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1. Introduction

Over the last five or so years a good deal has been written on the topic of rent-seeking. At least two books have been devoted to the area, numerous articles have explored the field and a survey paper has investigated the theory and applications of rent-seeking.¹ It is hard, however, to feel satisfied with the existing state of the literature: terminological and paradigmatic differences abound; there does not appear to be any consensus on an analytical core, and few of the existing results are accepted widely. Basically there is little agreement between the school of thought which labels these activities as rent-seeking and the other which places them under the general rubric of directly unproductive expenditure (hereafter DUPE). The purpose of this paper is to critically survey and reformulate some of the existing theory on rent-seeking and directly unproductive activities. It should be mentioned at the outset that no attempt is made here to exhaustively survey all of this literature. The object is to explore and rectify what we see as some of the major weaknesses and problems in this field.

2. Modeling Rent-Seeking

The earliest approach to modeling the effects of rent-seeking² (Tullock, 1967), used even to this day (e.g. Anderson and Hill, 1983) made use of a simple partial equilibrium framework. Tullock

(1967) showed that the so-called Harberger triangle can severely underestimate the welfare cost of a monopoly. In Figure 1 the traditional measure of the welfare cost of transforming a competitive industry into a monopoly is BAD. To the extent, however, that resources are expended in the attempt to create a monopoly, then, Tullock notes, this measure will underestimate the measure of waste by $P_m BAP_c$.³ Why does the expense of resources represent social waste? There are two explanations of why such expenditure will lead to social waste. One explanation falls under the general rubric of rent-seeking which is defined as "... behavior in institutional settings where individual efforts to maximize value generate social waste rather than social surplus" (Buchanan, 1980a: 4). The other falls under the heading of directly unproductive expenditure. Here the activity represents waste because individuals undertake expenditure on non-productive activities. A central question raised by these two definitions is; do they represent competing descriptions of wasteful competition or do they represent the same thing? The DUPE theory appears to provide the more simplistic account of why competition may result in waste so we turn to that explanation first. After having done so, attention turns to the rent-seeking theory. The relationships, if any, between the two theories are explored once the two accounts have been set out.

In the DUPE literature waste arises from the fact that individuals in their pursuit of monopoly rents, or wealth in general, undertake expenditure on activities which are only valued for the role they serve in securing a change in property rights.

The expenditure is on activities which do not have any intrinsic worth or alternatively put, is on unproductive activities. Bhagwati and Srinivasan define such activities as those which while profitable do not contribute

... directly or indirectly into output that enters the utility function. In short, these activities are tantamount to a contraction of the availability set of the economy, defined on goods and services entering the utility function (Bhagwati and Srinivasan, 1983: 313).

Given this definition it is obvious why the expenditure on the attempt to secure the monopoly right will lead to social waste. It is wasteful by definition. It is worth exploring this point in further detail.

Consider expenditure undertaken on an activity of a new commodity used solely for the purpose of lobbying, X_3 . This 'commodity' could be say information distributed by lawyers-lobbyists designed to persuade the politicians of the industry's case. The amount of resources therefore left over for the so called productive activities, X_1 and X_2 , in this three-good world will have decreased. For example, if the amount of X_3 produced in Figure 2 is X'_3 , then the maximum amount of X_1 and X_2 which can still be produced is given by the curve $X''_1 X''_2$ on the production surface $X_1^O X_2^O X_3^O$. When this curve is projected onto the (X_1, X_2) plane, then it appears that the production possibilities frontier for productive activities has shifted inwards. The welfare significance of this is clear. Given the inward shift of the production possibilities curve, the grand utility possibilities

curve will also shift inwards. DUPE activity here must decrease the satisfaction of at least one of the individuals.

