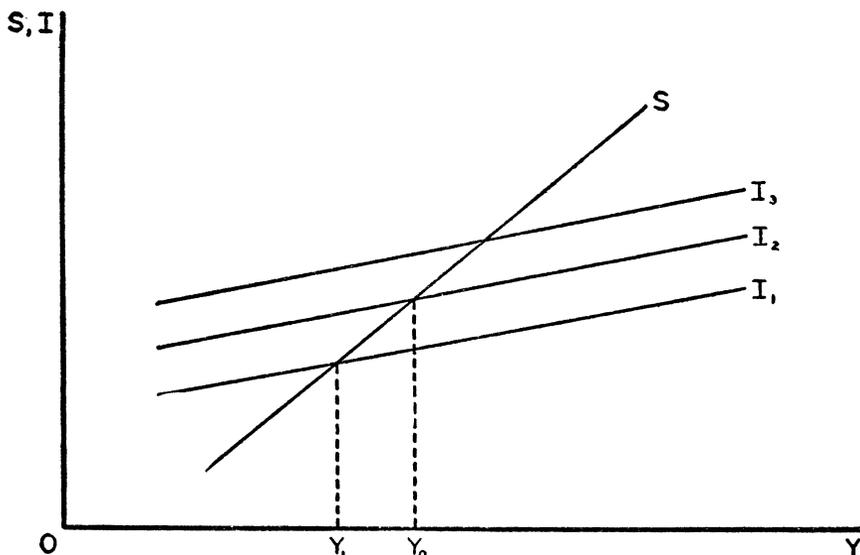
FIGURE 1

2. The classical answer to this attack is that desired savings and investment depend on the rate of interest, as well as the level of real income; and that, granted flexibility, variations in the interest rate serve as an automatic mechanism insuring full employment.

The argument can be interpreted as follows: the savings and investment functions (representing what people desire to do) are written as

$$S = \Omega \ (r, Y)$$
$$I = \Psi \ (r, Y)$$

where r represents the rate of interest.

Consider now Figure 2. On this graph there can be drawn a whole family of curves relating savings and investment to the rate of interest —one pair for each level of real income. In Figure 2, these pairs of curves are drawn for the full employment income, Y_0, and for the less than full employment income, Y_1. On the assumption that for a given rate of interest people will save and invest more at a higher level of

income, the investment curve corresponding to $Y = Y_0$ is drawn above that corresponding to $Y = Y_1$; similarly for the two savings curves. The curves also reflect the assumption that, for a given level of real income, people desire to save more and invest less at higher rates of interest.

Consider now the pair of curves corresponding to the full employment income Y_0. If in Figure 2 the interest rate were r_1, then it would be true that individuals would desire to save more at full employment than they would desire to invest. But, assuming no rigidities in the interest rate, this would present no difficulties. For if the interest rate
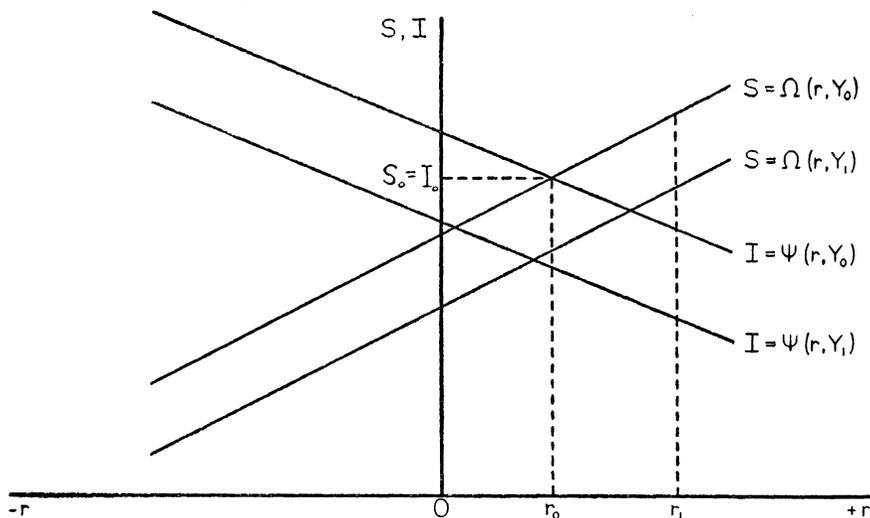
FIGURE 2

were to fall freely, savings would be discouraged, and investment stimulated until finally desired full employment savings and investment would be equated at the level $S_0 = I_0$. Similarly, if at full employment desired investment is greater than desired savings, a rise in the interest rate will prevent inflation. In this way variations in the rate of interest serve automatically to prevent any discrepancy between desired full employment investment and savings, and thus to assure full employment.

This argument can also be presented in terms of Figure 1: assume for simplicity that desired investment depends on the rate of interest as well as the level of real income, while desired savings depends only on the latter. Then downward variations in the interest rate can be counted on to raise the investment curve from, say, I_1 to I_2. That is, at any level of income people can be encouraged to invest more by a reduction in the rate of interest. Similarly, upward movements of the interest rate will shift the investment curve from, say, I_3 to I_2. Thus

desired full employment savings and investment will always be equated.

3. The Keynesian answer to this classical argument is that it greatly exaggerates the importance of the interest rate. Empirical evidence has accumulated in support of the hypothesis that variations in the rate of interest have little effect on the amount of desired investment. (That savings are insensitive to the interest rate is accepted even by the classical school.) This insensitivity has been interpreted as a reflection of the presence of widespread uncertainty.[1] The possible effect of this insensitivity on the ability of the system automatically to generate full employment is analyzed in Figure 3. For simplicity the savings functions corresponding to different levels of income are reproduced from Figure 2. But the investment functions are now represented as being much less interest-sensitive than those in Figure 2. If the situation in
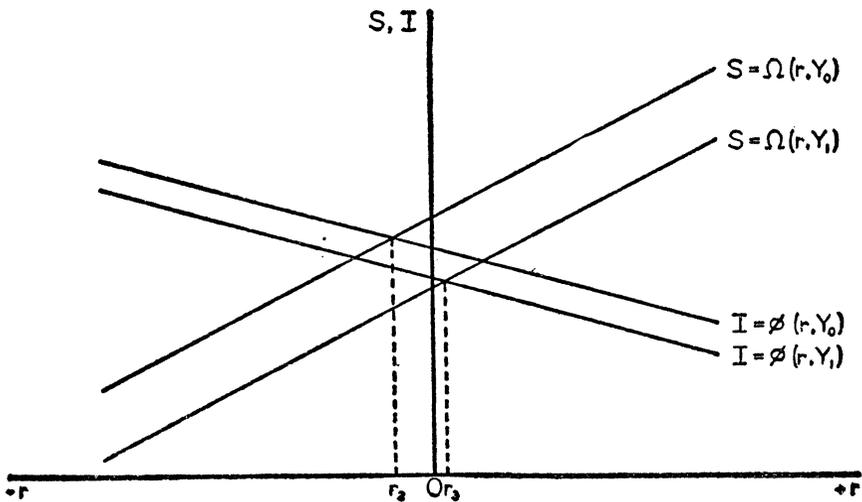
FIGURE 3

the real world were such as represented in Figure 3, it is clear that interest rate variations could never bring about full employment. For in an economy in which there are negligible costs of storing money, the interest rate can never be negative.[2] But from Figure 3 we see that the only way the interest rate can equate desired full employment savings and investment is by assuming the negative value r_2. Hence it is impossible for the full employment national income Y_0 to exist: for no

