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LABOUR-MANAGED FIRMS AND IMPERFECT COMPETITION

by

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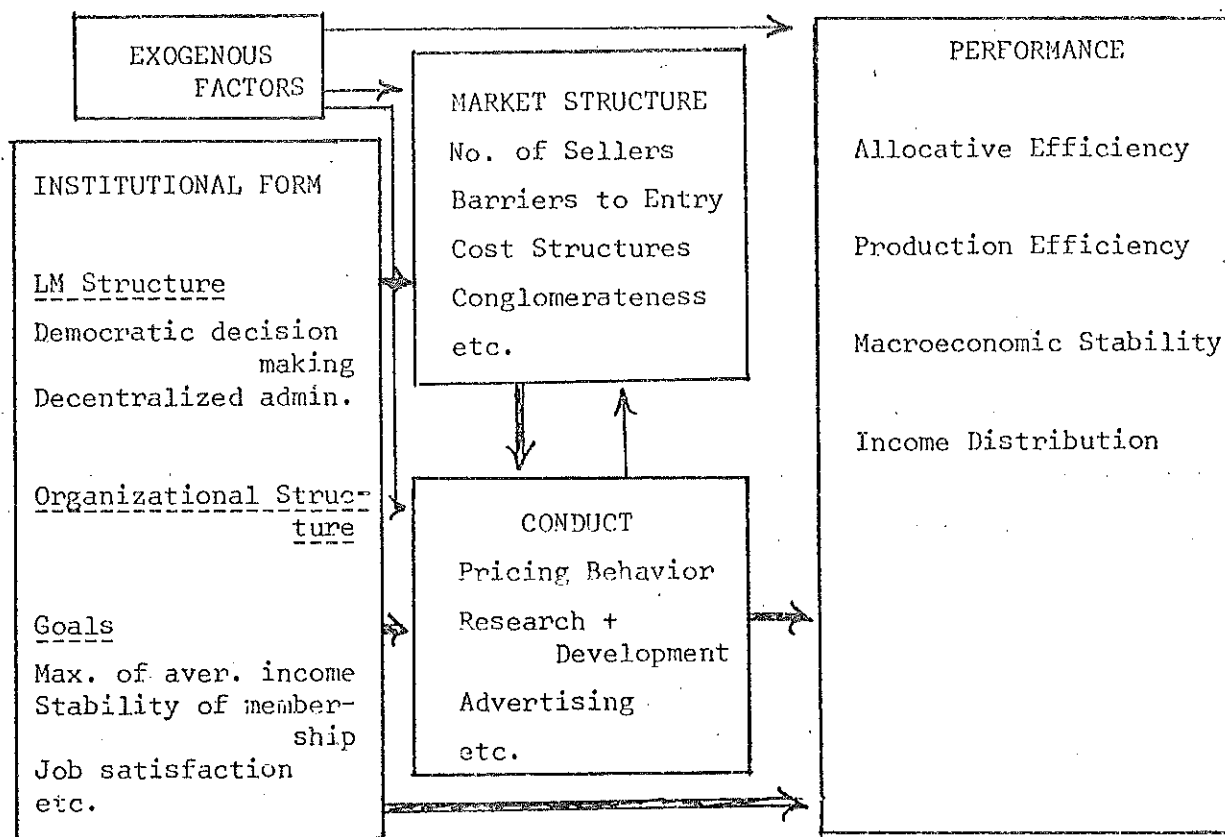
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In a recent contribution to the Economic Journal, Professor Meade (1974) analyzed the behavior of the labour-managed (LM) firm under conditions of imperfect competition and reconfirmed the results previously obtained by Vanek (1970) and Ward (1958). The three well-known conclusions emerging from such neoclassical analysis are that

- (1) an elasticity preserving increase in demand will cause a decline in the output of the LM firm ;
- (2) the LM firm will employ less labor with a given stock of capital and hence produce less and
- (3) a reduction in financial charges on fixed financial debts of the firm tends to reduce the optimal level of employment in the firm.

These results are interpreted by Meade as implying a misallocation of resources. According to Meade, only two types of policies could counter this - facilitating entry of new firms or reserving decisions about hiring and firing of workers to some outside authority. Moreover, as long as increasing returns to scale persist in a given firm, state subsidies would become necessary to induce this firm to expand production up to the point where average earnings are equated to those in other firms. Meade, therefore, concludes : "Fully independent labour-managed co-operatives are thus appropriate only in those industries in which there is room for many small scale enterprises of an efficient scale and in which entry for new competing concerns is easy." (1974, p.324).

