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# Keynes' Monopolistic Theory of Employment, Interest, and Money

By Clark Edwards\*

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## Abstract

Competition is usually assumed as the general case in applications of classical and neoclassical economic theory. Monopoly is treated as a special case. Several leading economists during the thirties sought to develop a general theory of monopoly within which competition might be treated as a special case, among these was John Maynard Keynes. This article develops the implications of Keynes' monopolistic assumptions for inflation and unemployment. Reconciliations of Keynesian macroeconomics with neoclassical aggregative theory that are based on the assumption that both models are competitive are misleading because they fail to capture the role of monopoly in the Keynesian model.

## Keywords

Economic theory, monopoly, inflation, unemployment

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## Introduction

Classical economic theorists were likened by John Maynard Keynes, in his *General Theory of Employment, Interest, and Money* (7, p. 16),<sup>1</sup> to "Euclidean geometers in a non-Euclidean world." Just as non-Euclidean geometers built new and useful logical systems by denying the fifth postulate of Euclid—the so-called "axiom of parallels"—so, implied Keynes, can economists build a new and useful system of economic thought by denying certain classical economic postulates. "It is, then," claimed Keynes, "the assumption of equality between the demand price of output as a whole and its supply price which is to be regarded as the classical theory's 'axiom of parallels'" (7, p. 21). Keynes was saying: Let us generalize by assuming that Marshallian (8) supply and demand curves *do not* necessarily intersect in equilibrium, and then let us see if the resulting theory better explains economic behavior than does a theory which assumes such curves *do* intersect. Keynes found the experiment in monopoly theory successful and concluded that "we are thus led to a more general theory, which includes the classical theory with which we are familiar as a special case" (7, p. vii).

The classical economic postulate to which Keynes objected implied competitive markets. It is only in competitive markets that Marshallian supply and demand curves necessarily intersect in equilibrium. The classical theory treated competition as the general case, and it recognized and

discussed monopoly as a special case. Keynes was among those who sought to change this point of view and to consider the competitive classical model as a special case of a general, monopolistic model.

The idea of replacing the classical extremes of competition and monopoly with something more realistic had been in the air for several years before Keynes published his *General Theory*. Joan Robinson, in her foreword to *Imperfect Competition*, identified an article by Piero Sraffa in the *Economic Journal* of December 1926 as "the fount from which my work flows" (10, p. v). She attributed considerable importance to the prior contributions of R. F. Kahn, Roy F. Harrod, and others: "The notion of a supply curve has always been associated with the notion of perfect competition," Robinson reminds us, "but if we are to study conditions in which competition is not perfect the orthodox conception of a supply curve must be reconsidered" (10, pp. 85-86). Robinson concludes: "It has been the purpose of the foregoing argument to show that . . . it is more proper to set out the analysis of monopoly, treating perfect competition as a special case" (10, p. 307).

Chamberlin tells us in his *Monopolistic Competition* that his search for a hybrid theory of monopoly and competition grew out of his analysis of railway rates in 1921 (2, p. 293). He agreed with Keynes and Robinson that "if either [monopoly or competition] is to be omitted from the picture, the ubiquitous monopoly has much more in its favor" (2, p. 11). Chamberlin underscored Keynes' point that "supply and demand are not equated in monopoly equilibrium" (2, p. 13), and he carefully distinguished between equilibrium prices,

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<sup>1</sup> Italicized numbers in parentheses refer to items in the references at the end of this article.

which occur under both monopoly and competition, and the equality of supply and demand, which occurs only under competitive equilibrium. He used the terms "special" and "general" in the same context that Keynes and Robinson had used them, that is, equality between demand and supply is "merely a special case" of price equilibrium, and the result of the hybrid model is "very generally equilibrium prices" (2, p 15)

Chamberlin differed from Keynes and Robinson, who viewed competition as a special case of general monopoly. Instead, he viewed monopolistic competition as the general case of which pure competition and pure monopoly were each special cases. But he fully agreed that the classical view—that competition was the general, and monopoly, the special case—was unacceptable. All three economists sought a system for which supply and demand curves do not necessarily intersect in equilibrium and, therefore, for which the supply price is not equal to the demand price.

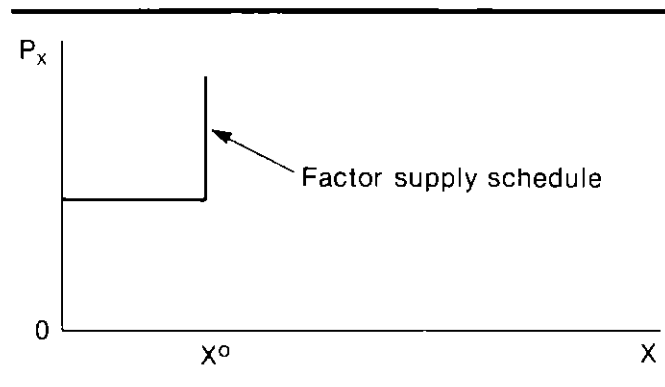
Today we consider Robinson's and Chamberlin's books as two important landmarks on the road toward our general understanding of monopolistic market structure. We do not usually recognize Keynes' *General Theory*, published 3 years after the books by Robinson and Chamberlin and 10 years after the article by Sraffa, as another landmark on that journey. Keynes said of his own work that, if the classical postulate of competition holds, "there is no obstacle to full employment." If, however, this is not the true law, there is a vitally important chapter in economic theory which remains to be written and without which all discussions concerning the volume of aggregate employment are futile" (7, p 26). In his own preface, he recognized an indebtedness to Kahn, Harrod, Robinson, and others who had contributed to the theory of monopolistic markets.

