REAL AND MONETARY FACTORS IN THE DETERMINATION OF EMPLOYMENT LEVELS

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Two opposite views of the respective roles of the "real" and "monetary" factors in the economic system as a whole have been taken in the literature.[1] The first view, which we may call the "Classical" view, holds that it is possible to separate these two sets of factors entirely, and to show that, provided prices and wages are both flexible, the monetary factors (i.e. the quantity of money in the system and the liquidity preference schedule) will serve merely to determine the absolute price and wage level, and whatever that level is, the real situation will be unaffected, *except that* the real value of the cash balances held by the community will be higher or lower. Such differences in the level of the real cash balances correspond to differences in the position of the liquidity preference schedule. According to this view, the amount of money in the system, or the liquidity preference schedule in relation to that amount, will affect the real factors in the system (the volume of employment, the interest rate, the real wage rate, and real saving and investment) only when money wage rates[2] are fixed from outside (e.g. by collective wage contracts); for in that event the absolute price level helps to determine the level of real income, etc., which is compatible with the fixed money wage level.

The second view, which grew out of the *General Theory*, holds that it is not possible to make a complete separation between the real and the monetary factors;[3] that in no circumstance is it true that the

1. The role of real and monetary factors in the determination of the interest rate has recently been reconsidered by Lloyd A. Metzler, "Wealth, Saving and the Rate of Interest," *Journal of Political Economy*, April 1951, pp. 93–116.

2. And/or commodity prices if they are kept rigid by certain types of monopoly policy.

3. The tenability of the dichotomy made by the Classics has been much discussed in the last few years. A bibliography of the discussion can be found in two of the most recent contributions: Don Patinkin, "The Invalidity of Classical Monetary Theory," and Karl Brunner, "Inconsistency and Indeterminacy in Classical Economics," both in *Econometrica*, April 1951.

rate of interest, the real levels of income, saving, investment, and the wage rate are determined by real savings and investment functions and a real productivity function which can be isolated from the monetary factors. The amount of money and the position of the liquidity preference schedule are, according to this view, never immaterial.[4]

We shall argue here that, while the second view as usually formulated has erred in the direction of ignoring or underestimating the role of price and wage adjustments, the first view neglects factors of another order, associated with the influence of the existing stock of assets, and of the existing debt liabilities of the system. In making our reappraisal of the two views we shall use the system of simultaneous equations which, in some form or other, underlies most of the discussion. We shall provisionally take over, with a few changes, the system used by Modigliani.[5] This system, as will become clear later, *assumes* that the Classical dichotomy between the real and monetary factors is valid.

I. The Role of Monetary Factors under Three Forms of Wage Policy

A. *The case of perfect competition in the product market*

We follow the practice of dividing the demand for cash in the system into two parts. The first is the balances held for the "transactions purpose." These have an average income velocity that is independent of the interest rate, and depends on the habits of payment, etc., which we assume constant; if we take our unit period as equivalent to one income period, we may take the velocity as being equal to unity. The second are the balances held for the "speculative and precautionary motives," which have a velocity of zero. Our liquidity preference function refers only to this second part, i.e. to the "inactive" balances. An alternative treatment would, of course, have been to include all cash in one category, in which case the average income velocity of the whole stock would have appeared as a variable depending directly on the interest rate.

The symbols used are the following: M_1 represents the "inactive" cash balances, M_2 the "transactions" or "active" balances, V the (constant) income velocity of the latter, and M the total volume of

4. In its extreme form, which we shall not attempt to argue here, this view goes so far as to hold that the rate of interest depends exclusively on the amount of money and the liquidity preference schedule.

5. Cf. F. Modigliani, "Liquidity Preference and the Theory of Interest and Money," *Econometrica* 1944, pp. 45–88, reprinted in *Readings in Monetary Theory* (Blakiston, 1951). Although a number of variants of this system have appeared in the literature, the differences are mostly immaterial for our argument. An important variation will, however, be treated in Sections II and III.

money (currency plus commercial bank deposits) in the system. We assume provisionally that M is constant, and that the commercial banks are always fully "lent up."[6] P represents the commodity price level, and r the rate of interest. We assume that price (and interest rate) expectations are "static," i.e. that the prices established in the current period are expected to continue over future periods, and, for the present, we assume also that expectations are single-valued.[7] Y, I, S, and C represent income, investment, saving and consumption respectively, all in "real" terms. Finally W represents the real wage rate, $\bar{w}$ the money wage rate, and N the number of employed.

Then, using the division made by the Classical view, we have three *monetary* equations as follows:

$$M_1 = L(r,Y,P) \quad (1)[8]$$
$$M_2V = YP \quad (2)$$
$$M_1 + M_2 = M \text{ (constant)} \quad (3)$$

Further we have the following *real* equations (or identities):

$$I = \psi(r,C) \quad (4)$$
$$S = \phi(r,Y) \quad (5)$$
$$S = I \quad (6)$$
$$S \equiv Y-C \quad (7)$$
$$Y = f(N) \quad (8)$$
$$W = f'(N) \quad (9)[9]$$

and our final equation may be real or monetary, taking one of three alternative forms:

$$N = T \text{ (constant) [or } N = F(W)] \quad (10a)$$

which is a non-monetary equation; in which case W is determined from the equations $W = f'(N)$ and $N = T$ [or $N = F(W)$], *or*

$$WP = \bar{w} \text{ (constant)} \quad (10b)$$

6. The conditions under which this assumption has to be modified are examined below (p. 270).

7. Under static single-valued expectations about prices and interest rates, the demand for liquidity in the sense defined above would doubtless be small since, so long as the interest rate is positive, the demand is connected primarily with dynamic or at least multi-valued expectations. Our present simplifying assumptions about expectations are made in order to facilitate the exposition of the first part of our argument which would not be essentially different if we were to assume multi-valued and dynamic expectations.