[1] Cf. Oscar Lange, Price Flexibility and Employment (Bloomington, Indiana, Principia Press, 1945) p. 85 and the literature cited there. For an excellent theoretical discussion of this insensitivity, cf. G. L. S. Shackle, "Interest Rates and the Pace of Investment," Econ. Jour., Vol. LVI (1946), pp. 1-17.

[2] Note that in a dynamic world of rising prices, the effective rate of interest may become negative. But even here the anticipated effective rate cannot be negative. For in that event there would again be an infinite demand for money.

matter what (positive) rate of interest may prevail, the amount people want to save at full employment exceeds what they want to invest. Instead there will exist some less than full employment income (say) Y_1 for which desired savings and investment can be brought into equality at a positive rate of interest, (say) r_3 (cf. Figure 3).

Thus once again the automaticity of the system is thrown into question. Whether the system will generate full employment depends on whether the full employment savings and investment functions intersect at a positive rate of interest. But there is no automatic mechanism to assure that the savings and investment functions will have the proper slopes and positions to bring about such an intersection.[3]

4. Sometimes attempts are made to defend the classical position by arguing that the investment function is really higher (or the savings function lower) than represented by the Keynesians—so that desired full employment savings and investment can be equated at a positive rate of interest (cf. Figure 3). But this is beside the point. The fundamental reason Keynesian economics, if correct, destroys the foundations of classical economics, is that it denies the automaticity of the full employment posited by the latter. Hence a successful restatement of the classical position must demonstrate the existence of some automatic mechanism which will always bring about full employment. Thus to argue that *if* the investment or saving function is at a certain level, full employment will be brought about is irrelevant; what must be shown is that there exist forces which will *automatically* bring the investment or saving functions to the required level. In other words, the issue at stake is not the *possible,* but the *automatic,* generation of full employment.

5. In recent years Pigou has made a noteworthy attempt to remedy this deficiency in the classical theory.[4] Just as the "classics" responded to the crude Keynesian argument of § 1 by introducing a new variable —the rate of interest—into the savings function, so Pigou counters the more refined Keynesian attack of § 3 by introducing yet another variable—the absolute price level. That is, Pigou's saving schedule is a function of three variables:

$$S = \Gamma\ (r,\ Y,\ p),$$

where p represents the absolute price level.

His argument is as follows: if people would refuse to save anything

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[3] This whole question of the contrast between the classical and the Keynesian position is discussed in much greater detail in a study which I hope to publish in the near future.

[4] A. C. Pigou, "The Classical Stationary State," *Econ. Jour.,* Vol. LIII (1943), pp. 343-51; "Economic Progress in a Stable Environment," *Economica,* n.s. XIV (1947), pp. 180-90. Although these articles deal only with a stationary state, their basic argument can readily be extended to the case in which net investment is taking place.

at negative and zero rates of interest, then the desired savings schedule
would intersect the desired investment schedule at a positive rate of
interest regardless of the level of income (cf. Figure 3). The willing-
ness to save even without receiving interest, or even at a cost, must
imply that savings are not made solely for the sake of future income
(i.e., interest) but also for "the desire for possession as such, con-
formity to tradition or custom and so on."[5] But the extent to which an
individual wishes to save out of current income for reasons other than
the desire of future income is inversely related to the real value of his
cash balances.[6] If this is sufficiently large, all his secondary desires for
saving will be fully satisfied. At this point the only reason he will con-
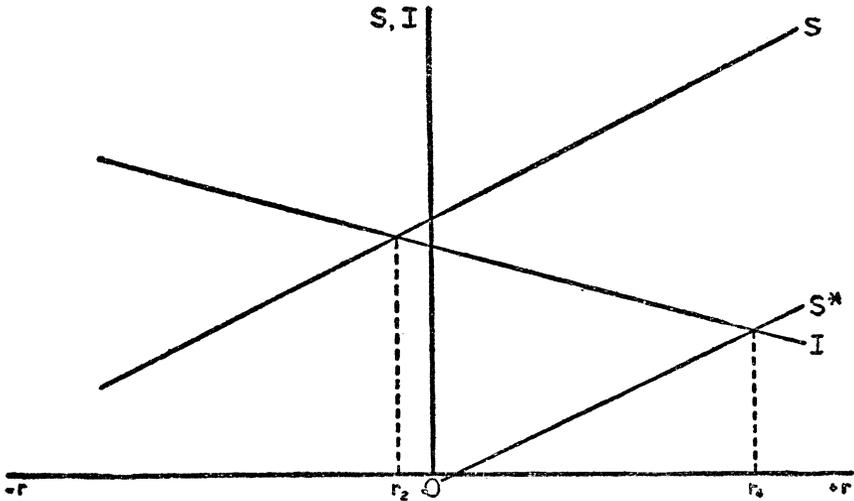
FIGURE 4

tinue to save out of current income is the primary one of anticipated
future interest payments. In other words, if the real value of cash
balances is sufficiently large, the savings function becomes zero at a
positive rate of interest, regardless of the income level.

A graphical interpretation of this argument is presented in Figure 4.
Here S and I are the full-employment savings and investment curves
of Figure 3 (i.e., those corresponding to $Y = Y_0$), and r_2 is again the
negative rate of interest at which they are equal. Pigou then argues
that by increasing the real value of cash balances, the full employment
savings curve shifts to the right until it is in such a position that no

[5] Ibid., p. 346.