My purpose here is to set forth a simplified version of Keynes' monopolistic theory. My aim is not so high as to explain the difficulties this country has been having in recent years with inflation, unemployment, sluggish growth, and a weakening dollar. Rather, it is to focus on one aspect of the models we now use to explain these problems and to suggest that the equations in these models, which reflect either competitive price determination or which represent a Phillips curve, might be replaced with equations which reflect, instead, the monopolistic price determination suggested by Keynes.

Keynes began in chapter 3 by redefining four terms: aggregate demand function, aggregate supply function, aggregate demand price, and aggregate supply price. He continued to use

the classical jargon, but with different meanings. The aggregate demand price became the proceeds which entrepreneurs expected to receive from the sale of the output associated with a given level of employment. The aggregate supply price for the output became the income (factor cost plus profit) associated with that level of employment. Equilibrium occurs when aggregate demand price equals aggregate supply price—that is, when gross national product equals gross national income. This equilibrium defined what Keynes called "effective demand" (7, pp 25, 304). His redefinitions directed attention away from Marshallian demand and supply curves. Whereas Marshall spoke of a schedule of quantities that would clear the market for alternative prices, Keynes spoke of levels of employment that would be consistent with alternative levels of expenditure. That Keynes used the old economic jargon to denote his new concepts resulted in considerable confusion among his readers. Thus, when Keynes spoke of "the intersection of the aggregate demand function with the aggregate supply function" (7, p 30), it was his own redefined concepts for which supply equalled demand—not the Marshallian concepts. Moreover, by his denial of the economists' "axiom of parallels," he assumed at the outset that the Marshallian supply and demand curves did not necessarily intersect in equilibrium.

The Marshallian schedules of quantities that will clear the market at alternative prices were suppressed in the Keynesian reformulation. They were no longer needed because they were generally no longer expected to intersect in equilibrium. Keynes explicitly alluded to the Marshallian supply function in his formulation of the factor market; he said that labor is in "perfectly elastic supply so long as there is unemployment, and perfectly inelastic supply so soon as full employment is reached" (7, p 295). We can diagram this reformulation of Marshallian factor supply as follows, with  $X$  as an index of employment and  $P_x$  as an index of the nominal wage.

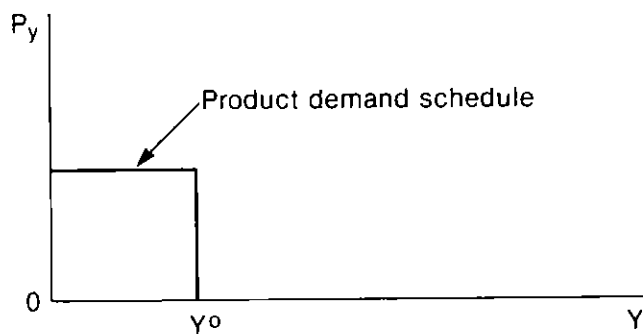


*The classical theory treated competition as the general case, and it recognized and discussed monopoly as a special case. Keynes was among those who sought to change this point of view and to consider the competitive classical model as a special case of a general, monopolistic model*

The perfectly elastic segment of this factor supply function reflects Keynes' idea of rigid wages. "Labor is not prepared to work for a lower money-wage" (7, p. 8). The segment became, in Keynes' monopolistic theory, the battle line between bilateral monopolists, management was on one side and labor unions on the other.

Today we interpret Keynes' aggregate demand function as a schedule of expenditures that vary with income. His product supply curve in this reformulation is reduced to the tautological "income varies with income," and it is plotted on the Keynesian cross diagram as a 45° line. A change in expenditure may reflect a change in price or in quantity or in both.

In addition to assuming a rigid wage so long as there is unemployment, Keynes added that an increase in demand "will have no effect whatever on prices" (7, p. 295). The implied Marshallian product demand schedule was, apparently, perfectly elastic up to the level of expenditures warranted by the propensity to consume out of income. The curve became perfectly inelastic at that point. We can diagram this reformulation of Marshallian product demand as follows, with  $Y$  as an index of aggregate real product and  $P_y$  as an index of the general price level.



This formulation set up the general price level as a battle line between bilateral monopolists, consumers were on one side and business on the other. Modigliani has shown that we need not describe the product market in this way to achieve the Keynesian result of unemployment in equilibrium, provided that we describe the factor market as one of rigid wages. By the symmetry of the problem, we can assume rigid prices and flexible wages, instead of rigid wages and flexible prices, and achieve a comparable result. But we can-

not achieve Keynes' results by assuming flexible wages and flexible prices because that is tantamount to assuming that the "axiom of parallels" holds. Keynes explicitly and repeatedly described the factor market as one of rigid wages, and he implied that the product market can be described as one of rigid prices. However, he did so only as an interim step in understanding pressures on wages and prices. Keynes was interested in explaining changes in prices and wages both during periods of full employment and of unemployment.

