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A Diagrammatic Representation of The Policy of Accounting Prices

by

Dr. A. Qayum

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A DIAGRAMMATIC REPRESENTATION OF THE POLICY OF ACCOUNTING PRICES.

Accounting prices are defined as the set of prices of factors such that if the production is carried out at cost calculations according to these prices, it will lead to the introduction of the optimal technology which will lead to the maximisation of total value of output given the community's preference schedule and factor endowment. In other words, the accounting prices of factors are the set of prices which are in equilibrium with the optimal technology as defined above. In what follows, we shall consider only the basic factors of production, labour (L) and capital (K). For the sake of simplicity we shall assume that the taste of the community does not change, that is, the relative quantities of the final commodities produced remain unchanged, so that all the commodities can be expressed in terms of one commodity, i.e., the national product (P). Further we shall base our discussion on a system of continuous production functions represented by convex production contours, each curve representing one level of production and a higher one a larger level.

In most of the underdeveloped countries, an accute shortage of capital exists with an abundant labour force. A number of reasons may be given for such a phenomenon:

1. a high rate of population increase with a low rate of savings;
2. state cheap money policy and enforcement of minimum wage laws;
3. existence of large frictional elements in the economy, etc.

These lead to chronic structural disequilibrium and persistent maladjustment in factor utilisation, resulting in the production of a volume of output which is less than what can be produced by employing all the factors fully through introducing alternative (optimal) techniques. In figure 1, OL is the total labour force available and $O\bar{L}$ is the amount utilised and $OK = \overline{OK}$ is the total amount of capital available and utilised. Point $\bar{P}$ represents the level of national product which is produced by the existing techniques of production that utilise labour and capital in the proportion $O\bar{L}$ / OK. Point P represents the maximum level of output which can be produced by the available factors of production. The optimal techniques associated with P utilise labour and capital in the proportion OL/OK, i.e., in the proportion in which they are available. The policy of accounting prices is a device to introduce the techniques associated with P in place of those with $\bar{P}$.

Let us now look at the factor prices that are in equilibrium with the techniques associated with $\bar{P}$ and P. In figure 1, the ratio of factor prices at point $\bar{P}$ is given by the slope of the tangent to the production contour. These are the actual market prices prevailing before the introduction of the accounting prices. Let the market wage rate be denoted by $\bar{w}$ and the market interest by $\bar{r}$, then

$$\frac{\bar{w}}{\bar{r}} = \frac{OA}{OB}$$

The factor prices that are in equilibrium with the techniques associated with point P are accounting prices. Let

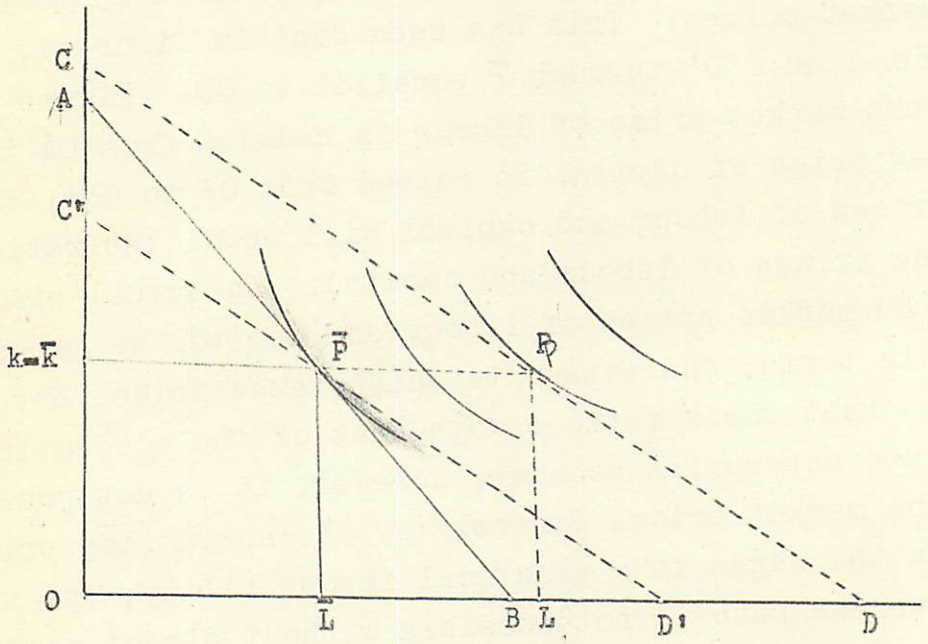
the accounting wage rate be denoted by w and the accounting interest rate by r, then