[6] And all his other assets too. But the introduction of these other assets does not change
Pigou's argument; while concentration on money assets brings out its (the argument's)
basic aspect. Cf. below, § 6.

savings are desired except at positive rates of interest. This is repre-
sented by the savings curve S*, which becomes zero for a positive rate
of interest. (In fact, S* shows dissaving taking place for sufficiently low
rates of interest.) The full employment savings curve S* clearly inter-
sects the full employment investment curve I at the positive rate of
interest r_4. Thus by changing the real value of cash balances, desired
full employment savings and investment can always be equated at a
positive rate of interest.

How can we be sure that real cash balances will automatically change
in the required direction and magnitude? Here Pigou brings in his
assumptions of flexible wage and price levels, and a constant stock of
money in circulation. If full employment saving exceeds investment,
national income begins to fall, and unemployment results. If workers
react to this by decreasing their money wages, then the price level will
also begin to fall. As the latter continues to fall, the real value of the
constant stock of money increases correspondingly. Thus, as the price
level falls, the full employment saving function continuously shifts to
the right until it intersects the full employment investment function at
a positive rate of interest.[7]

This is the antomatic mechanism on which Pigou relies to assure
full employment. It is essential to notice that it will operate regardless
of the interest elasticity of the savings and investment functions—
provided it is not zero.

6. The inner mechanism and distinctive characteristic of the Pigou
analysis can be laid bare by considering it from a larger perspective.
It is obvious that a price reduction has a stimulating effect on creditors.
But, restricting ourselves to the private sector of a closed economy, to
every stimulated creditor there corresponds a discouraged debtor.
Hence from this viewpoint the net effect of a price reduction is likely
to be in the neighborhood of zero. The neatness of the Pigou approach
lies in its utilizing the fact that although the private sector considered
in isolation is, on balance, neither debtor nor creditor, when considered

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[7] The exact price level is determined when to our preceding four equations is added the
liquidity preference equation $M_0 = \Lambda (r, p, Y)$. We then have the complete system of five
equations in five variables:

$$I = \Phi (r, y)$$
$$S = \Gamma (r, p, Y)$$
$$I = S$$
$$Y = Y_0$$
$$M_0 = \Lambda (r, p, Y)$$

where M_0 represents the amount of money in the system. Under the Pigovian assumptions,
this system possesses a consistent solution.

As will be shown in the next section, the "stock of money" (M_0) which enters in the
last equation is completely different from the "stock of money" which is relevant for the
Pigou analysis of the savings equation.

in its relationship to the government, it *must be* a net "creditor." This is due to the fact that the private sector always holds money, which is a (non-interest bearing) "debt" of government. If we assume that government activity is not affected by the movements of the absolute price level,[8] then the net effect of a price decline must always be stimulatory.[9] The community gains at the "expense" of a gracious government, ready, willing, and able to bear the "loss" of the increased value of its "debt" to the public.

More precisely, not every price decline need have this stimulating effect. For we must consider the effect of the price decline on the other assets held by the individual. If the decline reduces the real value of these other assets (*e.g.,* houses and other forms of consumer capital; stock shares; etc.) to an extent more than offsetting the increased value of real cash balances,[10] then the net effect will be discouraging. But the important point is that no matter what our initial position, *there exists* a price level sufficiently low so that the total real value of assets corresponding to it is greater than the original real value. Consider the extreme case in which the value of the other assets becomes arbitrarily small.[11] Clearly even here the real value of the fixed stock of money can be made as large as desired by reducing the price level sufficiently. Thus, to be rigorous, the statement in the preceding paragraph should read: "There always exists a price decline such that its effect is stimulatory." From this and the analysis of the preceding section, we can derive another statement which succinctly summarizes the results of the Pigou analysis: "In the static classical model, regardless of the position of the investment schedule, there always exists a sufficiently low price level such that full employment is generated." In any event, it is clearly sufficient to concentrate (as Pigou has done) on cash balances alone.[12]

From the preceding analysis we can also see just exactly what constitutes the "cash balance" whose increase in real value provides the stimulatory effect of the Pigou analysis. This balance clearly consists

[8] Pigou makes this assumption when he writes the investment function (which presumably also includes government expenditure) as independent of the absolute price level. *Cf.* footnote 7 above.

[9] It must be emphasized that I am abstracting here from all dynamic considerations of the effect on anticipations, etc. These will be discussed in Part II of the paper.

[10] A necessary (but not sufficient) condition for this to occur is that the price level of assets falls in a greater proportion than the general price level.

[11] I am indebted to M. Friedman for this example.

[12] *Cf.* above, footnote 6. Another possible reason for Pigou's emphasis on cash balances to the exclusion of other assets is that the relative illiquidity of the latter makes them less likely to be used as a means of satisfying the "irrational" motives of saving. Hence the inverse relationship between other assets and savings out of current income might not be so straightforward as that between real cash balances and savings.

of the net obligation of the government to the private sector of the economy. That is, it consists of the sum of interest- and non-interest-bearing government debt held outside the treasury and central bank. Thus, by excluding demand deposits and including government interest-bearing debt, it differs completely from what is usually regarded as the stock of money.

These same conclusions can be reached through a somewhat different approach. Begin with the ordinary concept of the stock of money as consisting of hand-to-hand currency and demand deposits. Consider now what changes must be made in order to arrive at the figure relevant for the Pigou analysis. Clearly, government interest-bearing debt must be added, since a price decline increases its value. Now consider money in the form of demand deposits. To the extent that it is backed by bank loans and discounts, the gains of deposit holders are offset by the losses of bank debtors.[13] Thus the net effect of a price decline on demand deposits is reduced to its effect on the excess of deposits over loans, or (approximately) on the reserves of the banks held in the form of hand-to-hand currency. Finally, hand-to-hand currency held by individuals outside the banking system is added in, and we arrive at exactly the same figure as in the preceding paragraph.

For convenience denote the stock of money relevant for the Pigou analysis by M_1. Note that this is completely different from the M_0 of footnote 7: for M_0 is defined in the usual manner as hand-to-hand currency plus demand deposits. This distinction is of fundamental importance. One of its immediate implications is that open market operations affect the economic system only through the liquidity preference equation. Since these operations merely substitute one type of government debt (currency) for another (bonds), they have no effect on M_1, and hence no direct effect on the amount of savings. We shall return to this point later.

7. How does the Pigou formulation compare with the original classical theory?[14] Although both Pigou and the "classics" stress the importance of "price flexibility," they mean completely different things. The "classics" are talking about flexibility of *relative* prices; Pigou is talking about flexibility of *absolute* prices. The classical school holds

[13] *Cf.* M. Kalecki, "Professor Pigou on 'The Classical Stationary State'—A Comment," *Econ. Jour.*, Vol. LIV (1944), pp. 131-32.