In section I of this paper we show that Meade's conclusions are derived from a very restricted and partly incorrect review of the theory of LM firms, and that his policy conclusions do not necessarily follow from his theoretical analysis. In section II we generalize Vanek's analysis (1970, ch.16) and develop a general equilibrium theory of optimal control of a LM monopoly. Finally, in section III we suggest some extensions of the restricted approach Meade has chosen by considering the consequences of the institutional form implied by LM for the behavior of firms, market structure, and performance of the economy. A general framework for analysis of LM firms would be based on the following scheme :



Meade deals only with the direct link between one aspect of institutional form - the goal of maximizing income per worker - and one aspect of performance - allocative efficiency.¹ The restricted nature of such a focus is immediately evident from the above scheme.

Section I

Meade characterizes imperfect markets by a downward sloping demand curve for the product of the firm. Since no assumptions are made with respect to other firms' reactions, this describes the case of a monopolist. Although no references are made, LM monopolies are analyzed by Vanek (1970, ch.6, sections 2 and 3) and Ward (1958). In addition, Vanek dealt with oligopolistic market structures (1970, ch.6, sections 4, 5 and 6). It may, therefore, be useful to complement Meade's survey with a brief description of the main results pertaining

to oligopolistic market structure under LM.

Under various assumptions about oligopolistic competition Vanek has shown that for a given number of firms any realized outcome tends to be more stable than in a capitalist economy. Since efficient size is attained at smaller levels of output, entry should be easier and market structure more competitive. The criticism that such firms will be producing at less than minimum cost under increasing returns to scale over the relevant range of production should not be put too strongly ; the more firms there are, the more elastic will be the demand curve facing each one. Each will produce a greater output, possibly as great or greater than the output of a fewer number of capitalist firms which face more inelastic demand curves. Since the market structure under LM should result in more competitive pricing, it is no longer certain that imperfect competition under LM results in a more serious misallocation of resources than is the case with capitalist firms.

Several considerations work in favor of LM. More often than not capitalist oligopolies are at the same time oligopsonists in factor markets ; for LM oligopolies the magnitude of resulting distortions is reduced due to their smaller scale of operation. And as can easily be shown for a pure monopsony (selling at a constant price), labour will not be exploited in the sense of receiving less than its marginal product as is the case of a capitalist oligopsony especially in the absence of countervailing power. Furthermore, oligopolies do not only arise out of greater technological efficiency. With constant returns to scale and positive profits firms are motivated to expand output until either profits are wiped out or the market structure is no longer

competitive. By contrast, with the same assumption, the short run equilibrium of the LM firm is also its long run equilibrium, and market structure is preserved². Note that the LM firm produces in equilibrium always at lowest average cost while this is only true for the capital firm if profits are zero.

The analytic part of Meade's paper is limited to the short run with fixed capital and variable labour inputs. On the other hand, when turning to policy considerations he is concerned with the case of increasing returns to scale.

A number of points can be made in reference to the short run. First, it is by no means certain that a positive subsidy will bring about the desired increase in output. As Vanek (1970, pp. 331-2) has shown, when capital is fixed a lump-sum tax and not a subsidy is required to increase output. Second, as shown by Vanek (1970, p. 332), for the one variable factor case (and demonstrated in the next section for the more general case of variable labour and capital inputs) there exists a policy combination achieving a Pareto-optimal solution. This optimal policy consists of combining price ceilings in order to expand the output of the monopolistic sector with a lump-sum tax to equalize marginal returns to factors in both the competitive and the monopolistic sectors. Finally, it should be noted that the suggested and, to be sure, unattractive policy of fixing employment by an outside authority is clearly inappropriate since it would imply a general equilibrium solution off the contract curve. Moreover, if returns to scale are increasing to such an extent that least cost production would only be assured by a monopoly, then policy intervention is needed for both LM and capitalist firms. Indeed, even though the firm produces a larger output at a lower price, there are still two problems ; consumers pay a price above marginal costs and the allocation of resources is suboptimal. Thus, the difference of policy intervention required for LM as compared with the capitalist firm is one of degree only.

Given such policies as mentioned above, one can view the entry of new firms more positively. Not only do LM oligonopolistic firms tend to be smaller and less aggressive in their market conduct, as mentioned earlier, but price ceilings would have the effect of increasing market stability even further. They imply that limit pricing, for example, would turn out to be relatively unprofitable due to the impossibility of raising prices above the ceiling level once the potential newcomer was fended off. At any rate, LM firms are less likely to be concerned about entry and perhaps are less inclined to retaliate upon entry.