There has been considerable discussion of whether the claim about social waste is a general one. DUPE theorists such as Bhagwati and Srinivasan (1982) have pointed out that expenditure of a 'rent-seeking' kind in a second-best environment may be welfare improving. Rent-seeking theorists⁴ have cast doubt on how much significance ought to be placed on such findings. We do not wish however to comment on that debate here. To our mind there are much more deep-seated flaws pervading the entire DUPE literature. As indicated the basic assumption which motivates this literature is that individuals in the pursuit of wealth switch from productive to unproductive activities. Recall that they are unproductive because they do not enter either directly or indirectly into the utility function of any individual. A moment's reflection indicates such an assumption is unsatisfactory on two accounts. First, the assumption is made at the outset that activities like lobbying are wasteful or unproductive: DUPE theorists simply posit that the expenditure is wasteful. Yet as Samuels and Mercurio note no acceptable criterion is provided by which one could discern whether or not something is unproductive. How do we know whether or not some activity should be left out of a utility function?⁵

Second this definition of waste does not provide us with any idea of why wealth-seekers would want to undertake such activities in the first place. If DUPE theorist are taken at face value when they argue that such activities do not enter either directly or indirectly the utility function of any agent, then it is difficult

to understand why the expenditure would be undertaken. If the politician-bureaucrat is not made better off for example, then why would he respond at all to the pressure. In order to rectify the apparent lack of any rationale for government action it would appear that successful lobbying must do one of two things. It could make the politician-bureaucrat better off which would of course explain why the bureaucrat would be in favor of the regulation. But this would mean that the rent-seeking activity will be one of the indirect arguments in the politicians-bureaucrats' utility function. And this clearly contradicts the DUPE theorists claim that the activity does not enter any agent's utility function either directly or indirectly. One interpretation of the DUPE theorist's position might be that while these activities do enter an individual's utility function they should not enter the social utility function. Although this interpretation may save the DUPE theorist from some embarrassment on the score of the reason why lobbying might be successful it is not an acceptable position. As noted previously this literature provides no criterion to indicate which activities should be left out of the social utility function.

The lobbying might instead change the politician's tastes; the politicians are persuaded of the 'propriety' of the lobbyist's cause. But this is even more problematic. To the extent that the subject of concern is the welfare significance of the DUPE activity, and accepting that in such calculations the regulator's welfare ought to be taken into account, then the problem is that there is no generally accepted way of evaluating the welfare significance of expenditure which results in a new set of

preferences. The DUPE definition of such activity therefore leads to two problematic courses of action. DUPE theorists can either evaluate the welfare significance of government regulation but they can not provide any clue as to why it might exist, or they can explain that government action arises from persuasive lobbying but then can not carry out an acceptable evaluation of the welfare significance of the wealth-seeking activity.

The literature on rent-seeking as opposed to DUPE activities is not necessarily marred by such problems and it is to that approach we now turn. This theory is often associated with Buchanan, Tollison and Tullock.⁶ The basic explanation of why wealth-seeking behavior here generates waste is that individuals withdraw resources from some sector of the economy, and spend these resources on rent-seeking activities without at the same time expanding the output of the sector they wish to enter. The objective here is twofold. To demonstrate that this approach provides a conceptually distinct theory of wealth destruction. And to indicate that the rent-seeking approach is not marred by the problems which plague the DUPE literature.

Consider the following scenario, one which has been used repeatedly in this literature to exemplify rent-seeking but here with a few modifications.⁷ Entrepreneurs or courtiers in this particular example learn of the fact that one of them could be granted the right to be the single seller of playing cards. The potential rents encourage the individuals to court the monarch to shift the monopoly right in their direction. Buchanan concludes that

...[r]ent seeking on the part of potential entrants in a setting where entry is blocked or can at best reflect one-for-one substitution must generate social waste. Resources devoted to efforts to curry the queen's favor might be used to produce valued goods and services elsewhere in the economy, whereas nothing of net value is produced by rent-seeking (Buchanan, 1980a: 8)

It is not clear why this activity necessarily leads to social waste. Is the expansion of output in rent-seeking activities such as banquets for the queen's ministers not to be counted as valued output? If this were the case, then there would appear to be no difference between this explanation and that provided by the DUPE theorists. As the state of the theory currently stands rent-seeking is wasteful by assumption rather than the outcome of a sustained argument. This does not have to be, we believe, the fate of the rent-seeking literature. The basic thrust of Buchanan's argument strikes us as being the appropriate way to think about the welfare implications of rent-seeking and we attempt to substantiate this claim in the following sections. For the sake of consistency the discussion continues to analyse rent-seeking in terms of the simple playing card scenario.

It is worth noting from the outset that the rent-seeking explanation implies that a strict partial equilibrium framework cannot be used to examine the effects of rent-seeking; waste arises from the fact that resources which could be employed creating social value in some sector of the economy are used instead to procure wealth transfers. Put simply, while the geometrical analysis has been often cast in partial equilibrium terms the basic

thrust of the rent-seeking literature relies on general equilibrium notions.