## A Model

A model may help to clarify the implications of Keynes' monopolistic theory. Unlike Keynes' own version, this simplified version of his model makes the Marshallian supply and demand curves explicit, and the Keynesian aggregate supply and demand curves implicit, this facilitates a comparison of the Keynesian model with the classical model. The model developed here excludes many of the variables important in Keynesian analysis, such as consumption, investment, and the money supply, it includes the fewest number of variables required for focusing on the monopolistic structure in the product and factor markets. Modigliani has shown that such a simplification is sufficient. He found that the "propensities to save and invest are not a part of the mechanism determining employment" (9, p. 67). He also discovered that involuntary unemployment is "not [due] to the Keynesian liquidity preference. This result is due entirely to the assumption of 'rigid wages'" (9, p. 65).

Keynes assumed, in agreement with the classical theorists, that maximization of profits ( $\pi$ ) is the correct objective for the producing sector (7, p. 23).

$$\pi = P_y Y - P_x X \quad (1)$$

where  $(P_y Y)$  is the demand price and  $(\pi + P_x X)$  is the supply price. This formulation recognizes a single product ( $Y$ ), which may be thought of as real gross national product. There is a single factor ( $X$ ), which may be taken as labor. Other factors, such as land and capital, are suppressed. The ensuing discussion will be much simpler if one also regards normal profits as suppressed and lets  $\pi$  represent profits in excess of those required to keep firms in business.

In what follows, I maximize the above profit function subject to constraints and examine the equilibrium conditions. This procedure raises a problem of interpretation. If we consider that the aggregate profit level is to be maximized, we imply a centrally planned economy. If we consider instead that

profits are maximized for each firm, we have an aggregation problem

We can tentatively take the general price level ( $P_y$ ) and the nominal wage ( $P_x$ ) as given, as Keynes does (7, p 295) This simplifies the aggregation problem because firm cost and revenue curves are additive under this assumption. Keynes relaxed this assumption soon after imposing it (7, p 296) and inquired into mechanisms which change the nominal wage level and the general price level. I will examine Keynes' view of those mechanisms in subsequent sections. But first, I make Keynes' simplifying assumption because it eliminates the aggregation problem and allows us to interpret the resulting equations as general equilibrium conditions

The quantities that will clear the product and factor markets at these rigid prices and wages are limited. The level of real output ( $Y$ ) is less than or equal to the maximum level allowed ( $Y^0$ ) by the aggregate demand function including autonomous and induced demand

$$Y \leq Y^0 \quad (2)$$

The upper bound on the level of real output that will clear the market corresponds to the point at which the Marshallian product demand function becomes perfectly inelastic. The level varies, for example, with a change in government purchases of goods and services. We take this bound as (temporarily) fixed

The level of employment ( $X$ ) is less than or equal to full employment of the available labor force ( $X^0$ )

$$X \leq X^0 \quad (3)$$

The upper bound on the level of employment corresponds to the point at which the Marshallian factor supply function becomes perfectly inelastic

The objective is maximized subject to the constraint of a production function. Keynes called the aggregate production function an employment function (7, pp 25, 280). This change in terminology indicates his intention of using the function differently than it was used in the classical formulation. The employment function is

$$Y = f(X) \quad (4)$$

This system of four equations can be represented as a Lagrangian function

$$L = P_y Y - P_x X + \lambda_1 (Y^0 - Y) + \lambda_2 (X^0 - X) + \lambda_3 (f(X) - Y) \quad (5)$$

The value of  $L$  is maximized with respect to output ( $Y$ ) and labor ( $X$ ) and minimized with respect to the Lagrangian multipliers ( $\lambda$ 's), with the understanding that  $X$ ,  $Y$ , and the  $\lambda$ 's are non-negative. Necessary conditions for the solution to the problem are as follows

$$\frac{\partial L}{\partial Y} = P_y - \lambda_1 - \lambda_3 \leq 0 \quad \frac{\partial L}{\partial Y} Y = 0 \quad Y \geq 0 \quad (6)$$

$$\frac{\partial L}{\partial X} = -P_x - \lambda_2 + \lambda_3 \frac{dY}{dX} \leq 0 \quad \frac{\partial L}{\partial X} X = 0 \quad X \geq 0 \quad (7)$$

$$\frac{\partial L}{\partial \lambda_1} = Y^0 - Y \geq 0 \quad \frac{\partial L}{\partial \lambda_1} \lambda_1 = 0 \quad \lambda_1 \geq 0 \quad (8)$$

$$\frac{\partial L}{\partial \lambda_2} = X^0 - X \geq 0 \quad \frac{\partial L}{\partial \lambda_2} \lambda_2 = 0 \quad \lambda_2 \geq 0 \quad (9)$$

$$\frac{\partial L}{\partial \lambda_3} = f(X) - Y = 0 \quad \lambda_3 > 0 \quad (10)$$