Section II

We now consider explicitly the case of increasing returns to scale, involving at least two variable inputs. It can be shown that a lump-sum tax induces increased production by the LM firm, the rationale being that in this way the fixed tax will be reduced per unit of output. Let the LM firm maximize income per labourer (y) defined as :

$$y = \frac{V - rK - T}{L}$$

where V = total revenue = $P \cdot Q$

$Q = Q(L, K)$

$Q = K^\alpha L^\beta$ is a Cobb-Douglas production function. If $\alpha + \beta > 1$ then returns to scale are increasing

L = labour input

K = capital input

$P = P(Q)$ is the demand function of the firm with $P'_Q < 0$

r = rent on capital

T = lump-sum tax

To maximize y with respect to K and L the following first-order conditions need to be satisfied :

$$(1) \quad y'_L = V'_L - y = 0$$

$$(2) \quad y_K' = v_K' - r = 0.$$

To evaluate the impact of a change in T on the equilibrium level of L and K (denoted by L^* , K^*) one takes the total differentials of (1) and (2) to obtain :

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{pmatrix} dL^* \\ dK^* \end{pmatrix} = \begin{pmatrix} -\frac{1}{L} \\ 0 \end{pmatrix} dT$$

where it is easy to derive :

$$a_{11} = \beta(3\beta - 1)P_Q' K^{2\alpha} L^{2(\beta-1)} + \beta(\beta - 1)PK^\alpha L^{\beta-2} < 0$$

$$\text{if } \frac{1}{3} < \beta < 1 ;$$

$$a_{12} = a_{21} = \alpha\beta PK^{\alpha-1} L^{\beta-1} (3\varepsilon + 1) > 0$$

$$\text{if } |\varepsilon| < \frac{1}{3}, \text{ where } \varepsilon = P_Q' \frac{Q}{P} < 0 ;$$

$$a_{22} = \alpha(3\alpha - 1)P_Q' K^{2(\alpha-1)} L^\beta + \alpha(\alpha - 1)PK^{\alpha-2} L^\beta < 0$$

$$\text{if } \frac{1}{3} < \alpha < 1.$$

The assumptions on α and β are easily satisfied, as is the one on ε . Should $|\varepsilon|$ be larger than $\frac{1}{3}$ then a_{12} and a_{21} are small relative to a_{11} and a_{22} and the sign of the determinant would remain unchanged. Given the signs of the a_{ij} 's the determinant Δ of the matrix $A = [a_{ij}]$ is positive. One then obtains :

$$\frac{dL^*}{dT} = \frac{-1/L \cdot a_{22}}{\Delta} > 0$$

$$\frac{dK^*}{dT} = \frac{1/L \cdot a_{21}}{\Delta} > 0.$$

Thus, in response to a higher lump-sum tax the optimal amounts of both labour and capital inputs increase and so must production.

It can also be easily shown that with decreasing costs lower price ceiling always lead to increases in output. Consider Figure 1. If price ceiling p_a is effective then output will be at least Q_1 since if any lower output level is profitable at price P_a , then Q_1 must be more profitable with decreasing costs. The same being true for P_b and Q_2 , our assertion is thus established. For each price ceiling and corresponding output level there exists an isoquant (see Figure 2). With the output level and price determined and capital cost given exogenously, the only remaining magnitude to be determined is the capital-labor ratio. This is found by maximising income per worker $y = (\bar{p}x - \bar{r}K(\bar{x}, L) - T)/L$ (where a bar denotes a variable held constant). Maximum y is equal to the slope of the line tangent to curve $\bar{p}x - \bar{r}K(\bar{x}, L)$ and intersecting the vertical axis at a height determined by the lump-sum tax (See Figure 3). Knowing now the K/L ratio one can easily determine the marginal rate of factor substitution from the isoquants in Figure 2.

Note that an increase in the lump-sum tax from 0 to T_1 moves the tangency point to the right in Figure 3, indicating a substitution of labour for capital and hence a movement down the isoquant in Figure 2. We therefore have two expansion paths in Figure 2, generated by gradually declining price ceilings and two alternative lump-sum taxes, T_0 and T_1 , with $T_0 < T_1$. We now have all the analytical elements necessary for a general equilibrium analysis of optimal control of a monopolistic market under LM. Assuming a simple division of the economy into a competitive and monopolistic sector, one is faced with the transformation curve of Figure 4 and the Edgeworth-Bowley box of Figure 5. Suppose the initial equilibrium is indicated by points a in both Figures, corresponding