Perhaps the simplest general equilibrium analysis to explore the welfare implications of rent-seeking is the approach used by Varian (1983). There he examines the implications of "lobbying" for a per-unit subsidy on a commodity which proceeds by way of expenditure on some other commodity. This approach to rent-seeking, which we call for the want of a better term **rent-seeking by "consumption"**⁸, can be interpreted in the setting here as paying for ministerial luncheons in order to curry the queen's favor. The general approach is also exemplified in Tullock's analysis (1967: 46-47) of the rent-seeking costs of theft. There Tullock argued that expenditure on protective commodities, not valued in themselves, such as theft-proof locks, constitutes a welfare cost of the theft of a painting. Armed with this general approach reconsider the welfare costs of the playing-card monopoly.

The economy consists of n individuals, of which n_1 are regulators-bureaucrats (indexed by i , $i=1,2,\dots,n_1$), and n_2 are common people (indexed by j , $j=1,2,\dots,n_2$). The two types of agents differ only in the sense that regulators can instigate regulations, whereas common people cannot. For simplicity assume that all individuals have the following utility function:

$$(1) \quad \begin{aligned} U_i &= [X_{1i}^{1/2} + X_{2i}^{1/2}]^2 & i=1,2,\dots,n_1 \\ U_j &= [X_{1j}^{1/2} + X_{2j}^{1/2}]^2 & j=1,2,\dots,n_2 \end{aligned}$$

where X_{ki} denotes the consumption of goods produced in industry k by individual i , and U_i and U_j are the utility of individuals i and j respectively. Agents maximize utility subject to their budget constraint:

$$I_i = P_1 X_{1i} + P_2 X_{2i} \quad (2)$$

$$I_j = P_1 X_{1j} + P_2 X_{2j}$$

where P_k is the price charged in industry k , and I_i and I_j are the incomes of individual i and j respectively. All individuals have identical endowments of labor equal to unity, that are supplied perfectly inelastically. There are no other sources of income apart from labor income. The nominal wage rate is denoted by W . Hence:

$$(3) \quad I_i = I_j = W \quad \text{for all } i \text{ and } j$$

Maximization of (1) subject to (2) yields the demand functions for the two goods for each of the two types of individuals:

$$X_{1i} = [P_1 [1 + (P_1/P_2)]]^{-1} I_i \quad (4)$$

$$X_{2i} = [P_2 [1 + (P_2/P_1)]]^{-1} I_i$$

$$X_{1j} = [P_1 [1 + (P_1/P_2)]]^{-1} I_j \quad (5)$$

$$X_{2j} = [P_2 [1 + (P_2/P_1)]]^{-1} I_j$$

Producers in both industries are assumed to produce under identical constant returns to scale technologies, with labor as the only variable input:

$$(6) \quad Q_1 = L_1$$

$$(7) \quad Q_2 = L_2$$

Profit maximization in both industries yields the demand for labor and supply of goods in both industries.⁹ These are perfectly elastic at $W/P_1 = W/P_2 = 1$. Choosing labor as the numeraire ($W=1$), the model is closed by postulating equilibrium in the labor and goods markets. By Walras' Law we can delete one market clearing condition. Hence:

$$(8) \quad X_1 = n_1 X_{1i} + n_2 X_{1j} = Q_1$$

$$(9) \quad n = L_1 + L_2$$

Equation (8) implies that aggregate demand for good 1 equals aggregate supply. Equation (9) is the labour market equilibrium condition. This simple model can now be used to describe the following two cases.

(a) Competitive Equilibrium.

The first case that we can analyze with the help of this simple model is that in which there is perfect competition in both

industries. This implies that the bureaucrats-regulators have not imposed any regulations and so serves as a benchmark for the discussion of the welfare effects of rent-seeking. It is straightforward to show that the competitive equilibrium implies the following levels of output and employment in the two sectors:

$$(10) \quad X_1^c = L_1 = n/2$$

$$(11) \quad X_2^c = L_2 = n/2$$

And, of course, we have the result that $P_1^c = P_2^c = 1$. The central features of this simple model are depicted geometrically in Figure 3. The competitive equilibrium involves production of X_1^c and X_2^c units of commodities 1 and 2. The initial demand curves for the two goods, as obtained by aggregating equations (4) and (5) over all n individuals, are depicted as $D_1(P_1; P_2 = P_2^c)$ and $D_2(P_2; P_1 = P_1^c)$ respectively.

