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EMPLOYMENT AND EQUILIBRIUM (2d Edition). By A. C. Pigou. London, Macmillan & Co., 1949.

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of existing economic facilities and its potent destruction of future possibilities of trade.

Today with military victory still in the balance as a result of Russia's intransigent attitude toward cooperation, we face again a challenge. In this matter of international trade policy, there are now only two alternatives—and only two—before the world. The one is a situation in which every country, acting in its own interests and without regard for the interest of others, will maintain and increasingly impose detailed administrative regulations on its foreign trade. The other is a situation in which all countries, acting in their common interest, under the terms of the Charter and the General Agreement on Tariffs and Trade, will voluntarily agree to keep such detailed regulations within narrow bounds.

If our adherence to the Charter and the General Agreement were to be rejected by the Wherrys of the United States, it is certain that the world would be headed back toward the jungle of isolationism, economic warfare, and anarchy in trade relationships. If we do adjudge that *unity* is the best policy, we shall be given an opportunity, through continuing cooperation, to bring order out of chaos, to achieve a measure of stability, and to maintain economic peace. In rejection, there is a certainty of disaster; in acceptance, the possibility of deliverance from the sword of Damocles which is suspended over all our efforts toward perpetual world peace.

In conclusion, I should like to quote from Mr. Wilcox, "In my judgment the choice lies between this Charter and no Charter at all. Faced with this choice, some prefer a world in which there is no set of agreed rules to govern international trade relationships and no instrument for the settlement of economic differences. I prefer the Charter of Havana."

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EMPLOYMENT AND EQUILIBRIUM (2d Edition). By A. C. Pigou. London, Macmillan & Co., 1949. Pp. 283. \$4.00

PROFESSOR Pigou's *Employment and Equilibrium* is a brilliant performance in neo-classical economics and a masterpiece of theoretical analysis. The architecture of the whole work reflects the great talent of its creator. The book has logical consistency, and the author from well defined assumptions, through strict mathematical reasoning arrives at clear and precise conclusions.

The first edition of the book appeared in 1941 and it was intended to serve as an answer to Lord Keynes' *General Theory of Employment, Interest and Money* in which the author violently attacked the fundamental postulates of classical economics.

If there are any criticisms in the following pages, they are directed not against Professor Pigou's masterly presentation of neo-classical economics, but against the inherent weaknesses of some neo-classical basic assumptions.

Professor Pigou constructs a theoretical economic system or model analysis from which many complications found in real life are absent. It is fundamental for one to decide in all such theoretical structures which variables should be included and which excluded. The author begins with the assumption that his economic system is a self-contained one and thus he excludes from his analysis all problems arising from international economic relations. Another assumption is that labor is perfectly homogeneous and perfectly mobile. This implies that the money wage rate is the same everywhere. Fixed capital is also homogeneous, mobile, and indestructible,—which implies that the marginal productivity of capital is the same in every place and depreciation is zero. The capital stock, called "S," is assumed constant in the short run and the annual production of new fixed capital is postulated to be a very small fraction of the total quantity of capital in existence. Thus the author can ignore the effects of the investment process of the stock of capital during two, or more than two, consecutive periods of time. Total employment of the labor force is at any period of time allocated among two groups of industries producing consumption (x) and investment goods (y) respectively ($x+y$). Under the assumption that in the short run the stock of capital is a datum, we may consider the output of consumption goods, $F(x)$, as a function of labor employed in the consumption goods industries, and the output of new capital goods, $\psi(y)$, as a function of labor employed in the new production of capital goods. Thus, total real income becomes a function of one variable *employment*. As far as the consumption-savings process is concerned, the wage earners are assumed to buy only consumption goods. Investment is undertaken only by the capitalist class. Finally, money income "I" depends upon the stock of money "M" and the income velocity of circulation "V." Money income may be considered a function of banking policy due to the fact that the banking system may vary the stock of money at will. As to the market conditions, both monopolistic and pure competition are considered as alternative situations.