to monopoly price P_a in Figure 1. Point a is off the contract curve since marginal value products are not equal in both sectors and income per worker is presumably much higher in the monopolistic sector. The corresponding production point is obviously inside the transformation curve. Now suppose that either price ceilings or lump-sum taxes are imposed. From the previous analysis we know that output of the monopolistic sector must expand, drawing resources from the competitive sector. Supply will expand more, the lower the price ceiling or the higher the lump-sum tax. (This is depicted in Figures 4 and 5 by the dashed (ceiling) and dashed-and-dotted (tax) lines). Clearly, to achieve a Pareto-optimal solution one cannot rely on one policy instrument alone but rather a combination of both. One such combination would consist of letting the price ceiling be such as to push the monopolistic sector's production level to d, given by the tangency of the community welfare function and the transformation curve. Now impose a lump-sum tax moving point d down the isoquant in Figure 5 and up vertically in Figure 4. This means that labour will be transferred from the competitive sector to the monopolistic sector and vice versa for capital. Production in the monopolistic sector thus remains constant while production in the competitive sector increases. At the final equilibrium e the marginal rates of transformation must be equal and, since by virtue of the capital market r is the same for both sectors, the marginal value products of labour are also equalized. From this it follows that average incomes are equalized in both sectors.

Meade's claim that only external controls of labour employment could be used to deal with a LM monopoly is clearly unwarranted. A more desirable, effective, and efficient policy exists. In terms of the Meade-Tinbergen instrument-target approach, this can be illustrated by looking at the box diagram of Figure 5 as a two-dimensional target space ; to go from point a to point c two independent policy instruments are necessary. Meade's single tool of employment control cannot suffice.

Section III

It was argued in Section II that Meade analyzed only one characteristic of the LM firm, relating it to only one performance criterion. Now some broader considerations are indicated.

As others before him, Meade shows that the LM firm reacts to an elasticity preserving increase in demand by reducing its output. However, this result holds only when it is assumed that labour is the sole variable input and joint production is ruled out. But more important : It is really meaningful to derive general conclusions from a model which assumes that all that changes under LM is the simplified objective function to be maximized ? Clearly, LM will affect the goals and the internal organization of the firm in still other, more significant ways, with repercussions on the structure of motivation, information, etc. Two illustrations of the reservations one should have about Meade's results are offered.

First, the Marshallian short run probably misrepresents the short run under LM. Both Robinson (1967) and Vanek (1970, p.287) as well as empirical evidence suggest that the employment level in LM firms is practically invariant in the short run and is certainly likely to vary a great deal less than in capitalist firms. Workers will be more reticent to lay off their fellow workers than an entrepreneur, and any such decision would be taken collectively, so there is a risk of laying oneself off. Two important consequences are that the negatively sloped supply curve disappears and that the business cycle will be more stable with workers accepting a lower average income instead of laying off part of the workforce. Thus, a further aspect of performance, macroeconomic stability, can be linked directly to institutional form, in addition to being indirectly fostered by the more competitive market structure likely under LM³. Real output and employment cycles are therefore smoother under LM than in a capitalist economy.⁴

Second, the Marshallian short run also implies a strict relationship between employment of labour and product supply. In fact, labour input can be varied not only by changing membership in a LM firms, but also by changing the duration, quality, and intensity of effort of the existing membership. Since the institutional form under LM provides for a more flexible effort-leisure trade-off it is no longer clear whether short run supply curves of LM firms are less elastic than those of capitalist firms.

This point leads us to the matter of production efficiency. As Leibenstein (1966) has shown, x-efficiency is likely to be more important than allocative efficiency. The institutional form under LM can be expected to result in less organizational slack, increased two-way information flows, lower cost of control and decision making.⁵ Empirical research also indicates that participation provides increased worker satisfaction and individual motivation and also leads to higher qualitative a work performance.⁶

As a result of these institutional and motivational changes the LM firm requires fewer supervisory and coordinating functions. Hierarchical control will be partly substituted by motivation and peer group pressure. In hierarchical organizations management can collect intra-firm information and can carry out efficiency control only at increasing costs whereas in a LM firm vertical and horizontal information flows are stimulated and control may be substituted by motivation. Hence, the expanding LM firm experiences less cost increase due to such managerial diseconomies of scale. These considerations suggest then, contrary to Meade's results, that the optimal scale of a LM firm may in certain circumstances even exceed that of a comparable capitalist firm. Indeed, Boulding (1966, p.8) has argued : "There is a great deal of evidence that almost all organizational structures tend to produce false images in the decision-maker, and that the larger and more authoritarian the organization, the better the chance that its top decision-makers will be operating in purely imaginary worlds. This perhaps is the most fundamental reason for supposing that there are ultimately diminishing returns to scale".⁷ Hence one should be skeptical of Meade's belief that LM firms must be smaller than their capitalist counterparts.