8. Y is an index of total physical output. We neglect the index number problem associated with the summation of consumption and investment goods in varying proportions.

9. For simplicity we neglect investment in goods in process (circulating capital): the only investment we consider is in durable equipment. We therefore equate the real wage with the marginal product undiscounted.

which is a monetary equation (i.e. it is dependent on the price level); in which case N is determined from the equation $\bar{w}$ (constant) $= f'(N)P$, *or*

$$W = Z \text{ (constant)} \tag{10c}$$

which is again a non-monetary equation; in which case N is determined from the equation Z (constant) $= f'(N)$.

The unknowns in the system are $r, Y, S, I, C, P, W, N, M_1, M_2$.

We make the customary assumptions about the shapes of the various functions. We should perhaps call attention, however, to the following points. The form of equation (9) used above assumes perfect competition in the product market, which implies that, in order for the stability conditions for the individual firm to be satisfied, $f'(N)$ must be decreasing with increases in N. The case of imperfect competition in the product market will be treated later. As regards the shape of the liquidity preference function, we exclude the case, envisaged by Keynes, where the demand for cash becomes infinite at a rate of interest considerably above zero, thus establishing this rate as a minimum level below which the rate of interest cannot fall.[1] As regards the shapes of the I and S functions, we assume that I is a decreasing function of r and an increasing function of C, and that S is an increasing function of both r and Y; or, more generally, that the functions relating I and S respectively to r, at various real income levels, are so shaped relatively to each other that equality between I and S can always be obtained at a positive value for r no matter what the level of real income is. This means that we exclude the circumstances out of which so-called "secular stagnation" is supposed to arise. The case where the I and S functions are so shaped that, at high levels of employment and real income, they would give equality between I and S only at negative values for r (and such values cannot exist because, so long as the cost of storing cash is negligible, r cannot fall below zero), has been critically examined in detail by Pigou.[2] He has pointed to other factors of which the functions as set out above fail to take account, and which will generally suffice to make saving cease at a positive rate of interest so that saving can still be brought to equality with investment at full employment income.[3] It is

1. The case is in fact hardly conceivable under static expectations.

2. This case forms the basic assumption underlying some of the recent literature. Cf., for example, Laurence Klein, *The Keynesian Revolution* (New York, 1947), pp. 76ff.

3. The factors are primarily two: (a) the tendency for consumption to increase (saving to decrease) as the stock of real assets (including the real value of cash balances) increases relative to consumption, and (b) the tendency for the supply of labor to decrease (the desire for leisure to increase) as the stock of real assets increases. Cf. A. C. Pigou, *Employment and Equilibrium* (2d ed.; 1949),

sufficient to refer the reader to Pigou's analysis of this case. We may also note in passing a point to which we shall make frequent reference in the following sections, namely that the saving (= investment) which takes place in the current period raises the level of the real income function ($f(N)$), and of the marginal productivity function ($f'(N)$), of future periods.

Our main concern in this section is with the alternative forms of the last equation (10), or what we may call the wage policy equation. Only the first two forms of this equation have generally been considered in the literature. Following Keynes, the second form came to be regarded as the one that was most relevant to modern conditions of wage determination through collective bargaining. It is, however, becoming increasingly apparent from the rapid spread in many countries of wage contracts which tie money wage rates to the price level (cost of living index) that the third form is the one which we must seriously consider as being relevant for practical purposes today.

On the basis of our system of equations, three possible situations (corresponding to the three different forms of equation (10) or, that is, of wage policy) present themselves:

The *first* situation is that where "thorough-going competition among wage-earners" prevails. Here the real equations (4) to (9) and (10a) will determine all the real unknowns, in particular the real income, Y, and the interest rate, r; and, given this interest rate, the monetary equations (1) to (3) will determine the price level, P.

It is, of course, implied here and in what follows that the whole set of equations is solved simultaneously, i.e. that all the quantities and prices are determined at once (as in a "Walrasian market"). In practice, of course, there are bound to be time lags in the adjustment process. Thus, for example, even when this "Classical" case of no interdependence between the monetary and real equations and perfect flexibility of wages and prices prevails, an increase in the quantity of money will in the first instance, assuming (say) that the new money

Part II, chap. IX; and "Economic Progress in a Stable Environment," *Economica*, 1947, pp. 180–90, reprinted in *Readings in Monetary Theory* (Blakiston, 1951). Cf. also Don Patinkin "Price Flexibility and Full Employment," *American Economic Review*, 1948, pp. 543–64 (also reprinted in *Readings in Monetary Theory*). The first factor has been further analysed by Lloyd A. Metzler, *op. cit.* The latter also gives references to earlier treatments of the connection between wealth and savings by Haberler and Scitovsky. Cf. also Gardner Ackley, "The Wealth-Saving Relationship," *Journal of Political Economy*, April 1951, pp. 154–61.

We shall argue below (p. 263f.) that the first of the two factors mentioned has to be introduced into the system of equations if the latter is to be consistent with economic logic.

enters the system via the capital market,[4] exert a downward pressure on the interest rate; a pressure which will only slightly later be removed or compensated by the increase in the price level which causes the *monetary* demand for funds for both liquidity and transactions purposes (representing in each case the same real demand as before) to catch up with the increase in the total supply.[5]

The *second* situation is that where, under collective bargaining contracts or minimum wage laws, the *money* wage, $\bar{w}$, is fixed from outside the system, so that the monetary equation (10b) replaces the real equation (10a). Here the real income, Y, will depend on the ratio $P/\bar{w}$ or ultimately on the ratio $M_2V/\bar{w}$, being the higher the higher is this ratio (so long as it has not reached the level consistent with full employment income). And we have to find, with the aid of the first three monetary equations, the level of Y (implying, given the shapes of the I and S functions, a certain value for r) which the given quantity of money, M, is sufficient to support. The lower is the savings schedule and the higher is the investment schedule, each drawn as a function of r, for each level of real income, and therefore the higher is the value of r corresponding to any given level of Y, the higher will be the aggregate money demand, M_2V, and the ratio $M_2V/\bar{w}$, and the higher therefore will be the level of real income and employment, attainable on the basis of the constant M.