[14] Pigou's system, of course, assigns to the absolute price level a major role; whereas the classical system depends only on relative prices. But this difference is due to the fact that they are really concerned with different questions, since the classical analysis abstracts completely from the problem of money.

The preceding comment raises some fundamental and very complicated issues which, being somewhat extraneous to the main purpose of this essay, cannot be discussed here. *Cf.* D. Patinkin, "Relative Prices, Say's Law, and the Demand for Money," *Econometrica*, Vol. XVI (1948), pp. 135-54.

that the existence of long-run unemployment is *prima facie* evidence of rigid wages. The only way to eliminate unemployment is, then, by reducing *real* wages. (Since workers can presumably accomplish this end by reducing their *money* wage, this position has implicit in it the assumption of a constant price level.)[15] Pigou now recognizes that changing the relative price of labor is not enough, and that the absolute price level itself must vary. In fact, a strict interpretation of Pigou's position would indicate that unemployment can be eliminated even if real wages remain the same or even rise (namely, if the proportionate fall in prices is greater than or equal to that of wages); for in any case the effect of increased real value of cash balances is still present.[16]

The Pigou analysis differs also from the more sophisticated interpretations of the classical position. These present the effect of a wage decrease as acting through the liquidity preference equation to increase the real value of M_0 and thereby reduce the rate of interest; this in turn stimulates both consumption and investment expenditures—thus generating a higher level of national income. To this effect, Pigou now adds the direct stimulus to consumption expenditures provided by the price decline and the accompanying increase in real balances. Consequently, even if the savings and investment functions are completely insensitive to changes in the rate of interest (so that the "classical" effect through the liquidity equation is completely inoperative), a wage decrease will still be stimulatory through its effect on real balances and hence on savings.

8. Before concluding this part of the paper, one more point must be clarified. The *explicit* assumption of the Pigou analysis is that savings are directly related to the price level, and therefore inversely related to the size of real cash balances. This assumption by itself is, on *a priori* grounds, quite reasonable; but it must be emphasized that it is insufficient to bring about the conclusion desired by Pigou; for this purpose he *implicitly* makes an additional, and possibly less reasonable, assumption. Specifically, in addition to postulating explicitly the *direction* of the relationship between savings and the price level, he also implies something about its *intensity*.

The force of this distinction is illustrated by Figure 5. Here S and I are the full employment savings and investment curves of Figure 3 (*i.e.*, those corresponding to $Y = Y_0$) for a fixed price level, p_0. The other savings curves, S_1, S_2, S_3, S_4, represent the full employment

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[15] Or at least one falling relatively less than wages.

[16] The role of real wages in Pigou's system is very ambiguous. At one point (p. 348, bottom) he assumes that reduced money wages will also decrease real wages. At another (p. 349, lines 20-38) no such assumption seems to be involved. ("As money wage-rates fall . . . prices fall and go on falling." *Ibid.*)

savings schedules corresponding to the different price levels p_1, p_2, p_3, p_4, respectively. In accordance with the Pigou assumption, as the price level falls, the savings function shifts over to the right. (That is p_1, p_2, p_3, p_4 are listed in descending order.) But it may well be that as the real value of their cash balances continues to increase, people are less and less affected by this increase. That is, for each successive increase in real balances (for each successive price level decline) the savings function moves less and less to the right, until eventually it might respond only infinitesimally, no matter how much prices fall. In graphical terms, as the price decline continues, the savings function might reach S_3 as a limiting position. That is, no matter how much the price level might fall, the savings function would never move to the right of S_3.[17] In such an event the declining price level would fail to bring about full employment. The validity of the Pigou argument thus depends on the additional assumption that the intensity of the inverse relationship between savings and real cash balances is such that it will be possible to shift over the savings function to a position where it will intercept the investment function at a positive rate of interest: say, S_4 (cf. Figure 5).

What is at issue here is the reaction of individuals with already large real balances to further increases in these balances. Consider an individual with a cash balance of a fixed number of dollars. As the price falls, the increased real value of these dollars must be allocated between the alternatives of an addition to either consumption and/or real balances.[18] How the individual will actually allocate the increase clearly depends on the relative marginal utilities of these two alternatives. If we are willing to assume that the marginal utility of cash balances approaches zero with sufficient rapidity relative to that of consumption, then we can ignore the possibility of the savings curve reaching a limiting position such as in Figure 5. That is, we would be maintaining the position that by increasing the individual's balances sufficiently, he will have no further incentive to add to these balances; hence he will

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[17] Mathematically this may be stated as follows. Write the savings function as
$$S = \Gamma(r, p, Y).$$
(Cf. footnote 7, above.) Pigou's explicit assumption is
$$\Gamma_p(r, p, Y) > 0$$
where Γ_p is the partial derivative of S with respect to p. Yet $Y = Y_0$ represent the full employment income. Then the argument here is that the savings function, Γ, may still be of a form such that
$$\lim_{p \to 0} \Gamma(r, p, Y_0) = \Gamma^*(r, Y_0)$$
for any fixed r—where Γ^* is any curve which intersects the investment curve at a negative rate of interest. (In the argument of the text, Γ^* is taken to be S_3 in Figure 5.) Pigou tacitly assumes that the savings function approaches no such limit; or that if it does, the limiting function intersects the investment function at a positive rate of interest.

[18] I am abstracting here from the possible third alternative, investment.

spend any additional real funds on consumption, so that we can make him consume any amount desired. If, on the other hand, we admit the possibility that, for sufficiently large consumption, the decrease in the marginal utility of cash balances is accompanied by a much faster decrease in the marginal utility of consumption, then the individual will continuously use most of the additional real funds (made available by the price decline) to add to his balances. In this event, the situation of Figure 5 may well occur.
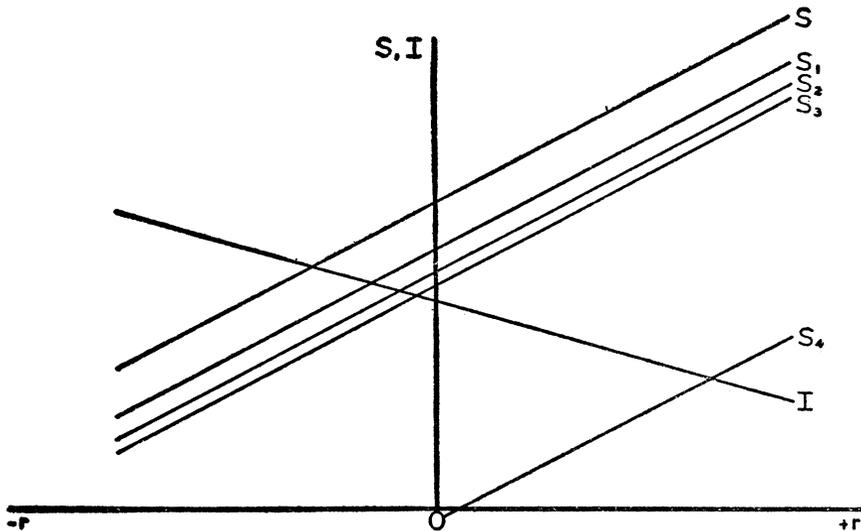
FIGURE 5