The middle column above insures that, if a variable is positive, the corresponding derivative in the left column equals zero and that, if the derivative is nonzero, the corresponding variable in the right column is zero. We are interested in the case for which output is positive ( $Y > 0$ ). It follows from equation (6) that  $\partial L / \partial Y = 0$  and, therefore

$$\lambda_3 = P_y - \lambda_1 \quad (11)$$

For a positive level of employment,  $X > 0$ , it follows from equations (7) and (11) that the marginal condition for equilibrium is

$$(P_y - \lambda_1) \frac{dY}{dX} = (P_x + \lambda_2) \quad (12)$$

Keynes said that his "more general theory" includes the classical theory as a special case" (7, p vii). From the marginal condition, equation (12), we can understand what Keynes meant. When either  $\lambda_1$  or  $\lambda_2$  is greater than

zero, Marshallian demand and supply curves do not intersect and monopoly is implied, when both  $\lambda_1$  and  $\lambda_2$  are zero, the Marshallian curves intersect and competitive equilibrium conditions obtain

$$P_y \frac{dY}{dX} = P_x \quad (13)$$

This is exactly what, 3 years earlier, Joan Robinson had said was the preferable approach—it reversed the order imposed by the classical approach of starting with a competitive model and including monopoly as a special case

Keynes thought that the Lagrangian multipliers of our version of his model ( $\lambda_1$  and  $\lambda_2$ ) would vanish only under government intervention. He said, “if our central controls succeed in establishing an aggregate volume of output corresponding to full employment as nearly as is practicable, the classical theory comes into its own again” (7, p. 378). The point of the general model is that, given its assumption of rigid prices or rigid wages through a limited range of output or employment, the Marshallian supply and demand curves need not intersect in equilibrium except as a special case. The classical economists’ counterpart to the “axiom of parallels” was “thrown over” (7, p. 16) and a “vitally important chapter of economic theory” (7, p. 26) remained to be written.

Keynes showed that unemployment can exist in equilibrium, and he focused on monetary and fiscal policies to move an equilibrium with unemployment toward one of full employment. Such a policy in our simplified version of the model might be reflected by extending  $Y^0$  to a sufficiently high level that  $X = X^0$  in equilibrium. Keynes’ policies were intended to reach this goal by forcing  $\lambda_1$  and/or  $\lambda_2$  toward zero. Harrod (6) addressed this policy issue when he expanded the Keynesian model to include the effect of capital accumulation on the capacity to produce. Harrod said that capital accumulation, momentarily setting aside consideration of the supply of labor, determines the warranted rate of growth. However, labor force availability determines the natural rate of growth. Harrod was concerned that Keynes and his followers emphasized policies which focus on the natural rate while overlooking the warranted rate. Some of Harrod’s followers have concentrated on the warranted rate and overlooked constraints on growth imposed by the natural rate. Robinson said later of such models that they assume workers will come in from the woods to work when we need them and go back to eat acorns when we don’t. Keynes’ monopolistic theory, as extended by Harrod, allows

the actual rate of growth in dynamic equilibrium to differ from either the warranted or the natural rate. When this situation occurs, Harrod suggested that policies are needed to intervene and move the economy toward what he called the proper rate of growth.

The special case of perfect competition also results when the Lagrangian multipliers,  $\lambda_1$  and  $\lambda_2$ , are set equal to zero. To warrant that, we need only assume that demand is less than the maximum,  $Y < Y^0$  (see equation (8)), and employment is less than full,  $X < X^0$  (see equation (9)). In this special case it follows that average revenue equals marginal revenue, which equals marginal cost, which equals average cost, and the perfectly competitive equilibrium conditions hold (see equation (13)). The Marshallian supply and demand curves meet for this special case. Keynes failed to state that unemployment can exist in a competitive situation. Robinson had anticipated such unemployment when she said, “there is no natural tendency even under competition to maintain full employment, which depends upon the levels of saving and investment” (10, p. 310). Modigliani (9) also found unemployment in this situation for which wages are rigid but competitive equilibrium is attained.

## Unemployment

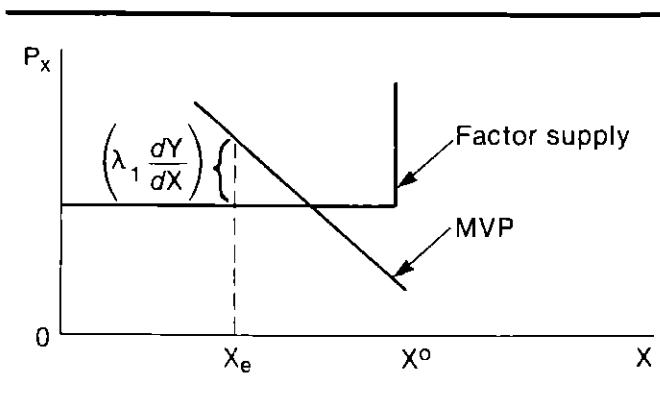
Keynes emphasized the problem of unemployment rather than inflation because that was the difficulty in Western economies when he wrote. In the simple version of his model presented here, the problem of unemployment can be described and explained from either of two points of view: insufficient aggregate product demand or excess aggregate factor supply. The two explanations are symmetrical and equivalent. Additionally, unemployment can be explained in terms of factor market concepts or product market concepts. Once again, the two explanations are equivalent. Let us consider the factor market first.