Professor Pigou, having simplified his system is in a position to explain and specify his functional relationships. In respect to the two production functions, that of consumption and investment goods, the marginal products of labor although considered positive for all relevant ranges of production possibilities may be either increasing, decreasing, or constant.

Pigou makes important restrictive assumptions with respect to the savings and investment functions. Investment is assumed to respond positively to a decline in the rate of interest. This assumption is rather inadequate. In the first place the rate of interest is an ambiguous concept including two distinct variables, the short term and the long term rate of interest. In most cases

investment decisions depend upon the long-term rate of interest while banking policy depends upon the short-term rate. Pigou, nevertheless, uses the same variables in both cases because he does not believe that these two rates differ appreciably. This can only be true if additional restrictive assumptions are made in respect to the short run. But such assumptions are not made. He excludes the effects of total employment on the level of investment as follows:

It is true that *in certain circumstances*, if the quantity of labor in the consumption industries undergoes an increase, an addition will need to be made to the stock of machines, and that short period flow equilibrium cannot be established until this and many other things also have been done. But these reactions belong to states of disequilibrium, when the system is in short period flow equilibrium with a steady rate of employment alike in the investment and in the consumption industries there is no place for them.¹ (Emphasis added).

But there is evidence to the effect that investment in the pre-war period was closely related to employment and the level of economic activity, even more so than to the rate of interest. This undoubtedly is a very important criticism of Professor Pigou's model.

The function of saving is directly related to both employment and the rate of interest, i.e., the larger the employment and the rate of interest the larger the aggregate savings. Although he admits that the effect of fluctuations in the rate of interest upon aggregate savings is slight, Professor Pigou's analysis suggests the possibility of a rate of interest low enough to render savings practically nil. This analysis is perhaps the most crucial assumption implicit in the whole system. In addition, the specific properties of his investment function makes possible their equilibration through the determination of the rate of interest. On this point Keynes has made a fundamental departure by assuming that both saving and investment depend upon the level of employment and are in turn equated through the employment-income determination.

The author next examines the money income function $MV=I$; the velocity of circulation "V" is considered a function of the interest rate and stands for the proportion of income accruing to wage earners represented by "P." The relation in both cases is assumed positive, which means that the larger the wage bill and/or the interest rate, the greater the income velocity of circulation. This undoubtedly is a back door introduction to the liquidity preference theory, for it follows that people will reduce the income velocity of their cash balances at low interest rates.

1. Pigou: *Employment and Equilibrium*; 55 (2d ed. 1949). Mr. Kaldor has very ably demonstrated that this relationship is not inconsistent with short period equilibrium. As he expressed it, although "... it is true that the additional equipment demand induced by an increase in the level of activity will be temporary—it will last only until sufficient additional capacity is constructed—but so is any investment demand." Kaldor, Book Review, 51 *ECONOMIC JOURNAL* 462 (1941).

On the other hand Pigou assumes that the quantity of money depends upon appropriate banking policy. He examines in turn four different banking policies: (a) a normal policy—when M is directly related to the interest rate; (b) a policy directed toward keeping money income constant; (c) a policy directed toward keeping the interest rate constant; and (d) a policy directed toward keeping the price level of consumption goods constant.

The six functional relationships discussed previously can be reduced through simplification into the following three equations:

$$(I) \phi(r) = f[r \cdot F(x)]$$

$$(II) y = f[r \cdot F(x)]$$

$$III (k_1+k_2) w = g(r)$$

These equations contain four variables, x , y , r and w , and if the system is to have a determinate solution an additional equation is required; more specifically, an equation relating either to total employment or to the money wage rate.

Pigou considers the alternative of full employment or of a money wage rate determined from the outside, i.e., through collective bargaining or governmental legislation concerning minimum wages. He believes that while the former was representative of the past, the latter applies to the present. This is nothing but a restatement of the familiar Keynesian assumption of inflexible money wages. Thus, it appears that Pigou has admitted both Keynesian assumptions of liquidity preference and sticky wages. This would have been either an unprecedented paradox or the conversion of Professor Pigou into a Keynesian. In reality Pigou's admission of liquidity preference is only formal and when the system is left to operate, the interest rate still plays the dominant role in equating savings to investment.