9. I do not believe we have sufficient evidence—either of an *a priori* or empirical[19] nature—to help us answer the question raised in the preceding paragraph. The empirical evidence available is consistent with the hypothesis that the effect of real balances on savings is very weak. But even granted the truth of this hypothesis, it casts no light on the question raised here. What we want to know is what happens to the effect of real balances on savings as these real balances increase in size. Even if the effect were arbitrarily small, but remained constant regardless of the size of real balances, there could be no convergence of savings functions like that pictured in Figure 5. In the face of this lack of evidence, we have to be satisfied with the conclusion that,

[19] Empirical studies on the effect of real balances on savings have been made by L. R. Klein, "The Use of Econometric Models as a Guide to Economic Policy," *Econometrica*, Vol. XV (1947), pp. 122-25. Klein's procedure was incorrect in that he used a series for M_0, instead of M_1 in fitting his equations (*cf.* last paragraph of § 6 above). However, another study, using the correct M_1 series, has been carried out by the writer in conjunction with Kenneth J. Arrow of the Cowles Commission. This study shows that the effect of cash balances on saving is at best very small.

subject to the provisos of the preceding section, Pigou has demonstrated the automaticity of full employment within the framework of the classical static model[20]—the main mechanism by which this is brought about being the effect of a price decline on cash balances.

The statement of this conclusion immediately raises the interesting question of how this set of forces, uncovered by Pigou, could have been overlooked by Keynesian economists, in general, and Keynes himself, in particular. Questions of this type can rarely be answered satisfactorily—and perhaps should not even be asked. Nevertheless, I think it is both possible and instructive to trace through the exact chain of errors in Keynes's reasoning which caused him to overlook these factors.

I submit the hypothesis that Keynes recognized the influence of assets on saving (consumption), but unfortunately thought of this influence only in terms of physical capital assets. This was his fundamental error.[21] From it immediately followed that in his main discussion of the (short-run) consumption function, where he assumed a *constant* stock of capital, the possible influence of assets was not (and could not) even be considered.[22] But as soon as Keynes discussed a period sufficiently long for noticeable capital growth, the influence of assets on savings was immediately recognized.[23] Even here Keynes could not come to the same conclusion as Pigou. For Keynes restricted himself to physical assets, and thus rightfully pointed out that it would be "an unlikely coincidence" that just the correct amount of assets should exist—*i.e.*, that amount which would push over the savings function to such a position where full employment could be generated. Compare this with the determinate process by which just exactly the "correct amount" of real cash balances is brought into existence in the Pigou analysis. (See above, § 5, paragraph 4.)

This exclusion of physical assets from the short-run consumption function was subconsciously extended to all kinds of assets. Here was the last link in the chain of errors. For later when Keynes began to examine the effects of increased real cash balances (brought about either by price declines or increases in the amount of money), he did not even consider their possible influence on consumption. Instead, he

[20] It must be re-emphasized that this conclusion holds only for static analysis. The modifications that must be introduced once dynamic factors enter are discussed in Part II.

[21] Note that there are really two distinct errors involved here. The first is the obvious one of the exclusion of monetary assets. The second is that what is relevant for the influence on saving is not the *physical* asset, but its *real* value in terms of some general price level.

[22] J. M. Keynes, *The General Theory of Employment, Interest, and Money* (New York, Harcourt, Brace, and Co., 1936), Chap. 8. See especially pp. 91-95, where Keynes considers the possible influence of other factors besides income on consumption, and does not even mention assets.

[23] *Ibid.*, p. 218, second paragraph.

concentrated exclusively on their tendency, through the liquidity func-
tion, to lower interest rates.[24] (*Cf.* above, § 7, last paragraph.)

Looking back on the nature of these errors, we cannot but be struck
by the irony that they should have emanated from the man who did
most to demonstrate the fundamental inseparability of the real and
monetary sectors of our economy.

II. *Dynamic Analysis: The Question of Policy*

10. The Pigou analysis discussed in Part I makes two contributions.
First, it uncovers a hitherto neglected set of forces at work—in its
analysis of the effect of a price decline on savings through its effect
on real balances. (For convenience this will be referred to as the Pigou
effect.) Secondly, it proceeds to draw the implications of this new set
of forces for static analysis, and summarizes its results in the following
theorem (*cf.* §§ 5 and 6): *There always exists a sufficiently low price
level such that, if expected to continue indefinitely,*[25] *it will generate
full employment.*[26] (For convenience this will be referred to as the
Pigou Theorem.) The purpose of this part of the paper is to accomplish
a third objective: *viz.*, to draw the implications of the Pigou effect for
dynamic analysis and policy formulation. It must be emphasized that
the Pigou Theorem tells us nothing about the dynamic and policy
aspects which interest us in this third objective. (This point is dis-
cussed in greater detail in § 12.)

Specifically, consider a full employment situation which is suddenly
terminated by a downswing in economic activity. The question I now
wish to examine is the usefulness of a policy which consists of main-
taining the stock of money constant, allowing the wage and price
levels to fall, and waiting for the resulting increase in real balances to
restore full employment.

At the outset it must be made clear that the above policy recomen-
dation is *not* to be attributed to Pigou. His interest is purely an intel-
lectual one, in a purely static analysis. As he himself writes: ". . . The
puzzles we have been considering . . . are academic exercises, of some
slight use perhaps for clarifying thought, but with very little chance
of ever being posed on the chequer board of actual life."[27]

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[24] *Ibid.*, pp. 231-34, 266. The following passage is especially interesting: "It is, therefore,
on the effect of a falling wage- and price-level on the *demand for money* that those who
believe in the self-adjusting quality of the economic system must rest the weight of their
argument; though I am not aware that they have done so. If the quantity of money is
itself a function of the wage- and price-level, there is, indeed, nothing to hope for in this
direction. But if the quantity of money is virtually fixed, it is evident that its quantity in
terms of wage-units can be indefinitely increased by a sufficient reduction in money
wages. . . ." (*Ibid.*, p. 266. Italics not in original.)

[25] This qualifying phrase incorporates in it the restriction of the Pigou argument to static
analysis.