$$\frac{w}{r} = \frac{OC}{OD}$$

We can express the accounting prices of factors in terms of the market prices. This has been done in figure 1, by drawing a straight line C'D' through $\bar{P}$ parallel to CD. Figure 1, shows that if the market price of labour is reduced from OA to OC' and the market price of capital is raised from OB to OD', the ratio of the prices of labour and capital will equal the ratio of the accounting prices of labour and capital. In actual practice, as we know the market prices of labour and capital we can determine, in absolute terms, the extent to which these prices have to be changed so that their ratio equals that of the accounting prices. In a private enterprise economy, however, it is not possible to replace the market prices directly by the accounting prices. To scale down the wages is a practical impossibility, and to scale up the interest rate is not possible without direct control of all lending institutions and detailed regulations of the purpose of the loans. As we are interested in inducing the producers to adopt the optimal technology, no attempt need be made to change the market prices in general. The objective can be obtained by making the unit cost of factors to the producers equal to the accounting prices at the current level of output and the availability of factors. This can be done by levying a tax on the use of factor whose accounting price is more than the market price equal to the difference between the two per unit, and by paying a subsidy on the use of factor whose accounting price is less

than the market price equal to the difference between the two. In terms of fig. 1, this can be done by levying a tax on the use of capital equal to BD' and by giving a subsidy on the use of labour equal to AC'.

Figure 1



It must be emphasized here that the form of the capital equipment belonging to the already existing plants cannot be changed, hence the techniques employed by these plants cannot be replaced by the alternative ones. The accounting taxes and subsidies should, therefore, be applied only to the amounts of factors utilised by the plants that are newly established. Some of these plants, however, are replacing the older ones and hence the number of plants which remains outside the jurisdiction of accounting prices will gradually decline. Full employment of

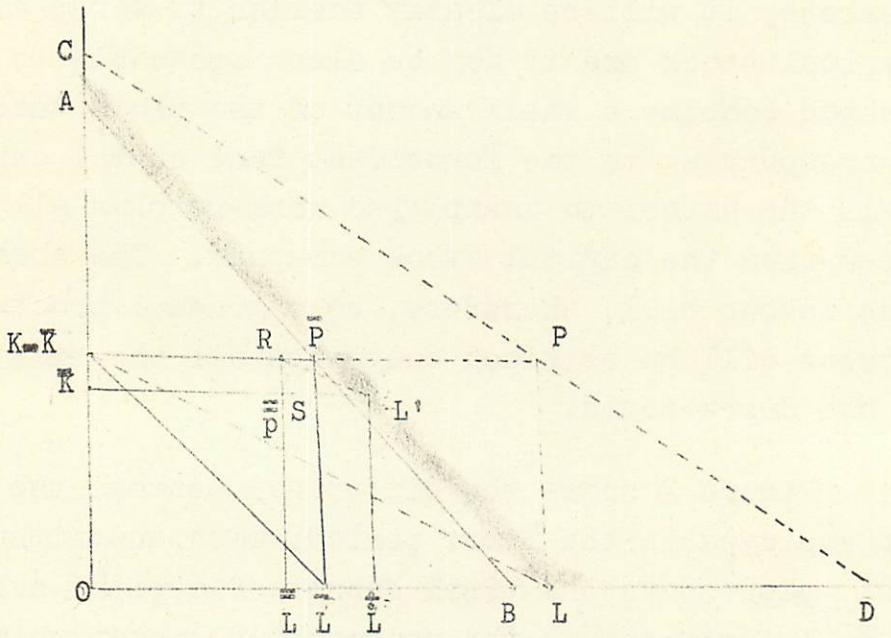
all the resources can be attained at once if all the older capital stock is scrapped and junked away and there are techniques available which combine the uncommitted resources in the proportion in which they are available. Both of these are impossible to effect and attain. In a country where a large scale un-and under-employment exists, it will be clearly foolish to scrap all the existing capital stock and it may be also impossible to find techniques which combine a small amount of the fluid uncommitted capital(corresponding to the investment fund of the current period) with all the hither to unemployed workers plus all the workers released from the capital stock scrapped. The absorption of surplus labour will, therefore, be a gradual process,and full employment will be attained only when all the existing capital stock has depreciated.