Alternatively, if we consider M as variable, we may determine the amount of M which is required to give us full employment, or, that is, to give us a price level at which $\frac{\bar{w}}{P} = W = f'(N)$ at the employment level $N = T$ [or $N = F(W)$]. That is to say, in this case we take M as an additional variable and use equations (10a) and (10b) simultaneously. Whether the higher ratio of $P/\bar{w}$, and the higher real income, will be associated with a higher or a lower interest rate will depend on the relative strength of the consumption effect (derived demand effect) on the marginal efficiency schedule for capital, and of the income effect on the supply of savings. The strength of the first effect will depend on the shapes of the marginal operating cost curves of the firms in the consumption goods industries on the basis

4. Similarly, if the new money enters the system in the shape of a direct demand for consumption goods or for investment goods, it will exert its first effect on the prices of consumption or investment goods respectively.

5. The argument is the same if a shift to the left occurs in the liquidity preference schedule, and the money thus released from inactive balances first enters active balances via the capital market. Only here, of course, the real inactive balances will finally be lower than they were initially.

of their existing equipment. If these curves are horizontal (or falling) over the relevant range, the derived demand effect will be zero. Only if they slope upwards will there be a positive effect; and the more steeply they slope upwards (or the closer the firms are to full capacity output), the greater will be the demand for additional equipment at any given interest rate. Under our present assumption of perfect competition, the curves must of course be upward sloping, for this is only another way of saying that $f'(N)$ is decreasing.

It is clear that in this second situation, even though we assume the validity of the dichotomy between the real and the monetary factors which is implied in the system of equations set out above, the real factors are affected by the monetary factors.

The *third* situation is that where, under collective bargaining contracts, the *real* wage rate is fixed from outside the system, so that (10c) is the relevant form of the last equation. Here the real equations (4) to (9) and (10c) determine real income, the level of employment, and the interest rate, and the monetary equations (1) to (3) again exert no influence on the real factors; they merely determine the price level. It follows that in this case, even if we consider M as a variable, changes in its amount can exert no influence on the level of real income and employment. In other words, however much we increase aggregate *money* demand (M_2V) in the system, we cannot increase aggregate *real* demand $\left(\frac{M_2V}{P} = Y\right)$. Even when employment is less than full, an increase in the volume of money will merely raise the price level.

The importance for purposes of practical policy of distinguishing between the second and third forms of our last equation, and the fact that it is the third form rather than the second which most nearly describes wage policy today in those countries where free collective bargaining still prevails, justify some elaboration of the preceding argument. It has become customary to assume that the decisive factor determining whether an increase in the volume of money will lead merely to proportional increases in prices and money wage rates, or whether it will exert some influence on the real situation, is the degree of employment. Thus it is usually contended that if at the outset full employment prevails, the additional money cannot affect the real situation and will merely raise prices and money wages; while if employment is less than full, the additional money will serve at least in part to increase the volume of employment and output,

and prices and money wages will not rise in proportion either to each other or to the increase in the volume of money.[6]

Our purpose here is to emphasize that this description of the role of the monetary factor is valid only under restricted conditions. For on the one hand, *even when employment is full* at the start, money wages may lag behind prices as aggregate money demand is increased, if wages are determined by collective bargaining at *long* (say annual) intervals, or if they are held down by a "wage freeze" imposed by the government or by trade union policy. A state of "overfull" employment then arises in which employers are unable fully to satisfy their demand for labor at the prevailing money wage-price ratio (i.e. there are unfilled vacancies). In such circumstances even though current real income cannot be increased, the redistribution of income between profits and wages[7] will, provided the recipients of profits save a higher proportion of their income than do the recipients of wages, cause the savings function (by which we mean here the function relating savings to the rate of interest) to lie further to the right, i.e. will lead to what is usually called, somewhat inappropriately, "forced saving." And the consequent addition to current investment will raise the marginal productivity function of labor ($f'(N)$) of future periods above the level it would otherwise have reached. Thus the real situation is in this case affected by the monetary factor despite the existence of full employment from the start.

On the other hand, *even when employment is less than full*, a perfectly synchronized upward movement of money wages and prices may occur in response to an increase in aggregate money demand, and the real situation fail to change, if wages throughout the economy are tied to the price level by "escalator clauses."[8] Just as a fall in aggregate money demand need not (given the conditions of the "Classical" system with flexible wages and prices) entail any fall in aggregate *real* demand, so a rise in aggregate money demand will not necessarily (even given the existence of unemployment) entail a rise in aggregate real demand.[9] In much of the literature concerning full

6. The assumption that under modern conditions of wage determination the situation here described represents the "general case" has been criticised by L. Albert Hahn, *The Economics of Illusion* (New York, 1949); cf. especially chaps. 10 and 11.

7. This is a factor which has not explicitly been allowed for in the savings function as written above.

8. Cf. L. Albert Hahn, *op. cit.*

9. It should be noted that Keynes himself said that if it were true that money wages always moved up simultaneously and proportionally with prices, an increase in aggregate money demand would fail to increase employment. Cf. *General Theory*, p. 284.

employment policies, however, it has been implicitly assumed that an increase in aggregate money demand is synonymous with an increase in aggregate real demand so long as unemployment exists.