[26] I ignore here, as I do throughout the remainder of the paper, the difficulties raised in § 8.

[27] "Economic Progress in a Stable Environment," *Economica*, n.s. XIV (1947), p. 188.

In reality, Pigou's disavowal of a deflationary policy (contained in the paragraph from which the above quotation is taken) is not nearly as thoroughgoing as might appear on the first reading. The rejection of a price decline as a practical means of combatting unemployment may be due to: (a) the conviction that dynamic considerations invalidate its use as an immediate policy, regardless of its merits in static analysis; (b) the conviction that industrial and labor groups, sometimes with the assistance of government, prevent the price flexibility necessary for the success of a deflationary policy. A careful reading of Pigou's disclaimer indicates that he had only the second of these alternatives in mind; *i.e.*, that he felt that the policy would not work because it would not be permitted to work. What I hope to establish in this part of the essay is the first alternative: namely, that even granted full flexibility of prices, it is still highly possible that a deflationary policy will not work, due to the dynamic factors involved.

Nevertheless, nothing in this part of the paper is intended (or even relevant) as a criticism of Pigou, since the latter has clearly abstained from the problem of policy formulation. If sometimes the terms "Pigou effect" and "Pigou Theorem" are used in the following discussion, they should be understood solely as shorthand notations for the concepts previously explained.

11. The analysis of this section is based on the following two assumptions: (a) One of the prerequisites of a successful anti-depression policy is that it should be able to achieve its objective rapidly (say, within a year). (b) Prices cannot fall instantaneously; hence, the larger the price level fall necessary to bring about full employment *via* the Pigou effect, the longer the time necessary for the carrying out of the policy. (If no price fall can bring about full employment, then we can say that an infinite amount of time is necessary for the carrying out of the policy.)

There are at least two factors which act toward lengthening the period necessary to carry out a policy based on the Pigou effect. (It should be noted that none of these difficulties arises when the discussion is restricted to static analysis.) The first is the possibility that the effect of an increase in cash balances on consumption is so small, that very large increases (very great price declines) will be necessary. Certainly the burden of proof lies on those supporting a policy of absolute price flexibility to show that the economic system is sufficiently responsive to make the policy practical. So far, no one has presented the required evidence. On the contrary, whatever evidence exists indicates that the dependence of savings on cash balances is much too weak to be of any practical use (*cf.* above, footnote 19).

The second factor is a result of the price decline itself. In dynamic analysis we must give full attention to the role played by price expectations and anticipations in general. It is quite possible that the original

price decline will lead to the expectation of further declines. Then purchasing decisions will be postponed, aggregate demand will fall off, and the amount of unemployment increased still more. In terms of Figures 1 and 3, the savings function will rise (consumption will be decreased) and the investment function fall, further aggravating the problem of achieving full employment. This was the point on which Keynes was so insistent.[28] Furthermore, the uncertainty about the future generated by the price decline will increase the liquidity preference of individuals. Thus if we consider an individual possessing a fixed number of dollars, and confronted with a price decline which increases the real value of these dollars, his uncertainty will make him more inclined to employ these additional real funds to increase his real balances, than to increase his expenditures.[29] In other words, the uncertainty created by the price decline might cause people to accumulate indefinitely large real cash balances, and to increase their expenditures very little, if at all.

The simultaneous interaction of this last factor with the first one will further exacerbate these difficulties. For as the period of price decline drags itself out, anticipations for the future will progressively worsen, and uncertainties further increase. The end result of letting the Pigou effect work itself out may be a disastrous deflationary spiral, continuing for several years without ever reaching any equilibrium position. Certainly our past experiences should have sensitized us to this danger.

Because of these considerations I feel that it is impractical to depend upon the Pigou effect as a means of policy: the required price decline might be either too large (factor one), or it might be the initial step of an indefinite deflationary spiral (factor two).

On this issue, it may be interesting to investigate the experience of the United States in the 1930's. In Table I, net balances are computed for the period 1929-32 according to the definition in § 6. As can be seen, although there was an 18 per cent *increase* in real balances from 1930 to 1931, real national income during this period *decreased* by 13 per cent. Even in the following year, when a further increase of 24 per cent in real balances took place, real income proceeded to fall by an additional 18 per cent. For the 1929-1932 period as a whole there was an increase in real balances of 38 per cent, and a decrease in real income of 40 per cent.

It will, of course, be objected that these data reflect the presence of "special factors," and do not indicate the real value of the Pigou effect. But the pertinent question which immediately arises is: To what extent

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[28] See his discussion of changes in money wages, *op. cit.*, pp. 260-69, especially p. 263. *Cf.* also J. R. Hicks, *Value and Capital* (Oxford, Oxford University Press, 1939), and O. Lange, *op. cit.*

[29] *Cf.* above, § 8, last paragraph.

were these "special factors" necessary, concomitant results of the price decline itself! If the general feeling of uncertainty and adverse anticipations that marked the period is cited as one of these "special factors," the direct relationship between this and the decline in price level itself certainly cannot be overlooked. Other proposed "special factors" must be subjected to the same type of examination. The data of the precedding table are not offered as conclusive evidence. But they are certainly consistent with the previously stated hypothesis of the impracticability of using the Pigou effect as a means of policy; and they

TABLE I

Year	Money in Circulation (1)[a]	Government Debt (2)[b]	Net Balance of Individuals (3)[c]	Cost of Living Index (4)[d]	Net Real Balances of Individuals (5)[e]	Real National Income (6)[f]
1929	4.5	15.5	20.0	1.22	16.4	89.9
1930	4.2	14.3	18.5	1.19	15.5	76.3
1931	4.5	15.4	19.9	1.09	18.3	66.3
1932	5.4	16.8	22.2	.98	22.7	54.2

[a] Money in circulation as of June 30 outside the Treasury and Federal Reserve Banks, in billions of current dollars, *Banking and Monetary Statistics*, p. 408.

[b] Government interest bearing debt as of June 30, held outside government agencies and the Federal Reserve Bank, in billions of current dollars. *Ibid.*, p. 512.

[c] $(3) = (1) + (2)$

[d] Bureau of Labor Statistics, cost of living index, *Survey of Current Business*, Supplement, 1942, p. 16.

[e] $(5) = (3) \div (4)$

[f] National income in billions of 1944 dollars. J. Dewhurst and Associates, *America's Needs and Resources* (New York, The Twentieth Century Fund, 1947), p. 697.

certainly throw the burden of proof on those who argue for its practicality.