(b) Nature of the Rent-seeking Equilibrium.

Now suppose that the courtiers or entrepreneurs who are presently involved in the production of industry 1, say competitively produced playing cards, attempt to establish a monopoly by lobbying the monarch, through the bureaucrats-regulators i.e. ministers of the crown. Assume that they use X_2 in their lobbying effort, and that the potential rent is exactly

dissipated. In this parable commodity X_2 represents say foodstuffs. The lobbying effort consists of an amount of X_2 , say X_2^R , that is distributed, free of charge, to a significant proportion of the bureaucrats. Assume that, in order for the lobbying effort to be successful, at least a a^* percent of the bureaucrats must be lobbied adequately (in the sense explained below). The parable is thus as follows. There are n_1 bureaucrats that are called to a special audience with the monarch. The bureaucrats do not communicate with each other. One of the items on the agenda is the proposed monopolization of industry 1. The voting rule is supposed to be of the following simple kind. If a a^* percent of the bureaucrats vote in favour of the regulation, then the monopoly privilege will be granted for the monarch heeds the advice of this majority. Assume that bureaucrats' votes can be "bought" by supplying them with an adequate amount of X_2 , say X_{2i}^R . This amount must be such that lobbied bureaucrats are better off in utility terms after the regulation is passed. Since, as is shown below, unlobbied bureaucrats are made worse off by the monopolization, they will vote against the proposal. We can define therefore the actual fraction of votes in favour of the regulation as follows:

$$(12) \quad a = X_2^R / (n_1 X_{2i}^R)$$

A successful lobbying effort implies that the following constraint must be met:

$$(13) \quad a \geq a^*$$

A bureaucrat that has been lobbied successfully effectively receives a transfer in kind equal to $P_2 X_{2i}^R$. Hence, his budget constraint is now:

$$(14) \quad P_1 X_{1i} + P_2 X_{2i} = 1 + P_2 X_{2i}^R$$

Maximization of (1) subject to this reformulated budget constraint (14), yields the demands for the two goods by the lobbied bureaucrat:

$$(15) \quad X_{1i} = [P_1 [1 + (P_1/P_2)]]^{-1} (1 + P_2 X_{2i}^R)$$

$$X_{2i} = [P_2 [1 + (P_2/P_1)]]^{-1} (1 + P_2 X_{2i}^R)$$

Unlobbied bureaucrats' demands remain as given in (4). Hence, in view of (4) and (5), this implies the following aggregate demands for the two commodities:

$$(16) \quad X_1 = [P_1 [1 + (P_1/P_2)]]^{-1} (n + P_2 X_2^R)$$

$$(17) \quad X_2 = [P_2 [1 + (P_2/P_1)]]^{-1} (n + P_2 X_2^R)$$

Given the demand curve, the profit maximizing price (P_1^m) that the intending monopolist wishes to set in industry 1 is:

$$(18) \quad P_1^m = 1 + [1 + P_2]^{1/2}$$

This implies that total rents in industry 1 are equal to:

$$(19) \quad R = (P_1^m - 1) X_1 = [1 + P_2]^{1/2} X_1$$

This area is depicted as $P_1^m B A P_1^c$ in Figure 3. As the rents (R) are exactly dissipated by expenditure on X_2 , this implies the following derived demand for X_2 used in rent-seeking (X_2^R):

$$(20) \quad X_2^R = R/P_2$$

The model is closed by postulating equilibrium in the labor and goods markets:

$$(21) \quad n = L_1 + L_2$$

$$(22) \quad L_1 = X_1 = Q_1$$

$$(23) \quad X_2 = Q_2$$

Since the marginal cost curves in the two industries do not shift (they remain at $W=1$), it is obvious that P_2 continues to be unity. In terms of Figure 3, the demand curve in industry 1 shifts out to D_1' as a result of the income effect borne by the lobbied bureaucrats. The demand curve in industry 2 shifts out to D_2' for two reasons. The introduction of the monopoly price in industry 1 leads to a substitution away from the consumption of X_1 to X_2 . And the provision of free lunches to the lobbied bureaucrats results in