Nor does the increase in aggregate money demand lead in this case of fixed *real* wage rates, to any increase in real saving. For there is neither any increase in real income, nor any redistribution of income in favor of profits, out of which the additional saving could come. Hence the expansion of money demand does not even induce any additional capital formation in the current period such as would accelerate the upward shift of the marginal productivity function in future periods and thus contribute to raising the level of real income and employment attainable, on the basis of the given real wage rate, in those future periods.[1]

In short, at least under conditions of perfect competition in the product market, it is the lag of money wages behind prices (i.e. the fall in real wage rates), and not the mere existence of unemployment, which is essential if the expansion of aggregate money demand is to exert an effect on current or future employment levels.

B. The case of imperfect competition in the product market

We turn now to the case where imperfect competition in the product market is the prevailing condition in the economy. This case has received considerable attention in the literature, and some authors have sought in it support for the contention that real wage rates need not decrease as employment increases from less than full to full.[2] Their argument has relied partly on the circumstance that under imperfect competition a constant or even rising marginal physical productivity function for labor is compatible with the stability conditions for the individual firm, and partly, or mainly, on the possibility that as aggregate output rises the difference between the value of the marginal physical product and the marginal value product[3] of labor

1. We are, of course, still assuming here, and shall assume throughout, that the marginal efficiency of additions to the stock of capital equipment is still positive, so that the real income of society can still be augmented by new capital formation. That is to say, we exclude the "secular stagnation" case.

There are signs that trade union policy of the future may be directed towards establishing sliding scales for wages which move not only with the cost of living but also with productivity. Were this practice to be generalized, the possibility of increasing employment as productivity increases would be automatically excluded.

2. We abstract, of course, from changes in productivity due to technical progress, which are always taking place in practice, and may constitute the chief factor allowing employment to expand with constant or even rising real wage rates.

3. We shall subsequently use the term "real marginal value product" to signify the marginal value product divided by the price level.

may be narrowed, because the elasticity of real demand for a good from any one of the monopolistically competitive firms engaged in producing it may increase (i.e. the degree of monopoly may decline). The belief that on the average the elasticity of demand confronting an individual firm for its product at any given output level[4] will increase as the total real income of the economy increases is based on the proposition that as people become better off they spend a larger proportion of their income on luxuries, for which the demand is relatively elastic, and a smaller proportion on necessities, for which the demand is relatively inelastic.

Under monopolistic competition, our last equation (10) may take the form:

$$W = \left(1 - \frac{1}{\eta}\right) f'(N) \text{ where } N = T \text{ (constant) } [\text{or } N = F(W)] \quad \text{(a)}$$

in the case of flexible money and real wage rates; *or*

$$\bar{w} \text{ (constant)} = \left(1 - \frac{1}{\eta}\right) f'(N)P \quad \text{(b)}$$

in the case that the money wage rate is fixed from outside; *or*

$$W \text{ (constant)} = \left(1 - \frac{1}{\eta}\right) f'(N) \quad \text{(c)}$$

in the case that the real wage rate is fixed from outside. η represents the elasticity of real demand, and is a function of the total real income ($f(N)$) of the system.

Now if the elasticity of real demand for the product of the individual firm is a constant or decreasing function of the total real income $f(N)$, there is nothing or little to add here to what we said above for the case of perfect competition. Suppose, however, that η is an increasing function of $f(N)$. This may mean that even if $f'(N)$ is decreasing, the same real wage is compatible with different levels of employment, a higher and a lower level.[5] A similar argument holds

4. It should be observed that even if $f'(N)$ is constant for all values of N, we still need a higher elasticity of demand than before at a given output level in order for the real marginal value product of labor at that level to increase.

5. The argument is *a fortiori* true if $f'(N)$ is constant or rising. The existence of an increasing $f'(N)$ is, however, seldom likely *by itself* to keep the real marginal value product of labor constant (or to allow it to rise) as real demand increases. For if the increase in real demand carries with it only the same elasticity at each output level as before, the real marginal value product of labor will obviously fall when $f'(N)$ is constant; and whether the real marginal value product can remain constant (or rise) when $f'(N)$ is increasing evidently depends on the rate at which $f'(N)$ increases.

for the case of oligopoly when the price charged by the oligopolistic firms for their product is "sticky" upwards.

Provided our equation assumes the first form (a), i.e. provided the money (and real) wage rate is flexible, the pressure of the competition of wage-earners for employment will suffice to push the system to the higher employment level.

Suppose, however, that the equation assumes the second form (b), and that, given the initial relative positions of aggregate money demand, M_2V, and the money wage, $\bar{w}$, the system is at the lower employment level. We now increase M_2V while $\bar{w}$ remains constant; and as the ratio $M_2V/\bar{w}$ increases, η also increases. The system can then reach a higher level of employment and real income, Y, while the price level, P, remains stationary or even falls; i.e. the increase in Y alone absorbs the whole of the increase in $M_2V = YP$, or more. The new higher employment level is accordingly associated with a real wage which is the same or higher than before. This employment level could not, however, be attained previously because the original level of aggregate money demand was insufficient to finance it at the given *money* wage rate. Here it is the increase in aggregate money demand which allows the system to pass from the lower to the higher level of employment, giving the same (or a higher) real wage rate.

When our equation assumes the third form (c), i.e. when the *real* wage is fixed from outside, the solution is less simple. For here the fact that the same (given) real wage is compatible with different levels of employment implies an element of indeterminateness in the system.[6] There is nothing to tell us which of the alternative levels of employment will prevail, and once the system has settled down to one such level there is nothing internal to the system which can be relied upon to shift it to another higher level. It is difficult to see how the manipulation of aggregate money demand can exert any effect unless we can establish the presence of an additional element of rigidity, i.e. that P is sticky *in both directions* (owing say to the price policies of oligopolies), so that an increase in M_2V relative to P may succeed in pushing the system from the lower to the higher level of employment. If when P is flexible the system had accidentally settled down to the lower employment level, it would be purely fortuitous also if it were to move to the higher level in response to an increase in the volume of money. Such a possibility can hardly be regarded as a basis for practical policy; the more so since the underlying proposition that η