### The Factor Market

If there is unemployment so that  $X < X^0$ , then equation (9) requires that  $\lambda_2 = 0$ . This is an excess of factor supply. If we set  $\lambda_1 > 0$ , so that Marshallian equilibrium does not occur, then it follows from equation (8) that  $Y = Y^0$  and that real consumption reaches the limit allowed by the propensity to consume. There may be insufficient aggregate demand. If output increases to absorb the idle labor when aggregate demand is at its limit, the added output will not clear the market and there will be disequilibrium. The equilibrium condition in the factor market, with  $\lambda_2 = 0$  and  $\lambda_1 > 0$ , can be stated

$$P_y \frac{dY}{dX} = P_x + \lambda_1 \frac{dY}{dX} \quad (14)$$

This rearranges the terms of equation (12), with  $\lambda_2 = 0$ . The expression on the left side is often called the marginal value product or the marginal revenue product. It can be interpreted as the Marshallian demand curve for labor if the market is competitive. The supply curve for labor is the perfectly elastic segment of labor supply for which the wage equals  $P_x$ . However, equilibrium is not at the intersection of supply and demand so long as  $\lambda_1 > 0$  and  $Y$  is at its upper limit,  $Y^0$ . The marginal condition (equation (14)) indicates that the Marshallian supply and demand curves do not intersect in the factor market when insufficient aggregate demand is accompanied by unemployment. Marginal value product exceeds average factor cost by the quantity  $(\lambda_1 (dY/dX))$ . The unemployment situation in the factor market may be diagrammed as follows:



The factor market reflects a bilateral monopoly between management and labor. That there is no unique solution to a duopoly, oligopoly, or bilateral monopoly problem had long been known. Economic theory has a history of concocting scenarios which will help specify possible solutions. Cournot (3) assumed that each duopolist considers that the output of the rival firm is given and then adjusts to maximize profits. Bertrand (1) assumed instead that each duopolist considers the price of the rival firm as given. Edgeworth (4) assumed that each rival would embark upon an endless series of price undercutting and price hiking. Chamberlin (2) assumed the existence of many firms with slightly differentiated products. Sweezy (11) assumed a kinked demand curve based on fear of retaliation. Von Neuman and Morgenstern (12) assumed

each manager followed a minimax strategy. And a host of others have suggested price leadership, collusion, and other strategies to overcome the indeterminacy. As Robinson had said, there will be a different solution on each different assumption (10, p. 87).

Keynes found a different scenario which also avoided the crisis of indeterminacy. Labor, if it had the power, would like to force up wages by the quantity  $(\lambda_1 (dY/dX))$ . Management, if it had the power, would like to hold wages down—even to a lower level than current wage if there is an upward-sloping Marshallian supply function lurking somewhere below the perfectly elastic segment shown by the diagram.

Keynes assumed that "labor is not prepared to work for a lower money-wage and that a reduction in the existing level of money-wages would lead, through strikes or otherwise, to a withdrawal from the labor market of labor which is now employed" (7, p. 8). He admitted that sometimes wages fell during slack periods (7, pp. 9-10). But his preferred scenario was that labor unions generally had sufficient monopoly power to prevent a wage reduction during periods of unemployment. Were recovery to begin and the market to expand, Keynes assumed "more labor than is at present employed is usually available at the existing money-wage" (7, p. 10). However, he recognized a situation not shown in the diagram—that labor might hold out for a higher wage should the market expand even with unemployment and no inflation. "The wage unit may tend to rise before full employment has been reached—there is naturally for all groups (of workers) a pressure in this direction, which entrepreneurs will be more ready to meet when they are doing better business" (7, p. 301). He expected labor unions sometimes to have the upper hand in the bilateral monopoly battle over wages when the economy began to do better, and he expected management sometimes to have the upper hand when the economy began to do worse, in general, however, Keynes' scenario called for a stand-off. Wages were expected to continue around current levels. This was what J. K. Galbraith (5) would later describe as countervailing power.

## The Product Market

A monopoly element in the factor market implies that Marshallian supply and demand curves do not intersect in the product market. Consider, as before, that there is unemployment ( $X < X^0$ ) so that  $\lambda_2 = 0$  (equation (9)) and also that  $\lambda_1 > 0$  so that  $Y = Y^0$  (equation (8)). The marginal condition in the product market when there is insufficient

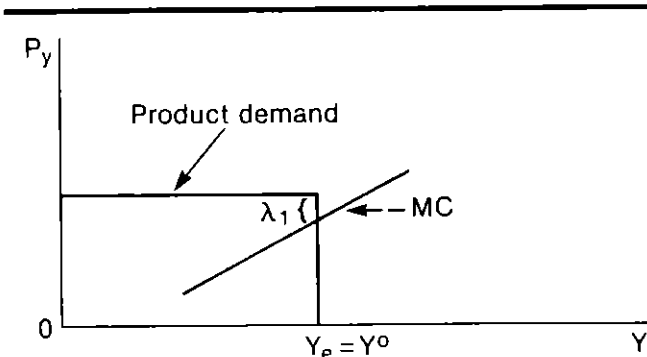
*The point of the general model is that, given its assumption of rigid prices or rigid wages through a limited range of output or employment, the Marshallian supply and demand curves need not intersect in equilibrium except as a special case*

product demand accompanied by unemployment, the usual Keynesian case, can be restated as

$$(P_y - \lambda_1) = P_x \frac{dX}{dY} \quad (15)$$

where the right side is an expression of marginal cost. This rearranges the terms in equation (14)

The expression on the right side is interpreted as the Marshallian supply curve for products if the market is competitive. The Marshallian demand curve for products is the perfectly elastic segment for which the general price level equals  $P_y$ . The Marshallian supply and demand curves do not intersect in product market equilibrium in this situation. They differ from each other by the quantity  $\lambda_1$ . The situation in the product market may be diagrammed as follows



Marginal revenue to each firm equals average revenue up to the point where the market is exhausted. At that point, a market imperfection bends the demand curve and marginal revenue falls to zero. Equilibrium is attained with price in excess of marginal cost in this imperfectly competitive market. The gap ( $\lambda_1$ ) in the product market and the gap ( $\lambda_1 (dy/dx)$ ) in the factor market are two manifestations of the same market imperfection.