Our discussion of the theory and the related policy issues of LM monopolies and oligopolies indicates that Meade's conclusion regarding the viability of LM firms is ill-founded. The proper control policy can yield optimal or near optimal solutions for imperfectly competitive LM firms.

Moreover, a broader and more relevant view of the issue is necessary to assess the efficiency of LM firms. It is then no longer clear that LM firms must be restricted to the realm of small business, while the mainstream of world production is reserved for capitalistic transnational conglomerates.

LABOUR-MANAGED FIRMS AND IMPERFECT COMPETITION

Abstract

Consideration of the theory and related policy issues of labour-managed monopolies and oligopolies suggests that such firms are economically viable alternatives to capitalist firms. A general equilibrium theory of optimal control of LM monopoly is developed. The proper control policy can yield optimal or near optimal solutions for imperfectly competitive LM firms, thereby minimizing allocative inefficiency. Moreover, when the full range of performance criteria is considered, it is likely that LM firms outperform capitalist firms in production efficiency, macroeconomics stability and income distribution, especially when the full range of institutional changes implied by LM is taken into account.

FOOTNOTES

¹Note that Vanek (1970) uses this simplified objective function only in parts I and II of his book, but devotes part III to the discussion of a more general and realistic objective function.

²This is proven by Vanek (1970, p.32).

³Scherer (1969) has empirically found investment to be most stable in competitive sectors. Note also a nice property of a negatively sloped supply curve : in a "recession" employment in existing firms would increase.

⁴Moreover, "if there is a lack of effective demand and unemployment in the capitalist world, the very forces which produce the situation also serve as a barrier to new entry and corresponding increases in employment. On the other hand, the forces which lead to unemployment in the LM-world are also the forces which stimulate the entry of new firms and the employment in such firms" (Vanek, p.362).

⁵"In principle every worker is a potential channel of communication, but when control is from the top down, there is little or no incentive to the worker to realize this potential... LM firms would give the worker incentive to realize this potential... the resource in question is entrepreneurship, as conceived by Leibenstein... 'collective entrepreneurship', is a powerful means of conserving entrepreneurship, a resource which other systems waste". (McCain, (1973), p.386).

⁶See Bellas (1972), Berman (1967) and Proceedings of the First National Conference on Worker Selfmanagement, January 12-13, 1974.

⁷Emphasis added. Williamson (1967) provides additional theoretical support. He has shown that irreducible control losses result from a simple multiplication of hierarchical levels.

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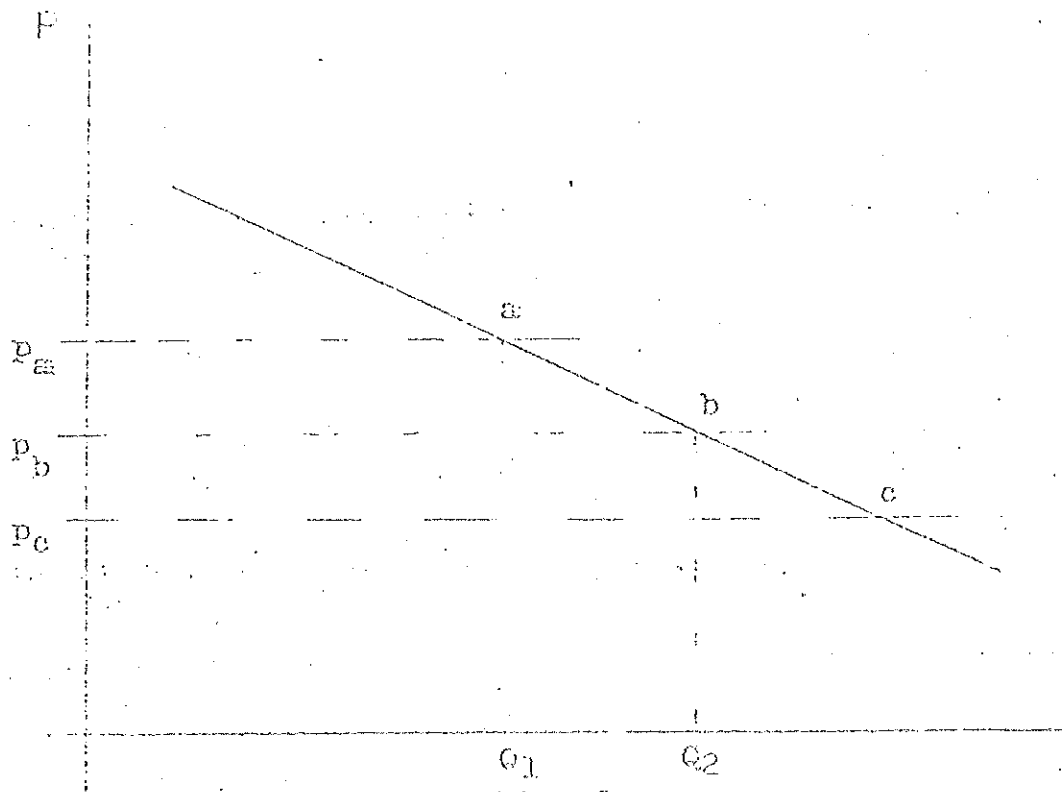