6. The same will be true if the monetary authorities follow a policy of stabilizing P (when $\bar{w}$ is already fixed from outside); for this means that the real wage ($= w/P$) is in effect fixed by the monetary authorities. Pigou has referred to this case (cf. *Employment and Equilibrium*, 2d ed., pp. 70–71, footnote).

will increase as real income increases, rather than the reverse, is itself of doubtful validity.[7]

We conclude that when the real wage rate is fixed, a policy of monetary expansion is not much more likely to be an answer to the unemployment problem when imperfect competition prevails in the product market than when perfect competition prevails. Nor is it evident — at least on the basis of our simple model which admittedly runs in terms of a few aggregate quantities and functional relationships only — that fiscal policy can provide an answer, unless it is by trying to redistribute income in such a way as to increase the average elasticity of demand, e.g. by subsidizing the rich out of taxes paid by the poor! Public works likewise would be of no avail unless they succeeded either in bringing about a redistribution of income of the kind described, or else in decreasing the degree of monopoly in some other manner.[8] It appears that the only remedy adequate to the present case is a direct attack on the elements of monopoly power in both the labor and the product markets.

II. Dependence on Monetary Factors of Savings Schedule

So far we have kept more or less strictly to the interpretation of the system of equations as they were written above.[9] We now come to the consideration of an assumption which underlies the whole system, and on which the possibility of separating the monetary and real factors depends in all cases, i.e. no matter which form of equation (10) is valid. In setting up the real functions for liquidity preference, saving and investment, etc., it has been assumed that the *real* quantities (real demand for cash, real saving, real investment) are independent of the absolute price level and of changes in it; it is this assumption which allows us, in a very simple and direct manner, to convert the real schedules into monetary schedules (representing the demand for liquidity in terms of nominal amounts of cash, the invest-

7. Thus Harrod argues, for example, that as people become better off they are less likely to transfer their custom from one seller to another in response to a small price difference. (Cf. R. F. Harrod, *The Trade Cycle*, 1936, pp. 86–87.) Also it is probable that when oligopoly prevails, the discipline of the group will be strengthened, and the mark-up or profit margin used in calculating the selling price increased, as the level of demand improves. (Cf. Oscar Lange, *Price Flexibility and Employment*, 1944, p. 41.)

8. Under our present assumptions they can augment the total volume of saving (and therefore of investment), public and private in the system, and thus raise the future level of productivity, only if they are financed out of taxation which is devised in such a way as to cause taxpayers to forego consumption rather than to reduce their private savings.

9. Apart, that is, from introducing the influence of the distribution of total real income between wages and profits on the savings schedule.

ment and savings schedules in terms of the demand for and supply of loanable funds, etc.). It allows us, that is to say, to assume that the functions $L(r,Y,P)$, $I_m = \psi_m(r,C,P)$, $S_m = \phi_m(r,Y,P)$, etc., where I_m and S_m represent investment and saving in money terms, are all homogeneous of degree one in P, so that we can write $L(r,Y,\lambda P) = \lambda L(r,Y,P)$, $\psi_m(r,C,\lambda P) = \lambda\psi_m(r,C,P)$ and so on.

There are, however, certain reasons why, even under "static price expectations," this condition of homogeneity in P may not be satisfied, either with respect to the liquidity function, or with respect to the savings function. Indeed it would appear that the necessities of economic logic make it impossible for this condition to be satisfied, at least with respect to the savings function.

We have seen that, according to the Modigliani system of equations, real consumption, C, and therefore real saving, S $(=I)$, depends solely on real income, Y, and the rate of interest, r, and is quite unaffected by variations in the level of real cash balances as determined by the liquidity preference equation. This implies that, for example, a shift to the right in the liquidity preference schedule, a shift which, let us suppose, is met (M remaining constant) by a fall in the price level, will (assuming flexible money wages and prices) leave not only real income but also real consumption and therefore real saving unchanged. That is to say, it presupposes that an addition to the real value of inactive balances (hoarding) is not considered by the owners of those balances as part of their saving; and it leads to the peculiar result that the system always saves the same real amount in the form of earning assets (= investment), or what comes to the same thing, always consumes the same real amount (out of a constant real income), no matter how much it "saves" simultaneously in the form of non-earning assets (hoards).

It seems clear that we must, as Pigou and others have done,[1] assume that, for any given level of real income, the real savings of the system, in the sense of income minus consumption, will vary inversely with the real level of total assets (including the inactive cash balances). This has the logical consequence that, if the intention of the savers is to put part of their savings into hoards, the effective real saving (= investment) in the system will be less (consumption will be more) than it would be if they decided to put all of their saving into earning assets. In other words, an autonomous shift in the real liquidity preference schedule to the right — no matter whether it is satisfied by a fall in the price level (M remaining constant) or by a rise in the volume of money (the price level remaining constant) — will lead to a

1. Cf. footnote 3, p. 255, above.

fall in the level of real saving in the sense of the demand for earning assets, and a rise in the interest rate. It is in fact only by taking account of the so-called "Pigou effect" (i.e. the effect, on consumption, of the level of total real assets) that we are able for any given real income to link up the choice between consumption and the acquisition of assets in general on the one hand,[2] with the choice between the two forms of assets (earning and non-earning assets respectively) on the other.[3]

The above argument is simply one way of expressing the general untenability of the Classical dichotomy between the real and monetary factors to which much attention has been given in the recent literature.[4]

We cannot, however, conclude from this that the level of real saving, in the sense of the demand for earning assets, will be affected by any and every change in the monetary factors. Suppose, for example, that the authorities increase the amount of money in the system (without any previous shift in the real liquidity preference schedule), and that the increase simply causes the money value of earning assets[5] and inactive cash balances, both separately and together, to rise in the same proportion as the commodity price level. The change in the monetary factor will in this case not affect the real factors (i.e. there will be no "Pigou effect"), since it neither alters the real value of total assets nor alters the ratio of cash balances to earning assets. All of the conditions of this case could, however, be satisfied only if the volume of money were increased without leading to any shift in the real liquidity preference schedule. In practice the process of injecting the additional money supply into the system may itself alter the ratio between money and earning assets in the system,[6] and thus induce a shift in the liquidity preference schedule (in the sense of the real demand for cash as a function of the interest rate) to the

2. This is not, of course, intended to imply that consumption plus additions to total real assets in the unit period must add up to the (given) real income of that period. If hoarding takes place the figure for consumption plus additions to real assets during the unit period will exceed the real income by the amount of the hoarding. (We assume that the hoarding leads to no reduction of real income, given that prices and wages are perfectly flexible.) We are here abstracting from the possible effect of the increase in total real assets on the supply of labor (demand for leisure).