A remnant of the Marshallian product demand curve is apparent in the monopoly analysis, but the curve which described product supply in competition no longer performs that role; there is no schedule of quantities that will be offered at alternative prices. The marginal cost curve does not function as a product supply curve except in competitive markets. Robinson devoted her chapter 6 to what has happened to the supply curve in monopolistic markets. She listed several

scenarios which could be assumed that would allow a supply curve to be identified. She concluded "Although it is possible to draw up a supply curve on any one of these assumptions, there will be a different supply curve on each different assumption" (10, p. 87).

Keynes' scenario was one which trod upon the concept of consumer sovereignty and which gave the producer the balance of power in the bilateral monopoly confrontation between consumer and producer. If consumers had market power, when there was insufficient aggregate demand accompanied by unemployment, they could drive prices down by the quantity  $\lambda_1$ . If so, marginal cost would equal average price and the Marshallian supply and demand curves would intersect. Keynes recognized that prices can fall during slack times, but frequently do not. "Indeed," he said, "[the economic system] seems capable of remaining in a chronic condition of sub-normal activity for a considerable period without any marked tendency towards recovery or towards complete collapse. Prices seem to be able to find a level at which they can remain moderately stable. These facts of experience do not follow of logical necessity" (7, pp. 249-50). But the "facts of experience" are consistent with the scenario chosen by Keynes—that in which the monopolistic power of producers against consumers is sufficient to hold prices above marginal cost.

The general price level is supported by monopoly power. The forces of competition, were they effective, would decrease the price level by the quantity  $\lambda_1$ . Keynes defined administered prices, or monopoly prices, as "prices which are determined by other considerations than marginal cost" (7, p. 268).

Keynes' scenario of a stable general price level and stable wages when there is insufficient aggregate demand and persistent unemployment implies that  $\lambda_1$  continues to be greater than zero, that average revenue exceeds average cost, and that monopoly profits accrue to the producer. Consumers fail to share in those profits if they cannot force a reduction in the general price level. Labor fails to share in those profits if it cannot force a rise in wages.

Keynes' policy prescription for a situation characterized by insufficient aggregate demand accompanied by unemployment was to shift the perfectly inelastic segment of the consumer demand curve to the right. Included in his methods for achieving this result was increased autonomous demand by business, government, or foreigners that would be accompanied by a multiplier effect in the household sector as



demand for workers shifts to the right, unemployment decreases, and income increases. Keynes' target for monetary and fiscal policy was to fix the perfectly inelastic segment of the demand curve so that

- In the product market,  $\lambda_1$  equals zero, the quantity which clears the market exactly equals the maximum allowed by the propensity to consume, and average price equals marginal revenue
- In the factor market,  $\lambda_1 (dY/dX)$  equals zero, there is full employment, and marginal value product equals average factor cost

When these conditions hold, the equilibrium conditions of classical competition are satisfied as a special case of the general theory, and full employment is attained without inflation

It is possible for equilibrium to be reached when there is unemployment, when there is unfulfilled demand, when  $\lambda_1$  and  $\lambda_2$  both equal zero, and when the competitive equilibrium conditions hold. Keynes did not discuss this situation, but, as already mentioned, Robinson recognized the possibility and Modigliani examined the situation carefully. Modigliani failed to recognize the product market imperfection caused by rigid prices, but he was explicit about the factor market imperfection caused by rigid wages, and he noted that this feature of the Keynesian theory "explains the consistency of economic equilibrium with the presence of involuntary unemployment" (9, p. 65). This is the competitive situation with persistent unemployment discussed above.

Keynes was also concerned with what would happen if the perfectly inelastic segment of the demand function shifted to the right beyond the level required to eliminate unemployment. His answer "true inflation" (7, p. 303). This situation is the subject of the next section.

## Inflation

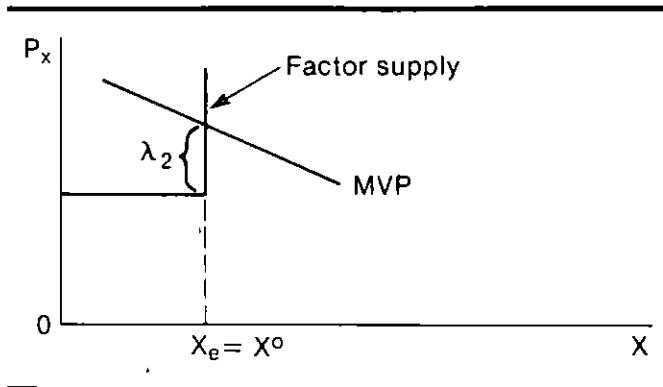
In his *General Theory*, Keynes paid greatest attention to the problem of insufficient product demand and periods of depression. The problem of insufficient factor supply and its relation to inflation was treated mostly in chapter 21, where he discussed the theory of prices. By the symmetry of the simple model presented here, we could just as well call this inflationary situation one of excess demand. In fact, that is the way Keynes looked at it.