With this fundamental model in mind, Pigou proceeds in Part III to examine the effects of a change in one of his variables upon the other variables of the system. The analysis is thoroughly mathematical and although the conclusions are presented in "prose" they have been deduced algebraically as one can easily see in the mathematical appendix.

It is well at this point to present verbally one of Professor Pigou's models for the convenience of the non-mathematically trained economist.

In connection with this model Pigou makes the following specific assumptions: (1) that conditions of perfect competition prevail; (2) that the wage bill is a constant fraction of total money income; and (3) that money income depends on the height of the interest rate (normal banking policy).

Let us assume that under equilibrium conditions, the interest rate is 5%. At that interest rate banking policy determines money income at \$100.00. If the money wage rate is also given, say \$1.00, and the proportion of the

wage bill to money income $6/10$ (constant) then total employment will be 60. Thus employment and capital stock are known.

With any given stock of capital and employment the economy can produce consumption and investment goods. If all the factors of production are employed in the production of consumption goods, OC quantity can be produced, and if all the factors are employed in the investment goods industries, investment output would have been OAS. On the other hand the factors of production can be allocated among these two industries in such a way so as to produce an innumerable combination of consumption and investment goods. Presumably the income recipients have a map of iso-preference curves relating to these two commodities, or rather, numerous iso-preference maps depending on the various interest rates. Under equilibrium conditions the curve at production alternatives must be tangent to the highest iso-preference curve at the prevailing rate of interest. Thus, labor is allocated between the two industries and the prices of the goods determined.

Let us now examine changes in one of the variables. Suppose for instance that the labor unions agree to reduce the money wage rate from \$1.00 to \$.60. This change, and other things remaining equal, will tend to increase employment, for the share of labor amounting to 60 dollars can be used to purchase 100 units of labor. With a larger quantity of labor and the same stock of capital we move to a higher curve of production alternatives and the system is in equilibrium in a higher position in relation to the production of both consumption and investment goods. Shifts of the psychological curves of preferences in favor of consumption or investment goods, although they effect the distribution of the factors of production between the two industries, cannot materially alter total employment or real income. This, of course, can only hold true if changes in the rate of investment do not effect the marginal productivity of capital. If, on the other hand, the marginal productivity of capital is a declining function of the stock of capital, every unit of investment tends to depress the interest rate, and under the assumption that the money income is a direct function of interest, to depress income and employment. This line of reasoning is absent from Professor Pigou's analysis, for he assumes that the rate of investment fails to decrease the marginal productivity of capital in his "short run."

A banking policy directed to keep money income constant is not exposed to the preceding line of attack. Here again a reduction in the money wage rate results in an expansion of employment and real income. The reader, in following Pigou in his alternative models, must always keep in mind the fact that the conclusions reached depend wholly upon the postulated assumptions and they fall or stand with the validity of these assumptions.

In Part IV Pigou deals with Economic Dynamics. His "dynamics" are limited to the analysis of one factor: that of variations in business confidence.

It seems that the author has not significantly altered his views since he wrote *Industrial Fluctuations* in 1927. He still believes that the immediate causes lying behind general movements of employment are to be attributed to shifts in the expectational vista of the business man.

The time is not yet ripe, and our knowledge still too imperfect, to undertake the formidable task of critically appraising the factors underlying long-run economic development, therefore, we will abstain from critically discussing Professor Pigou's dynamics.

When the reading of the book ended, this reader was deeply impressed by the logical consistency of the exposition. The questions raised are suggestive of novel methods and paths for theoretical research. Even if one disagrees with some of the underlying assumptions one cannot but feel the most profound respect and admiration for the author of such a splendid work in theoretical economics.

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