Fig. 1

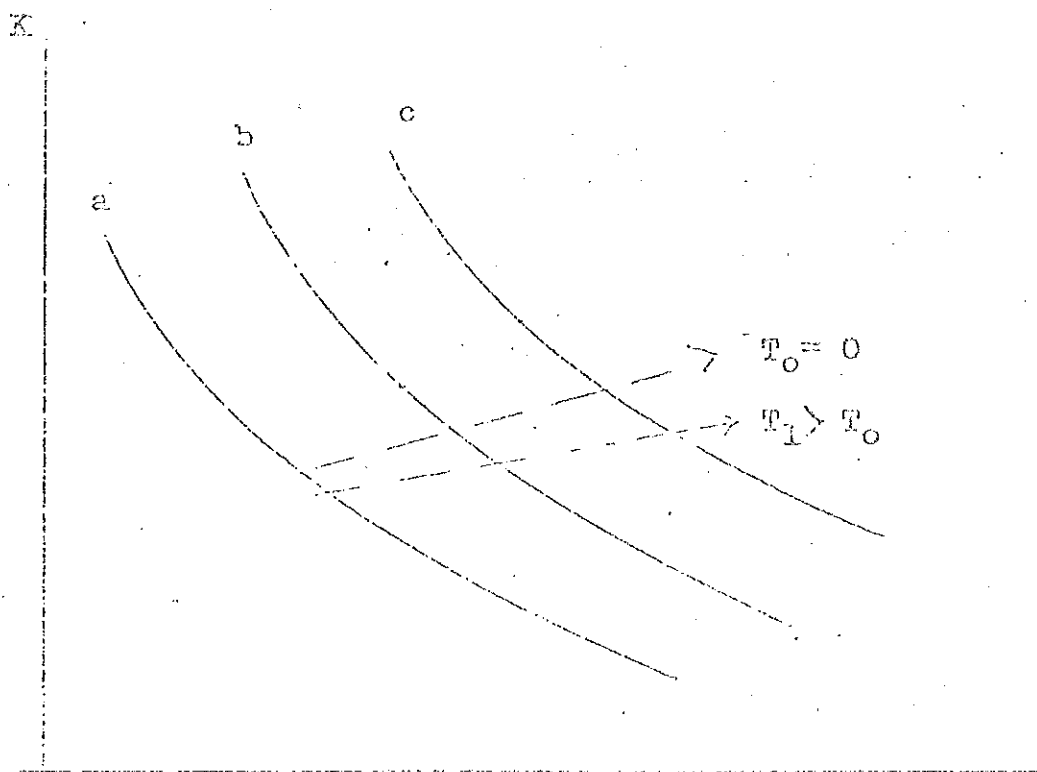


Fig. 2

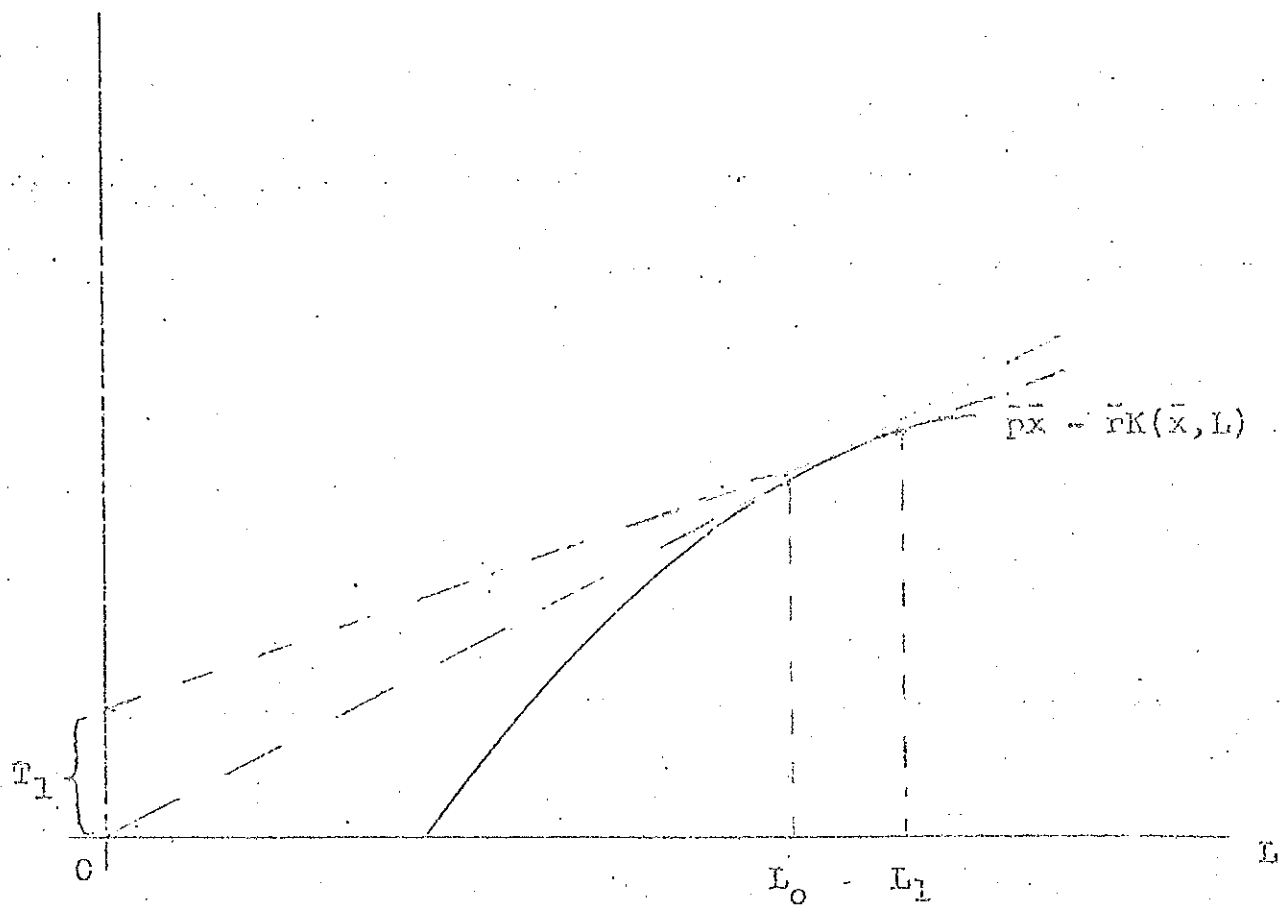