3. Pigou himself does not, however, use it for this purpose in his own system of equations.

4. Cf. footnote 3, p. 251, above.

5. For the time being we consider earning assets as being entirely represented by equities. The consequences of the fact that in reality they partly take the form of debt will be considered below.

6. As Metzler has observed for the case of open market operations, *op. cit.*

left. Our assumption here is that the real demand for liquidity (non-earning assets) is a function of the real value of earning assets as well as of r and Y.

This induced shift in the liquidity preference schedule will have the effect, just as would an autonomous shift, of raising prices (i.e. of raising them in this case more than in proportion to the increase in the volume of money), decreasing the real value of cash balances and therefore of existing total assets, increasing the level of real saving in the sense of the demand for earning assets, and lowering the interest rate. Another way of expressing the same thing is to say that, if through the action of the monetary authorities the ratio of earning to non-earning assets in the system is decreased, people will be induced *at any given* interest rate to shift some part of their non-earning assets into earning assets in order to reestablish the optimum proportion consistent with that interest rate; hence the equilibrium interest rate will be lower than it would have been in the absence of this action. This means that, as Metzler has pointed out,[7] open market operations, by decreasing the ratio of earning to non-earning assets in the system, will result in a "permanent" lowering of the interest rate and not merely to that temporary lowering due to lags in the adjustment process which we described on p. 255 above.

Summarizing the above analysis we may say that the "Pigou effect" may be brought into play by: (a) an autonomous shift in the real liquidity preference schedule which is met either by a change in the price level, the volume of money remaining constant, or by a change in the volume of money, the price level remaining constant (or by some combination of changes in the price level and in the volume of money); (b) an autonomous change in the volume of money which leads to an induced shift in the real liquidity preference schedule.

In general a shift in the real liquidity preference schedule to the left will tend to raise the level of real saving, and a shift to the right to lower it.[8] By saving we mean here, and in what follows, the demand for earning assets.

We come now to a second factor which makes real saving in the sense just defined dependent on the monetary factors and which, unlike the "Pigou effect," operates solely through changes in the price level, independently of whether these are or are not accompanied by changes in the volume of money in the same direction so that the real

7. *Ibid.*

8. A movement along the liquidity preference schedule to the right (due to a fall in the interest rate) will also be a factor tending to reduce real saving as the interest rate falls, and *vice versa* for a movement to the left.

value of total assets is kept constant. This factor comes into play when the private sector of the economy has a significant amount of fixed debt (or of long-term contracts fixed in terms of money). The existence of fixed debt means that there is one set of money values in the system (the principal of, and interest charges on, debt) which remain inflexible in the face of changes in the price level. As the commodity price level falls the real value of the debt burden, and consequently the real ratio of debt to equity in the system, rises; and *vice versa* when the commodity price level rises. The influence of this increase (or decrease) in the debt-equity ratio on the savings function is exerted through the higher (or lower) default risk[9] which it entails from the standpoint of holders of the bonds or other obligations (old and new) of the firms.

Since the willingness to save (i.e. to hold or purchase earning assets) depends not only on the nominal interest the assets bear, but also on the default risk, the savings function must be assumed to depend not merely on the interest rate offered by the borrower but also on his credit rating; and this will be a function of the debt-equity ratio and therefore of the absolute price level.[1] This means that the level of real savings will tend to fall if the commodity price level falls

9. Since the concept of the default risk is necessarily bound up with uncertainty, and therefore with multi-valued expectations, we are faced here with the question of how to interpret "static" and "dynamic" expectations, respectively, under multi-valued expectations. For present purposes we may follow Lange (*Price Flexibility and Employment*, pp. 31–32) and define the *effective* expected price as the single certain price to which the whole probability distribution of possible prices is regarded by the economic subject as being equivalent. We may then define static expectations to mean that the "certainty equivalents" of the probability distributions of future prices are equal to the current price. Dynamic expectations of various elasticities can be defined correspondingly. We should also observe that the extent to which people will revise their expectations about future prices on the basis of the current price movement will depend on whether the current price movement is "expected" or "unexpected"; and this raises the problem of what is meant by an "unexpected" price movement under multi-valued expectations. A possible working definition is again to say that the price in the current period is "unexpectedly" low if it is below the certainty equivalent of the probability distribution of possible prices as envisaged in the previous period. Since, however, the criterion of what constitutes "unexpectedness" — the important thing being the element of surprise or shock — is necessarily a subjective one, it is difficult to devise a definition that is appropriate for aggregate analysis.

1. This conclusion is not altered by the consideration that the degree of uncertainty attaching to the returns (i.e. the dispersion of the probability distribution of possible returns) on equity holdings is independent of the magnitude of the real debt burden. (Cf. F. A. and V. C. Lutz, *The Theory of Investment of the Firm*, 1951, chap. XVI). For any given volume of saving at the new (lower or higher) price level will, however it is distributed between bonds and equities, be associated with a different (higher or lower) total risk factor than would have prevailed at the old price level.

and to rise if it rises. Thus the real saving of the current period depends not only on what level of prices is expected to prevail in the future (a factor which has always been acknowledged for the case of non-static expectations); it depends also on what level of prices has ruled in the past.