Figure 2 shows the difference between the amounts of labour employed in the first period, with and without the policy. $OK = O\bar{K}$ represents the total amount of capital available out of which $\bar{K}\ K$ represents the uncommitted amount which can be used in alternative techniques. In the absence of the policy of accounting prices $\bar{K}\ K$ will be combined with an amount of labour force in the proportion given by $\frac{OA}{OB}$. Thus in the absence of the policy, $\bar{K}\ \bar{K}$ will be combined with an $L\ \bar{L}$ of labour force. After the introduction of the policy, however, $\bar{K}\ K$ will be combined with an amount of labour force in the proportion given by $\frac{OC}{OD}$. Thus, after the introduction of the policy, $\bar{K}\ \bar{K}$ will be combined with an amount $\bar{L}\ L'$ of labour force.[1] After the introduc-

1. This can be explained as follows: $\bar{K}\ K = \bar{P}S$. Draw SR parallel to $\bar{L}K$ and $R\bar{L}$ perpendicular to the horizontal line to find $R\bar{P} = \bar{L}\ \bar{L}$, the amount of labour-force employed with $\bar{K}\ \bar{K}$ in the absence of the accounting prices. Again draw RL' parallel to $\bar{K}\ L$, to find $\bar{P}\ L' = \bar{L}\ L'$, the amount of labour force employed with $\bar{K}\ K$ after the introduction of accounting prices.

tion of the policy, therefore, there will be an additional employment of labour force equal to $\bar{\bar{L}}\,\hat{L} - \bar{\bar{L}}\,\bar{L} = \bar{L}\,\hat{L}$.

Figure 2



We now turn to study the financial burden wich the state will have to bear for administering the accounting prices. We shall consider the first period only[2]. In Figure 3 $O\bar{\bar{K}}$ is the total amount of capital of which $\bar{\bar{K}}\,K$ is available for being utilised in the new plants with alternative techniques. The amount of labour force combined with $\bar{\bar{K}}\,\bar{K}$ after the introduction of the accounting prices is $\bar{\bar{L}}\,\hat{L}$. The amount of tax imposed on the capital utilised by the new plants is $\bar{\bar{K}}\,K \times BD'$ (= the area of F G H I), and the amount of subsidy paid on the use of labour is equal to $\bar{\bar{L}}\,\hat{L} \times AC'$ (= the area of M N Q U). The financial

2. In this paper we shall consider period one only; in the following period, the same analysis will apply.

burden to the state for administering the accounting prices is

$$\overline{\overline{L}}\,\overline{L} \times AC' - \overline{\overline{K}}\,K \times BD' = MNQU - FGHI \ldots\ldots\ldots (1)$$

If (1) is positive, the state sustains a financial loss equal to its absolute value; if it is negative, the state obtains a net revenue; and if it is zero, the state finances remain unaffected.

From Fig. 3, we can also see the total value of output that can be produced, in period 1, in the absence and after the introduction of the policy of accounting prices. Under conditions of competitive equilibrium the marginal productivity of a factor equals its price and the value of total output is equal to the sum of the amounts of factors utilised multiplied respectively by their marginal productivities. In period 1, the total receipts of labour employed in the absence of the accounting prices will be $O\overline{L} \times OA$ (= the area of the rectangle $OAE\overline{L}$) and the total receipts of capital will be $O\overline{K} \times OB$ (= the area of the rectangle $OBF\overline{K}$). The total value of output at point $\overline{P}$, which represent the value of output in the absence of the policy is $O\overline{L} \times OA + O\overline{K} \times OB = OAE\overline{L} + OBF\overline{K}$.