a positive income effect and shifts the demand curve to the right. The demand curve for X_2 , inclusive of the income and substitution effects, is $D'_2(P_2; P_1 = P_1^m)$. The dashed curve through A' is the demand for X_2 , exclusive of the income effect. Since all rent income is spent, we have that $A'B'X_2^{rc}C' + EBX_1^mF = P_1^mBX_1^mF$. In the rent-seeking equilibrium, output in industry 1 has fallen to X_1^m , whilst the price has risen to P_1^m . Total output in industry 2 is equal to X_2^{rc} . The solution values are:¹⁰

$$(24) \quad P_1^m = 2.4142$$

$$(25) \quad P_2 = 1.0$$

$$(26) \quad X_1^m = 0.1464n = L_1$$

$$(27) \quad R = 0.2070n = X_2^R$$

$$(28) \quad X_2 = 0.8536n = Q_2 = L_2$$

Feasibility Conditions

Before the welfare implications of rent-seeking are discussed one thing remains to be established; that this rent-seeking equilibrium is feasible in the sense that the available rent is adequate to buy the necessary votes as given in (13). As indicated in (27) the potential rent from monopolizing industry 1

is equal to $0.2070n$. If $a^* n_1$ bureaucrats are lobbied, then each lobbied bureaucrat will receive:

$$(29) \quad X_{2i}^R = X_2^R / (a^* n_1) = 0.2070 / (a^* b)$$

where b is the relative size of the bureaucracy in the economy ($b = n_1/n$), which is exogenous in the model. This amount has to be such that the lobbied bureaucrat is better off after the regulation is passed. The utility level in the competitive equilibrium is equal to 2. Using (1), (15), (24), (25), and (29) the utility level of a lobbied bureaucrat can be seen to be equal to:

$$\begin{aligned} (30) \quad U_i &= [(0.1213(1+X_{2i}^R))^{1/2} + (0.7071(1+X_{2i}^R))^{1/2}]^2 \\ &= [(0.1213(1+0.2070/(a^* b)))^{1/2} + \\ &\quad (0.7071(1+0.2070/(a^* b)))^{1/2}]^2 \\ &= 1.4142 + 0.2927/a^* b \end{aligned}$$

This implies a critical level for $a^* b$, denoted by $(a^* b)^c$ such that the following holds:

$$(31) \quad U_i \begin{matrix} > \\ < \end{matrix} 2 \text{ iff. } (a^* b) \begin{matrix} < \\ > \end{matrix} (a^* b)^c = 0.5$$

It may be helpful to put a geometrical interpretation on part of this argument. In Figure 4 the horizontal axis reflects the

fraction of bureaucrats in the economy and is, of course, scaled from zero to one. The vertical axis measures the fraction of lobbied bureaucrats, a , and the fraction of bureaucrats in support of a bill before it will be passed. This axis is also scaled from zero to unity because the maximum percentage of bureaucrats which can be lobbied is one hundred per cent and the most restrictive voting rule is unanimity. The line labelled $lZWl$ is the boundary of the feasible set. For example, suppose the economy is completely composed of bureaucrats and the monarch requires all of his ministers to be in favor of a proposal before he will place his seal on the document. Point Y is consistent with these two conditions. This point is not however feasible. As indicated in equation (31), the potential rent from monopolizing commodity 1 is only large enough to successively lobby fifty per cent of the bureaucrats and this is consistent with point W on the lobby-feasibility locus; there are insufficient rents available to lobby successively in this economy. On the other hand, if the fraction of bureaucrats in the economy was fifty per cent, then there would be just enough rents to lobby each and every bureaucrat successfully. This is consistent with point Z on the frontier. In fact the lobbying would have been rewarding if the voting rule had been less restrictive. The scenario outlined here is, of course, one amongst many. For example, if the monarch only required fifty per cent of his ministers to approve of a proposal, then the fraction of bureaucrats which would have to be effectively on side of the industry would be fifty per cent also. This would appear to raise the possibility that the potential rent may not be fully

dissipated; for after all there was enough potential rent to lobby all of the bureaucrats at point Z. But as indicated previously, the scope of enquiry here is one of competitive rent-seeking which we take as read that the rent is fully dissipated. The way to accommodate this in our analysis is to increase the size of the free lunch which is received by each lobbied bureaucrat. Also, for a given (a^*, b) all values of a in the interval $(a^*, 1)$ are feasible. Below we will always assume a boundary solution $(a=a^*)$, although no such assumption is necessary.