12. The argument of the preceding section requires further explanation on at least one point. In the discussion of the "second factor" there was mentioned the possibility of an indefinitely continuing spiral of deflation and unemployment. But what is the relation between this possibility and the Pigou Theorem (*cf.* § 10) established in Part I? The answer to this question may be expressed as follows:

On the downswing of the business cycle it might be interesting to know that there exists a sufficiently low price level which, if it were expected to continue existing indefinitely, would bring about full employment. Interesting, but, for policy purposes, irrelevant. For due to perverse price expectations and the dynamics of deflationary spirals, it is impossible to reach (or, once having reached, to remain at) such a position.

The implication of these remarks can be clarified by consideration of the cobweb theorem for the divergent case. Assume that a certain

market can be explained in terms of the cobweb theorem. It is desired
to know whether (assuming unchanged demand and supply curves) the
designated market will ever reach a stationary position; that is,
whether it will settle down to a unique price that will continue indefi-
nitely to clear the market. This question is clearly divided into two
parts: (a) does there exist such a price, and (b) if it does exist, will the
market be able to attain it. In the case of the cobweb presented in
Figure 6 it is clear that such a price does exist. For if the price p_0
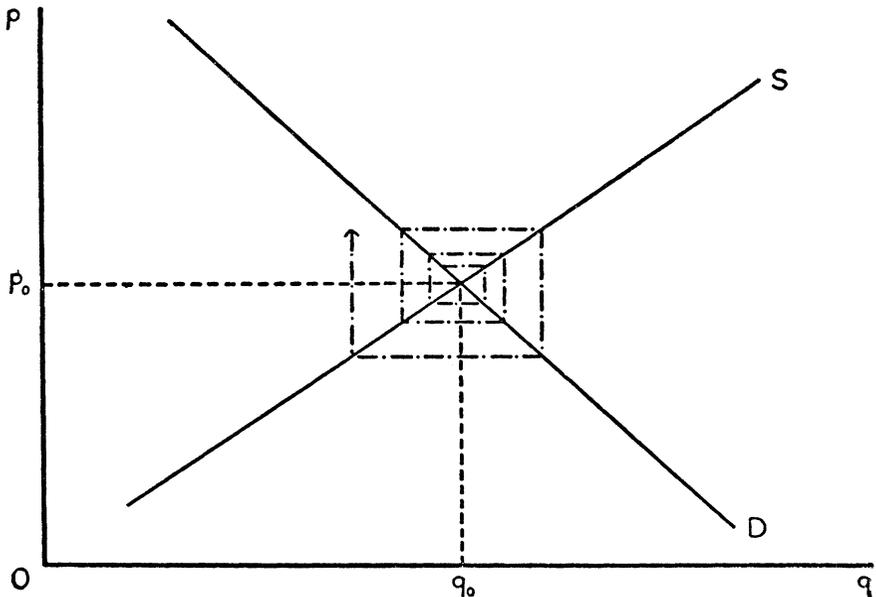
FIGURE 6

had always existed and were expected to exist indefinitely, it would
continuously clear the market. But Figure 6 represents the case of a
divergent cobweb; hence the market will never be able to reach the
price p_0. In brief, even though p_0 exists, it is irrelevant to the workings
of the market. The analogy to the argument of the preceding paragraph
is obvious.[30]

III. Conclusions

13. The conclusions of this paper can be summarized as follows:

[30] The distinction of this section can be expressed in rigorous mathematical form using
the dynamic system which has become familiar through the work of Samuelson and Lange
(P. A. Samuelson, "The Stability of Equilibrium: Comparative Statics and Dynamics,"
Econometrica, Vol. IX [1941], pp. 97-120. Lange, *op. cit.*, pp. 91 ff.) Consider a single
market and let D, S, and p represent the demand, supply and price of the particular good,
respectively. Let t represent time. Then we can write this system as

in a static world with a constant stock of money,[31] price flexibility
assures full employment. (I abstract here again from the difficulties
raised in § 8.) But in the real dynamic world in which we live, price
flexibility with a constant stock of money might generate full employ-
ment only after a long period; or might even lead to a deflationary
spiral of continuous unemployment. On either of these grounds, a full
employment policy based on a constant stock of money and price flexi-
bility does not seem to be very promising.

All that this means is that our full employment policy cannot be
the fairly simple one of maintaining a constant stock of money and
waiting for the economic system to generate full employment auto-
matically through price declines. Other policies will be required. One
possible alternative policy can be inferred from the Pigou analysis
itself: there are two ways to increase real balances. One is to keep
the money stock constant and permit prices to fall. An equally effec-
tive way is to maintain the price level constant, and increase the stock
of money by creating a government deficit.[32] This method of increasing
real balances has the added advantage of avoiding one of the difficulties
encountered previously (§ 11), for a policy of stabilizing the price

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(a) $D = f(p)$ demand function

(b) $S = g(p)$ supply function

(c) $\dfrac{dp}{dt} = h(D\text{-}S)$ market adjusting function

The last equation has the property that

(d) $\text{sign} \dfrac{dp}{dt} = \text{sign } (D\text{-}S)$

i.e., price rises with excess demand and falls with excess supply. Consider now the static
system identical with (a) — (c), except that it replaces (c) by

(e) $D = S$

As long as (e) is not satisfied, we see from (d) that the system will not be in stationary
equilibrium, but will continue to fluctuate. Thus the existence of a solution to the static
system (a), (b), (e) (*i.e.*, the consistency of (a), (b), (e) is a *necessary* condition for
the existence of a stationary solution for the dynamic system (a), (b), (c). But this is not
a sufficient condition. For the static system (a), (b), (e) may have a consistent solution
which, if the dynamic system is not convergent, will never be reached.

Thus Pigou has completed only half the task. Setting aside the difficulties of § 8, we can
accept his proof of the *consistency* of the *static* classical system. But that still leaves com-
pletely unanswered the question of whether the classical *dynamic* system will converge to
this consistent solution. In this and the preceding section I have tried to show why such
convergence may not occur in the real world. (I have discussed these issues in greater
detail elsewhere. *Cf.* footnote 3, above.)

[31] Throughout Part III, unless otherwise indicated, "stock of money" is to be understood
in the M_1 sense of the last paragraph of § 6.

[32] Considered from this perspective, the Pigou analysis presents in a rigorous fashion part
of the theoretical framework implicit in the fiscal-monetary policy of the Simons-Mints
position. *Cf.* the recently published collection of essays of Henry C. Simons, *Economic
Policy for a Free Society* (University of Chicago Press, Chicago, 1948); and Lloyd W.
Mints, "Monetary Policy," *Rev. Econ. Stat.*, Vol. XXVIII (1946), pp. 60-69.

level by increasing money stocks avoids some of the dangers of un-
certainty and adverse anticipation accompanying general price de-
clines. Nevertheless, there still remains the other difficulty—that indi-
viduals may not be very sensitive to increases in real balances. If this
turned out to be true, we would have to seek still other policies.