Fig. 3

competitive sector

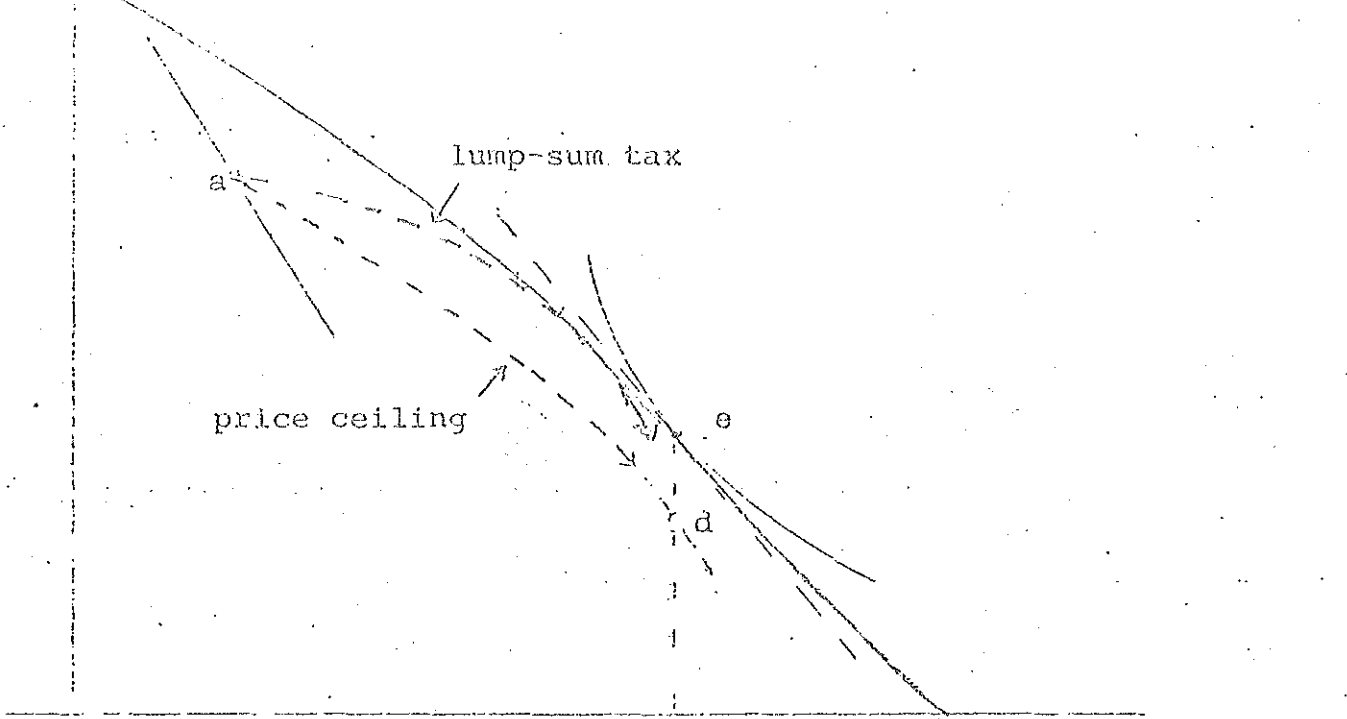