After the introduction of the policy of accountiag prices the value produced by (or imputed to) labour will be $\overline{OL} \times OA + \overline{\overline{L}}\,\overline{L} \times OC'$. The value imputed to capital will be $\overline{OK} \times OB + \overline{\overline{K}}\,K \times OD'$. The total value of output produced, in period 1, after the introduction of the policy of accounting prices will

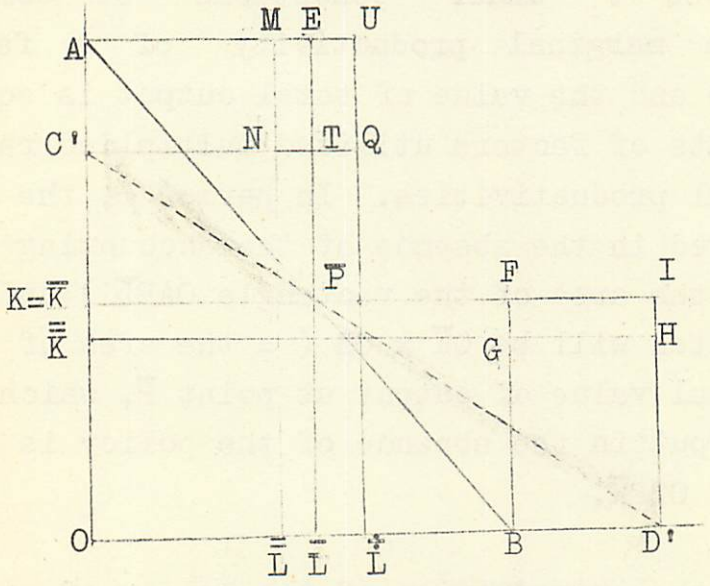
be $\bar{OL} \times OA + \bar{\bar{L}}\dot{L} \times OC' + \bar{OK} \times OB + \bar{K}\bar{K} \times OD' = \bar{OAML} + \bar{LNQ\dot{L}} + \bar{OBGK}$ $+ \bar{K}\bar{KHI}$. The increase in the value of output due to the introduction of the policy is

$$\bar{OAML} + \bar{LNQ\dot{L}} + \bar{OBGK} + \bar{K}\bar{KHI} - OAE\bar{L} - OBF\bar{K}$$

$$= \bar{LTQ\dot{L}} + FGHI - MNTE \ldots\ldots \qquad \ldots\ldots\ldots\ldots(2)$$

Given the convexity of the production curves (2) is always positive.

Figure 3



In order to see the effect of the policy on the savings, we have to compare the increase in the total amount of income accruing to the owners of factors and the proportion of it being spent with the increase in the value of output. As in the

administration of the policy, the rates of remuneration to the factors of production remain unchanged, the increase in the incomes earned will be equal to the increase in the amounts of factors employed multiplied by the rates of remuneration. As the amount of capital is the same in both the cases, the income accruing to the capital owners remains the same after the introduction of the policy. The amount of labour employed is, however, increased by $\bar{L}\overset{+}{L}$ due to the introduction of the policy. The total additional income accruing to the labourers over what would have done otherwise is $\bar{L}\overset{+}{L} \times OA = \bar{L}\overset{+}{L}UE$. If the labourers spend all their earnings on consumption, then the effect of the policy on savings can be determined by deducting $\bar{L}\overset{+}{L}UE$ from (2). It is

$$\bar{L}TQ\overset{+}{L} + FGHI - MNTE - \bar{L}\overset{+}{L}UE$$

$$= FGHI - MNQU \quad \ldots\ldots \quad \ldots\ldots \quad \ldots\ldots \quad (3)$$

If (3) is positive volume of savings is increased by the introduction of the policy; if it is negative, the savings are decreased; and if it is zero, the savings remain unaffected.

In actual practice[3], however, not all the income accruing to the newly employed labour force is spent on consumption. Hence the increase in savings is likely to be greater than that given by (3)

3. Some quantitative estimates have been made for (1),(2) and (3) in A.Qayum: 'Theory and Policy of Accounting Prices' North Holland Publishing Co, Amsterdam 1960.