14. We have come a long way from the crude Keynesian model of § 1.
And now we can re-examine that question which has been the favorite
of economists these past few years: what is the distinctive character-
istic of Keynesian analysis? It certainly cannot be the claim to have
demonstrated the possibility of the coexistence of underemployment
equilibrium and flexible prices. This, in its day, served well as a rallying
cry. But now it should be definitely recognized that this is an inde-
fensible position. For flexibility means that the money wage falls with
excess supply, and rises with excess demand; and equilibrium means
that the system can continue on through time without change. Hence,
by definition, a system with price flexibility cannot be in equilibrium
if there is any unemployment.[33]

Nor should Keynesian economics be interpreted as asserting that
just as an underemployment equilibrium is impossible, so, too, in a
static system may a full-employment equilibrium be impossible. That
is, the static system may be at neither an underemployment equi-
librium, nor a full-employment equilibrium. In other words, the static
system may be inconsistent. (This is the negative interest rate argu-
ment of § 3.) For Pigou's discussion of the effect of a declining price
level on real balances shows how this inconsistency is removed. It is, of
course, still possible to maintain this interpretation of Keynes on the
basis of the argument of § 8. But I think this is neither necessary nor
advisable. For the real significance of the Keynesian contribution can
be realized only within the framework of *dynamic* economics. Whether

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[33] This can be expressed mathematically in the following way: let N^S and N^D be the
amounts of labor supplied and demanded, respectively; w, the money wage rate; and t,
time. Then a flexible dynamic system will, by definition, contain an equation of the gen-
eral type

$$\frac{dw}{dt} = f(N^D - N^S)$$

where

$$\text{sign} \frac{dw}{dt} = \text{sign} (N^D - N^S).$$

If by equilibrium is meant a situation such that

$$\frac{dw}{dt} = 0$$

then clearly this system cannot be in equilibrium unless

$$N^D - N^S = 0$$

i.e., unless there is full employment.

or not an underemployment equilibrium exists; whether or not full employment equilibrium always will be generated in a static system— all this is irrelevant. The fundamental issue raised by Keynesian eco- nomics is the *stability of the dynamic system:* its ability to return automatically to a full-employment equilibrium within a reasonable time (say, a year) if it is subjected to the customary shocks and dis- turbances of a peacetime economy. In other words, what Keynesian economics claims is that the economic system may be in a position of underemployment *dis*equilibrium (in the sense that wages, prices, and the amount of unemployment are continuously changing over time) for long, or even indefinite, periods of time.

But this is not sufficient to characterize the Keynesians. Everyone agrees that there exist dynamic systems which will not automatically generate full employment. What distinguishes one economic school from the other is the system (or systems) to which this lack of automaticity is attributed. If the Keynesian message is applied to an economic system with no monetary policy (if such a thing is possible to define), then it is purely trivial. For few would claim automaticity of full employment for such a system. Keynesian theory acquires meaning only when applied to systems with more intelligent monetary policies. Here an element of arbitrariness is introduced; for what is termed "Keynesian" depends entirely on the choice of the monetary policy to be used as a criterion.

On the basis of Keynes' writings, I believe it is clear that he was primarily interested in attacking the policy of assuring full employment by manipulation of the interest rate through open market operations.[34] But to Keynes, this policy was equivalent to one of wage flexibility;[35] increase the real value of the stock of money (in the M_0, not M_1, sense; *cf.* above, last paragraph of § 6) and thereby decrease the rate of for (he erroneously thought) the only effect of a wage decline was to interest—just as in open market operations. As we have pointed out above (end of §§ 6 and 7), these policies are really not equivalent. For open market operations change only M_0, whereas a wage and price decline change the real value of M_1 as well. Hence, open market opera- tions act only through the liquidity preference equation, whereas a policy of price flexibility acts also through the savings function (*cf.* above, footnote 7 and end of § 6).

Let us now assume that even if Keynes had recognized the distinc- tion between open market and wage flexibility policies (*i.e.*, if he had

[31] *Cf.* Keynes, *op. cit.*, pp. 231-34; 266-67.

[35] "There is, therefore, no ground for the belief that a flexible wage policy is capable of maintaining a state of continuous full employment;—any more than for the belief that an open market monetary policy is capable, unaided, of achieving this result. The economic system cannot be made self-adjusting along these lines." (*Ibid.*, p. 267.)

recognized the Pigou effect) he still would have continued to reject the latter as a means of assuring full employment. This is not an unreasonable assumption; for the objections cited above (§ 11) against the use of a policy based on the Pigou effect, are the very same ones that Keynes uses in arguing against open market operations.[36]

Granted this assumption, I believe it is useful to identify the Keynesian position against one which maintains that full employment can be automatically achieved *via* the Pigou effect by maintaining a constant stock of money, and providing for wage and price flexibility. It is now possible to delineate three distinct theoretical formulations of the Keynesian position—differing in varying degrees from the classical one: (a) Most opposed to the classical position is the Keynesian one which states that even if there were no problem of uncertainty and adverse anticipations (that is, even if there were a static system), and even if we were to allow an infinite amount of time for adjustment, a policy of price flexibility would still not assure the generation of full employment. (This is the negative interest rate argument of §§ 3 and 8.) (b) Then there is the position which states that, in a static world, price flexibility would always assure full employment. But in a dynamic world of uncertainty and adverse anticipations, even if we were to allow an infinite adjustment period, there is no certainty that full employment will be generated. That is, we may remain indefinitely in a position of underemployment disequilibrium. (c) Finally, there is the Keynesian position, closest to the "classics," which states that even with uncertainty full employment would eventually be generated by a policy of price flexibility; but the length of time that might be necessary for the adjustment makes the policy impractical. The ease with which each of these three positions can be defended is inversely related to its distance from the classical position.

Although these positions are quite distinct theoretically, their policy implications are very similar. (In what way would the policies of a man advocating position (a) differ from those of a man advocating (c) and stating that the adjustment would take ten years?) The policies would in general be directed at influencing the consumption and investment functions themselves, in addition to manipulating the amount of money. Thus the policies may advocate tax reductions to stimulate consumption and investment (the Simons-Mints school); or may insist on direct government investment to supplement private investment (Hansen, *et al.*). In this way we could cross-classify Keynesian positions according to their advocated policies, as well as their theoretical foundations.

[36] *Cf.* the passages cited in footnote 34, above.