Welfare Implications

Given that the rent-seeking equilibrium is feasible, attention turns now to the level of waste associated with the solution. The total loss to consumers of the monopoly right in X_1 is $P_1^m BAP_1^c$ plus BCA . Since entrepreneurs spent $P_1^m BAP_1^c$ in the attempt to become the monopolist it follows that the area of monopoly rents does not, in contrast to the orthodox analysis, represent an off-setting transfer from consumers to the "producer". It appears to be the case [it will be pointed out at a later stage in what ways this measure is misleading] that in the absence of second-best problems the welfare cost of the monopoly is $P_1^m BCP_1^c$; area BCA is the loss due to the restriction in output, as traditionally measured, and $P_1^m BCP_1^c$ is the loss directly due to rent-seeking. Waste arises here for the following reason; the 'producer' has spent all of his rents on securing the monopoly

franchise so that he is no better off after the event; and while bureaucrats who are lobbied are made better off this does not outweigh the loss borne by consumers who have to pay a higher price on the commodity which is now monopolized. Overall 'society' has been made worse off. A number of important implications can be drawn from this analysis.

It is readily apparent that this explanation of wasteful competition differs from that put forward in the DUPE literature. No assumption is made here that the resources used in rent-seeking do not enter the utility function of any economic agent. Commodity X_2 enters positively the utility function of all the agents who continue to treat it as final consumption. And as the courtier was successful in securing the monopoly franchise, regulators presumably placed some positive value on their free lunches. The waste arises from the fact that although some individual may be successful in securing the monopoly franchise the rent-seekers undertook so much expenditure on trying to affect the transfer that the loss in social surplus by the consumers does not represent a gain in social surplus to the entrepreneurs.

It is also worth noting that the analysis put forward here differs from that usually offered in the rent-seeking literature. The usual claim is that rent-seeking results in waste because resources are withdrawn from some other sector of the economy without at the same time expanding the output of the sector they wish to monopolize or regulate. It is abundantly clear from the analysis of the parable here that such an explanation is too narrow. Waste arises here because resources are withdrawn from the

sector the rent-seekers wish to monopolize without creating a net social surplus in any other sector. Alternatively put, resources used in rent-seeking are not withdrawn from other sectors of the economy but rather are taken from the sector which is the subject of monopolization. Furthermore, contrary to traditional findings, the output of the other sector expands. Resources therefore need not be withdrawn from some other sector, without any compensating response, for competition to be regarded as wasteful. Perhaps it would be more productive for future research in this area to simply adopt Buchanan's definition that attempts to maximize individual utility which generate social waste should be defined as rent-seeking. This would force us to give up any attempt to provide the definitive explanation of wasteful competition; it is evident that there will be a number of possible scenarios of wasteful competition.

The above would seem to imply, for example, that over-use of a nonexclusive resource constitutes rent-seeking behavior; individual efforts to maximize utility dissipate the value of the resource. Note though that this does not mean that rent-seeking and rent dissipation are one of the same thing. Buchanan was careful to point out that rent dissipation also occurs in competitive markets with desirable consequences. After all, rents encourage entry, provide entrepreneurs with the incentive to expand limited production, thereby create a social surplus and in the process rent dissipation occurs. By this account, rent-seeking is analogous to rent dissipation which results in social waste. On the other hand,

profit seeking involves is dissipation which leads to a social surplus.

The second major implication to be drawn from the analysis is that the loss due to rent-seeking, $P_1^m BAP_1^C$, over-estimates the welfare cost. To the extent that the politicians are made better off by the luncheons,¹¹ then $P_1^m BAP_1^C$ will over-estimate the welfare cost of rent-seeking. Since it is not possible to easily identify the losses and gains in terms of Figure 3, we use the underlying expenditure functions to analyze the welfare implications of rent-seeking. The expenditure function corresponding to the CES utility function given in equation (1) is:

$$(32) \quad E_i^*(P_1, P_2; U_i) = [P_1^{-1} + P_2^{-1}]^{-1} \cdot U_i$$

In order to calculate the effects of rent-seeking we need only distinguish between lobbied bureaucrats (indexed by k) and all other individuals (indexed by l). Each lobbied bureaucrat receives free lunches equal to $0.2070/(a^* b)$ which is treated as an income payment. In view of (30) the utility level attained by the lobbied bureaucrat is equal to $U_k = 1.4142 + (0.2927/a^* b)$. In view of (24), (25), and (32) the expenditure level associated with U_k is equal to:

$$(33) \quad E_k^*(P_1^m, P_2; U_k) = 1 + 0.2070/a^* b$$

The net gain per lobbied bureaucrat can be measured as follows:

$$(34) \quad E_k^*(P_1^m, P_2; U_k) - E_k^*(P_1^m, P_2; 2) = 1 + 0.2070/a^*b - 1.4142$$

Where the second term on the LHS(34) measures the expenditure level which would return the lobbied bureaucrat to the original pre-rent-seeking utility level. Since there are a^*bn lobbied bureaucrats, their total gains (G) are equal to:

$$(35) \quad G = a^*bn [1 + 0.2070/a^*b - 1.4142]$$

Similarly the loss to any unlobbied individual is equal to:

$$(36) \quad E_1^*(P_1^m, P_2; U_1) - E_1^*(P_1^m, P_2; 2) = 1 - 1.4142$$

Where U_1 is the utility level of unlobbied individuals at the new prices. This can be calculated by inverting (32) to obtain the indirect utility function, and noting that their income is equal to 1. Since $(1-a^*b)n$ individuals remain unlobbied, the total losses (L) are equal to:

$$(37) \quad L = (1-a^*b)n [1 - 1.4142]$$

Inspection of (35) and (37) reveals that the winners cannot compensate the losers and the net loss to society of the monopoly is equal to:

$$(38) \quad L - G = 0.2072n > 0$$

It can be shown that the loss calculated here is less than that put forward in the rent-seeking literature. There are several ways in which our general equilibrium model can be used to "reconstruct" the level of waste which might be calculated by proponents of the rent-seeking school. By showing these different methods the inherent dangers of using partial equilibrium analysis on a general equilibrium phenomenon like rent-seeking and waste are exposed.

The first way in which the waste due to the monopoly with rent-seeking might be measured is to simply calculate the area $P_1^m P_1^c CB$ in Figure 3 - the traditionally proposed measure. This first measure is equal to:

$$(39) \quad W_1 = \int_{P_1^c}^{P_1^m} \frac{1.207n}{P_1(1+P_1)} dP_1 = 0.4183n$$

This measure, aside from failing to measure the change in consumer surplus with reference to the compensated demand curve, is deficient for the following reason. It is based upon the demand for X_1 alone when all rents are paid as income to the consumers, and therefore fails to take account of the benefits which accrue to the bureaucrats as consumers in other markets. It will overestimate the cost of the monopoly substantially.

Another possible measure of waste could be the area $P_1^m EGP_1^c$ in Figure 3. This measure is based upon demand for X_1 net of the rent income, and is equal to:

$$(40) \quad W_2 = \int_{P_1^c}^{P_1^m} \frac{n}{P_1(1+P_1)} dP_1 = 0.3466n$$

But this measure is also deficient, although this only becomes clear in a general equilibrium context. What this approach implies is that while rent is generated from the monopolization of X_1 nobody receives it. It is clear that such a treatment of rent-seeking is highly unsatisfactory since it introduces a fundamental inconsistency into the model. Put simply, resources can not vanish into thin air.

A third measure of waste removes this inconsistency by distributing the rent equally over all agents. It is worth noting that this is the convention adopted in the literature which explores monopolistic distortions in a general equilibrium setting. This implies that each agent receives a total income of 1.207, and the total level of waste is equal to:

$$(41) \quad W_3 = n[E(P_1^m, P_2; 2) - E^*(P_1^m, P_2; U_0)] = 0.2072n$$

Where U_0 is the level of utility attained when income is 1.207. This measure is identical to the one proposed in (38).¹² A comparison of the waste as calculated in (38) and (41) leads to a startling result. The rent-seeking school has been at pains to point out that the welfare cost of a monopoly is larger when rent-seeking effects are taken into account. We have now demonstrated that if rent-seeking takes place by distributing lunches or theater

tickets, for example, then the welfare cost of the monopolization is no different from that proposed by Harberger more than two decades ago. The simple intuition behind this surprising result (at least from the perspective of the rent-seeking literature) is that the expenditures of this kind involve a redistribution of income. And as is widely known, there is no welfare cost associated with pure redistribution.