We may then rewrite our real savings function as

$$S = \theta\left(r, Y, R, \frac{A + M_1}{P}\right)$$

where $R = \Lambda(P)$ represents the real ratio of debt to equity, and $A = \Gamma(r,P)$ represents the money value of the titles to earning assets.[2]

How does the introduction of the dependency of the savings function on the monetary factors (the position of the liquidity preference schedule, the volume of money, and the absolute price level) alter the conclusions that were reached in the previous section? It does not alter the conclusions concerning the level of employment and real income in the *current* period. It does, however, imply that no matter which of the three forms the wage policy equation assumes, a change in the monetary factors will have some effect on the real factors. Thus so long as we retain the assumption of static price expectations, we may say that any autonomous shift in the real liquidity preference schedule to the right (independently of whether it provokes a price fall or an increase in the volume of money) will cause real saving to be lower and the interest rate to be higher than it would have been in the absence of the shift. Similarly for any induced shift in the real liquidity preference schedule to the right which is caused by an autonomous reduction in the volume of money in relation to the volume of earning assets. Finally, if the shift in the real liquidity preference schedule to the right leads to a fall in the price level, this will be an additional factor accentuating the reduction in the volume of saving. The same argument applies *mutatis mutandis* to shifts in the liquidity preference schedule to the left and rises in the price level.

The fact that the monetary factors affect the level of real saving (and investment) in the current period means also that they affect the level of the marginal productivity function of labor $f'(N)$ of future periods. Thus, for example, a shift in the real liquidity preference

2. If A were represented entirely by equities it would, under static expectations, vary exactly in proportion to the commodity price level at any given r, but the fact that it consists partly of bonds may mean that the total value of the titles to physical assets varies somewhat more than the value of the physical assets themselves, because of the changing real debt-equity ratio.

schedule to the left (no matter whether it is met by a rise in prices or by a reduction in the quantity of money) will tend to raise current investment and therefore the future level of $f'(N)$ above what it would have been with an unchanged position of the liquidity preference schedule; and if the shift is met by a rise in prices rather than by a reduction in the quantity of money, this effect will be intensified. Similarly, if the authorities increase the volume of money in the absence of any increase in liquidity preference, and the price level rises in consequence, this will tend to raise the future level of $f'(N)$.

This means, for example, that even when (10a) is the valid form of our last equation (i.e. when there is perfect flexibility of both money and real wage rates), a change in the monetary factors in the current period will influence the full employment real wage level of future periods. It means also that in a situation where unemployment has arisen (through the operation of equation (10b)), a policy of restoring full employment by raising aggregate money demand and the price level will make possible a higher future real wage level than would the alternative policy of forcing down money wage rates.

Finally, if (10c) is the valid form of the final equation, i.e. the *real* wage is determined from outside (at a level which is too high to give full employment), the statement that an increase in aggregate money demand will exert no influence at all on aggregate real demand (i.e. on real income and employment) has to be qualified. We must now say that the increase in aggregate money demand in the current period will exert some influence (through its effect on current saving) on the real income and employment levels attainable in future periods.

However, a note of caution is in order here. The beneficial effect on employment of the increase in aggregate money demand in this last case where the real wage rate is fixed, is an indirect one. It operates by causing a rise in the price level which in turn raises the volume of real saving (and investment). The rise in the price level increases the rate of saving by "squeezing" the existing bondholders and thus reducing the default risk. We must be careful to stress that the working of this effect depends on the existence of static expectations, i.e. the condition that people do not expect the initial price rise to be repeated. For once expectations of further price rises are engendered, potential lenders will begin to fear that they will be squeezed in their turn; and the decrease in the default risk will then be compensated, or more than compensated, by the increase in the inflation risk. Indeed the inflation risk, though it induces a shift in the real liquidity preference schedule to the left, will usually at the same time, and in spite of the leftward shift in the real liquidity

preference schedule, cause the savings schedule also to shift to the left because it means that all earning assets (bonds plus equities) taken together are associated with a higher risk factor than before.[3]

These considerations, together with what was said in Section I, bring us to the conclusion that, when the real wage rate is fixed, an expansion of the volume of monetary demand can at best induce only a small upward shift in the current real savings schedule, and thereby in the future level of employment; and it will actually lead to a downward shift if the public is already inflation-conscious, or becomes so as the result of sustained price rises due to successive doses of monetary expansion.

We have still, however, to allow for the possible effect of "dynamic expectations" on the investment schedule (by which we mean here the schedule showing the level of investment as a function of the interest rate). Under price expectations of greater than unit elasticity, an initial price rise will usually cause the marginal efficiency schedule to shift to the right.[4] This shift may — but will not necessarily — more than compensate for any simultaneous shift to the left in the savings schedule, in the sense that the net effect may be to give a greater volume of saving and investment than would have been forthcoming in the absence of the price rise, though at a higher interest rate.

III. Dependence on Monetary Factors of Real Demand for Cash Balances

We come now to a second reason for the importance, even under static expectations, of the absolute price level, namely its effect on the liquidity preference schedule. The increase (or decrease) in the real debt burden due to a fall (or rise) in the commodity price level may affect the real demand for liquidity on the part of firms, households and also banks. Firms, because they are more vulnerable to losses after the price fall and the consequent increase in the real value of the debt burden, may try to protect themselves by holding larger real "inactive" cash balances. Households, too, may demand larger real

3. The higher risk factor associated with the real returns on saving cannot be removed by shifting all saving to equities. For it will always be true that the real returns on investment in equities (under rising prices) are less certain than are the real returns on investment in bonds under constant prices. This result could be avoided only if debt were to be fixed in real terms, i.e., if debt contracts also contained escalator clauses which raised the money value in step with the price level.