## The Factor Market

Consider the case for which  $Y < Y^0$  (see equation (8)). This implies that  $\lambda_1 = 0$ . Consider that  $\lambda_2$  is greater than zero (see equation (9)). Then it follows from  $(\partial L / \partial \lambda_2) \lambda_2 = 0$  that  $(\partial L / \partial \lambda_2) = 0$ , therefore,  $\bar{X} = X^0$ . That is, when  $\lambda_1$  is zero and  $\lambda_2$  is greater than zero, there is full employment and an excess of demand relative to available supply. One could also say of this situation that there is an insufficient aggregate supply relative to potential demand. The marginal condition for equilibrium in the factor market when insufficient supply—whether of labor or of petroleum—and unsatisfied demand exist is the following:

$$P_y \frac{dY}{dX} = P_x + \lambda_2 \quad (16)$$

This rearranges the terms in equation (12) with  $\lambda_1 = 0$ . The expression on the left side is marginal value product. Equation (16) indicates that in the factor market the marginal value product of labor exceeds the average wage by the quantity  $\lambda_2$ . The situation of insufficient factor supply and excess demand may be diagrammed as follows:



In this situation, labor unions will strive to increase wages in the amount of  $\lambda_2$ . Management can pay the increase in wages out of profits accruing from the monopoly situation. If labor unions have the monopoly power to extract this wage increase from management and thereby to eliminate the monopoly profits to business associated with  $\lambda_2 > 0$ , classical competitive equilibrium conditions will obtain in the factor market in the sense that marginal value product will equal average factor cost, and there will be full employment.

*Keynes' scenario was one which trod upon the concept of consumer sovereignty and which gave the producer the balance of power in the bilateral monopoly confrontation between consumer and producer*

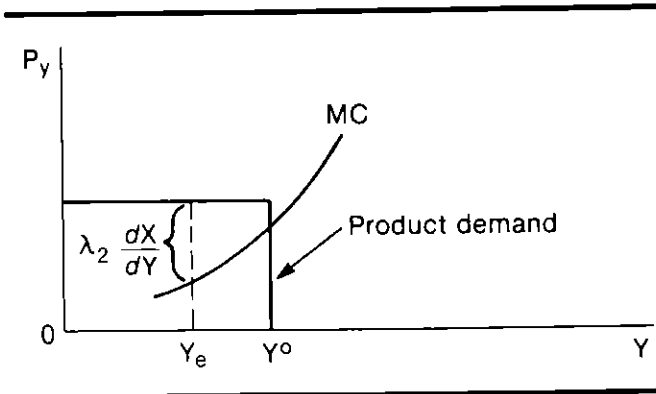
However, that is not the end of the story. It might have been if Keynes had felt that consumers could hold the line against product price increases. If they could, both  $\lambda_1$  and  $\lambda_2$  would equal zero, and income would be redistributed from business to labor to reach equilibrium. But, according to Keynes' inflation scenario in chapter 21, producer monopoly power against the consumer is strong enough to pass the wage increase along to the consumer through an increase in the general price level in an effort to maintain monopoly profits. To the extent that producers can do so, inflationary pressures will persist, additional rounds of higher wages will lead to additional rounds of higher product prices,  $\lambda_2$  will continue greater than zero, and the Marshallian supply and demand curves will never meet.

### The Product Market

Consider what happens in the product market during periods of insufficient factor supply and excess product demand. The marginal condition can be reformulated as

$$P_y - \lambda_2 \frac{dX}{dY} = P_x \frac{dX}{dY} \quad (17)$$

This equation is a rearrangement of the terms in equation (16). The expression on the right side is marginal cost. Equation (17) indicates that in equilibrium the product price exceeds marginal cost by the quantity  $(\lambda_2(dX/dY))$ . This product market situation may be diagrammed as follows:



If consumers had the power to decrease the general price level in the amount of  $\lambda_2(dX/dY)$ , perfectly competitive classical conditions for equilibrium would be restored by

means of an income transfer favoring consumers. In Keynes' scenario, consumers do not have that power. In fact, he said that the producer monopoly power over the consumer was generally not only strong enough to hold the price line and maintain monopoly profits, but also strong enough to press for price increases in the event that wage increases must be granted to labor monopolies in the factor market.

To describe upward price pressures which originate in the factor markets before full employment is reached, Keynes applied the term "semi-inflation" (7, p. 301). This is not shown in the diagram. He explained such price pressures in terms of "the psychology of workers and the policies of employers and trade unions" (7, p. 301). This source of price change was part of Keynes' general view that prices are always subject to change, generally upward, whether or not there is full employment. He found the analogy of semi-inflation to absolute inflation an imperfect one.

The problem of what Keynes called absolute inflation (7, p. 301) arises when there is full employment and potential demand is greater than the economy's capacity to produce. The gap  $(\lambda_2)$  in the factor market and the gap  $(\lambda_2(dX/dY))$  in the product market are two manifestations of the same market imperfections. By the symmetry of the simple model used here, the same analysis follows from interpreting  $\lambda_2 > 0$ , either as a situation of excess product demand or as one of insufficient factor supply. Keynes regarded this situation as an excess of product demand. Of inflation, which is demand driven, he said "[if] a further increase in the quantity of effective demand spends itself on an increase in the cost unit, we have reached a condition of true inflation" (7, p. 303).