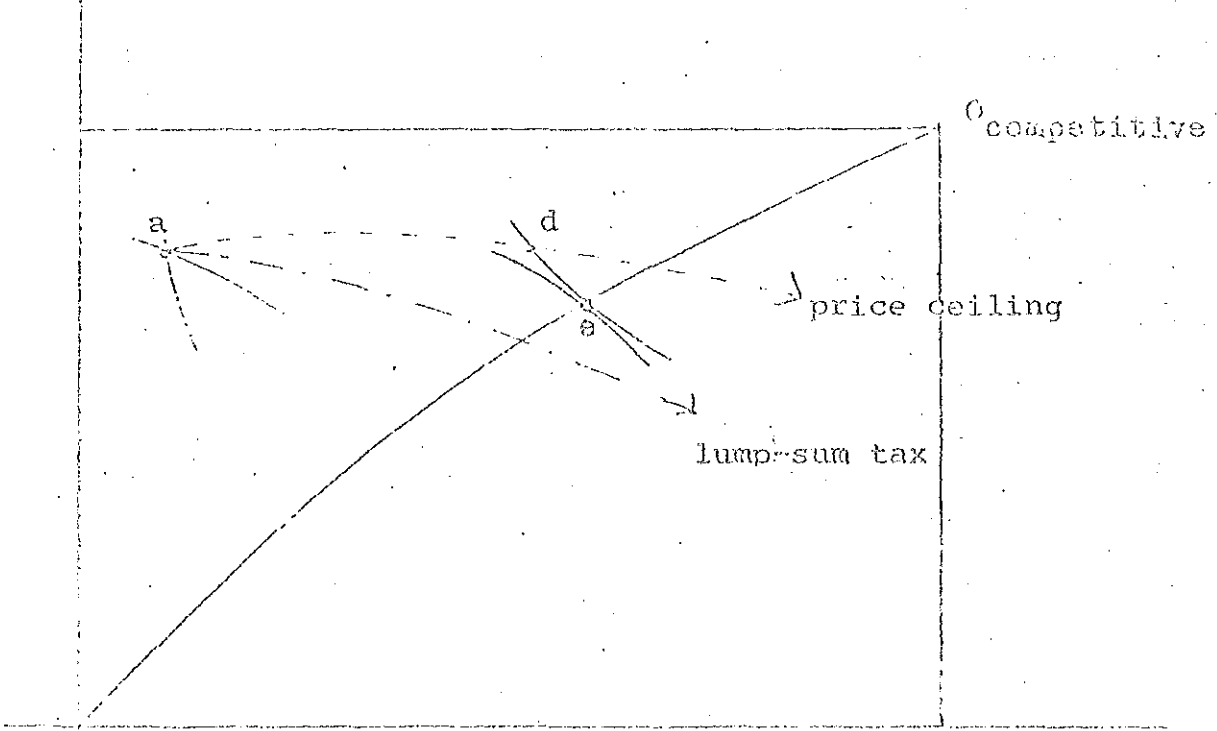


Fig. 4

monopolistic sector

K



$O_{monopolistic}$

Fig. 5

L