4. There is no apparent reason why the marginal efficiency schedule should shift when expectations are static. The change in the real debt burden will not in itself affect the profitability of new investment; it will influence the level of investment only through its effect on the savings schedule.

cash balances at any given interest rate after the price fall than before, because, owing to the increased default risk, fixed interest securities are now a less good substitute for cash. The contrary will be true when the price level rises.

Thus the real demand for liquidity will be a function of the real value of the debt. Accordingly we should write our first monetary equation in the form

$$M_1 = L(r,Y,P,R,A)$$

where $R = \Lambda(P)$ is as before the real ratio of debt to equity. ($A = \Gamma(r,P)$ represents the money value of earning assets; its effect on the demand for cash balances has been dealt with on p. 265 above).

The increase in the default risk throughout the business sector is also likely to cause the commercial banks to desire to hold a higher ratio of cash to earning assets at any given interest rate than before. But the increase in the demand for liquidity on their part will, other things being equal, affect the quantity of money itself, i.e. will lower M. Failing an increase in Central Bank money sufficient to provide enough extra reserve money to satisfy the banks' increased real demand for liquidity, the total amount of money (currency plus deposits) in the system will decrease as prices fall and as the default risk rises.[5]

Thus we conclude that even when expectations are static, price changes may, through their effect on the real debt burden, engender a cumulative process, because the real liquidity preference schedule is itself a function of the absolute price level or of changes in it. If an unexpected fall in prices occurs, the schedule will shift to the right, and the further price fall caused by this shift will induce a further shift to the right, and so on. This downward movement in prices is likely to be brought to an end only by widespread bankruptcies which finally wipe out a large part of the debt burden. If price expectations are not static, and the initial price fall creates the expectation of further falls, the movement will, of course, be intensified. These

5. Other factors of a more specialized nature may in some instances cause the commercial banks to accumulate "excess reserves" and reduce the volume of money in the system. Most important among them probably is the existence of oligopolistic elements in the banking system causing stickiness of interest rates, so that the banks fail to respond to a decline in the demand for funds on the part of customers (i.e., an excess of loan repayments over new borrowing) by lowering the interest rate. Other possibilities, which we have deliberately excluded in our general treatment, are (a) that a lowering of the interest rate may fail to restore the volume of lending because the investment demand of customers is insensitive to changes in the rate, and (b) that the interest rate is already at the minimum level below which it cannot fall further.

considerations were among the principal reasons leading Keynes to lay so much emphasis on the monetary factors.

This does not imply that *all* falls in prices, no matter how they are caused, will provoke this kind of cumulative process. Thus if prices fall gradually over time as a consequence of the continuous growth of real income (due either to the savings process itself or to technical progress) or as a consequence of a gradually declining interest rate which draws money out of active into inactive balances, there is no reason why any disturbance should result. The debt-equity ratio and the real cash holdings will be adapted in advance to the expected rate of price fall, i.e. will be the optima for that rate. Only if prices fall more sharply than was expected[6] will a cumulative reaction be set in motion.

IV. Conclusions

We conclude first, that no matter which form of wage policy prevails, and even when price expectations are static, the real factors cannot be isolated from the monetary factors. For changes in the monetary factors (shifts in the liquidity preference schedule, changes in the quantity of money and in the price level) through their effects on the real value of existing assets and liabilities will affect the current real savings schedule.

Secondly, since an unexpected price fall is apt to start a cumulative process downwards by increasing the real value of debt and therefore increasing the demand for liquidity, as well as by creating expectations of further price falls, it is preferable to meet an initial increase in the real demand for cash balances by increasing the nominal amount of money in the system rather than by letting prices and money wages fall. Likewise, once unemployment has occurred, it is preferable to seek to cure it by raising the level of aggregate money demand rather than by trying to force down money wage rates, given that a reduction in the latter is likely to entail some fall in prices.

Finally, we should be aware that under modern conditions it is the third form of our wage policy equation, implying that the real and not the money wage is fixed by collective bargaining, which most nearly describes the facts. In some countries almost the whole of industry is already subject to sliding scale arrangements which tie money wage rates to the cost of living; in others the practice is rapidly spreading. Where such arrangements prevail over most of the economy, so that few wage groups or none can be "squeezed," there

6. Cf. footnote 9, on p. 266.

is little that monetary and fiscal policy can do to affect the level of employment. It is true that in practice there usually remains *some* lag between money wages and prices; that even when the escalator clause is in operation, the money wage rate follows the cost of living index with one or two months delay. A lag of this magnitude is, however, too small to permit an increase in aggregate money demand to exert more than an imperceptible influence on the current level of employment and real income. Also when the lag is so small the increase in money demand will, even in the most favorable conditions (i.e. that the public is not inflation-conscious), have only a limited effect in forcing up the level of saving and investment, and thereby increasing the *future* level of employment.

We have emphasized in the preceding sections that an expansion of aggregate money demand (apart from preventing or cutting short a downward cumulative process) can exert a favorable effect on employment in one or both of two ways: First, it can act as an indirect means of diminishing the degree of monopoly in the labor market (by lowering the real wage rate when the money rate is fixed) or in the product market (by raising the elasticity of demand). Second, it can act as a means of forcing an increase in the rate of capital accumulation, and thus accelerating the increase in the level of productivity which allows a greater number of workers to be employed at any given real wage rate.

We have argued that, given the modern tendency for collective bargaining to determine the real instead of the money wage rate, an increase in aggregate money demand cannot by itself be relied upon to accomplish either of these purposes. It appears that two principal ways of combatting unemployment then remain open. One is to attack the elements of monopoly power in both the labor and the product markets directly. The other is to introduce government control over the real rate of earnings by physical means (rationing), which is in effect another indirect method of restricting the power of organized labor to bargain for a given level of real wages, a method which may be efficacious so long as the unions do not bargain for payment in terms of ration coupons.

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