### Conclusions

Three conclusions follow if the interpretation of Keynes presented here is correct. They relate to (1) his contribution to monopolistic theory, (2) his scenario about the balance of monopoly power among consumers, business, and factor owners (or labor unions), and (3) the implications for merging Keynesian and neoclassical models.

Perhaps it is time to recognize the contribution that Keynes made to monopolistic theory so that he can take his place beside Chamberlin, Robinson, and other early contributors. His clear statement of a factor supply curve which is perfectly elastic up to the point of full employment, and perfectly inelastic at that point, introduces a market imperfection—an element of monopoly. The factor market imperfection asso-

ciated with rigid wages has a counterpart in the product market in two senses. First, the failure of Marshallian supply and demand curves to intersect in the factor market implies that they do not intersect in the product market either, whether prices there are considered flexible or rigid. Second, the product demand curve can be drawn as perfectly elastic up to the point of effective demand and perfectly inelastic at that point. In the case of rigid product prices, there is an explicit imperfection—an element of monopoly—in the product market as well.

The theory of monopoly says that Marshallian supply and demand curves need not intersect in equilibrium. There is no identifiable schedule of quantities that will be offered in the product market at alternative prices which can be interpreted as a product supply schedule. Similarly, there is no identifiable factor demand schedule in the factor market. Keynes' assumptions of market imperfections remove his model from competitive analysis. That he knew full well what he was doing is clear from his declaration of a need to controvert the economists' counterpart to the geometers' "axiom of parallels" and thereby to develop an economic theory which no longer assumes that competitive demand and supply schedules of prices and quantities intersect.

Neither oligopoly nor bilateral monopoly problems have unique solutions. Economists introduce uniqueness by assuming a scenario. Keynes solved this problem by setting up three monopolistic interest groups: consumers, producers, and labor. In the battle between consumers and producers, he gave the balance of power to producers. Of Keynes' three interest groups, consumers were the weakest with respect to market power. Consumers have little power to press for lower prices in a recession, and they offer little resistance to price increases in an inflation. In the battle between producers and labor, Keynes gave the balance of power to labor during full employment and inflation, but assumed a stand-off (or possibly a balance to producers) during slack times. He explicitly recognized that one is not logically compelled to accept his scenario. He apparently was also aware that some scenario was needed to close the theory and achieve a unique and acceptable solution; he apparently felt his scenario led to a more realistic model than the alternatives.

Many books and articles have been written seeking to reconcile Keynes with the classical economic theorists. The task has proven difficult. Researchers usually present the Keynesian

model without making the price-quantity schedules in the monopolistic product and factor markets explicit, worse, they often present it without reference to the employment function or to the factor markets, and they focus on Keynes' redefined concepts of aggregate supply and demand in the product market. Efforts at reconciling Keynes with the classical economists usually reinstate competition, yet, it was Keynes' express intention to throw over this assumption. When efforts at reconciliation make the employment function explicit in order to connect the product market with the factor market, critics seldom recognize that Keynes' interpretation of the employment function (7, chapter 20) has the logic moving from product to factor, whereas the usual interpretation of the production function in classical theory, and also in what is coming to be called "supply-side economics," has the logic moving in the opposite direction, from factor to product. Keynes solved for equilibrium of aggregate supply and demand in the product market and then examined the labor requirement to determine whether the situation is one of unemployment or inflation; the classical model solves for equilibrium of Marshallian supply and demand in the factor market and then uses Say's Law to clear the product market of the resultant output.

Euclid's fifth postulate implies that one and only one parallel to a given straight line can pass through a given point. In consequence of this, space is assumed to be straight, not curved; we say that the sum of the internal angles of a triangle is 180 degrees. This postulate can be contradicted either by assuming that several parallels to a given straight line can pass through a given point, or that there are no parallels. In consequence, space is curved and the sum of the angles of a triangle may be either less or more than 180 degrees. Seeking to reconcile Keynesian theory with classical theory by first assuming perfectly competitive markets is analogous to seeking to reconcile Einstein's general relativity theory with Newtonian mechanics by first assuming that one and only one parallel to a given straight line can pass through a given point. Einstein's contradiction of Euclid's axiom of parallels led him to a general theory of relativity. Keynes' contradiction of the economists' "axiom of parallels" led him to a general—monopolistic— theory which, he felt, better explained the economic world in which we live than the special case of competition. To Keynes, the phrase "general theory" meant "monopolistic theory"; he might have entitled his book *The Monopolistic Theory of Employment, Interest, and Money*.

*Of Keynes' three interest groups, consumers were the weakest with respect to market power. Consumers have little power to press for lower prices in a recession, and they offer little resistance to price increases in an inflation*

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## In Earlier Issues

The rapid growth in the volume of statistics has been due largely to the collection of many additional data for use in administering governmental programs. Statistics have been adapted for many uses for which they were not originally intended. Moreover, the growth of economic statistics is unequal and somewhat haphazard from the viewpoint of supplying the information most needed in making policy decisions. Statistics must be developed to serve a purpose or need. Statistics must provide facts that will help people in making decisions.

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