Several responses might be made to the argument that the welfare cost ought to be discounted by the gains which accrue to the bureaucrat-politicians. One counter-argument might be that the preferences of regulators-politicians should not be counted in discussions of the collectivity's welfare. After all, if these representatives were completely immune from the sort of political pressure under consideration here, then 'society' would bear little in the way of costs due to rent-seeking and therefore these unmeritorious preferences should not be included. Strict adherence to methodological individualism requires, however, that the bureaucrats' preferences ought to be taken into account, except when there has been some constitutional decision to ignore the preferences of bureaucrats when in-period welfare comparisons are made. Besides, if the general implication was accepted that preferences ought not be taken into account when other individuals are made worse off, then almost the entire fields of social choice and welfare economics would fall by the wayside. We guess few economists would be willing to accept this extreme position.

On seemingly more acceptable ground it might be argued, as it has been by Posner, "...that expenditures on monopolizing

[which] yield such by-products will be ignored in the development of the model, and its principal relevance, therefore, is to methods of monopolizing that have little or no social value" (1975: 75-76) [our emphasis]. This will not do for precisely the same reasons which were advanced in our criticism of the DUPE literature.

A possible defence of the Posner type position might be that politicians-bureaucrats themselves will waste resources in their attempt to be elected or promoted to a senior position in which they will receive these free benefits of office. If electoral candidates, for example, spend up to G dollars (where G is given in equation (35)) worth of resources in the attempt to become the successful candidate, then it would appear that $P_1^m BAP_1^c$ would be an acceptable measure of the welfare cost due to rent-seeking. But even this will not do. As long as the politicians-to-be provide some benefits to other agents in the economy then $P_1^m BAP_1^c$ will continue to overestimate the welfare costs of rent-seeking.

3. Rent-seeking and the Production Possibilities Frontier.

It is instructive to return to a theme of section 1 by asking what are the implications, if any, of our view of rent-seeking for the universally held claim that wasteful competition leads to a contraction of the production possibilities frontier. It would appear that the DUPE theorists would shift the production possibilities frontier by the amount of the lobbying expenditure. In Figure 5, mn is the initial production possibilities frontier

and point E describes the competitive levels of production and consumption. Following the logic of the DUPE position, it would appear to be the case that the production possibility curve ought to be shifted in by $R=0.207n$ units of X_2 which is the level of output in terms of X_2 devoted to rent-seeking as indicated in equation (27). This means that the production possibilities frontier shifts from nn to tt . Point E^0 would presumably describe the level of outputs which enter into the utility function of the various agents.

It is relatively easy to see, however, that there can be no such universally held claim in the rent-seeking literature; contraction of the production frontier is not a necessary feature of the rent-seeking process.¹³ As indicated in the above discussion the level of output of X_2 which is used for rent-seeking purposes does enter the utility function of the politician-bureaucrats. Point E^1 - as indicated in equations (26) and (28) - reflects therefore the level of outputs under the rent-seeking equilibrium which do in fact contribute in some way to utility. Clearly there has been no contraction of the production possibilities frontier. There is no reason to believe that this result can be generalized to all cases of wasteful competition. But equally clearly it demonstrates that a contraction in the production possibility curve is not a necessary condition for rent-seeking. Analyses which start off with a contraction in the production frontier as the indispensable effect of rent-seeking are presenting a misleading approach to the process.¹⁴

While we are aware of the conceptual problems associated with the idea of community indifference curves (CICs) this technique is used in order to exemplify the basic differences between our position and that of the DUPE literature which has made heavy use of the technique. In Figure 5 the CIC passing through the rent-seeking equilibrium E^1 is CIC_2 . The loss in social welfare from CIC_3 to CIC_2 evaluated in terms of X_2 is given by E^1M . (In our example E^1M is equal to $0.2072n$). The DUPE theorists, however, would have us evaluate the movement from CIC_3 to CIC_1 which evaluated in terms of X_2 is E^0M , which is certainly larger than the correct measure E^1M . (In our example E^0M is equal to $0.207n + 0.2072n = 0.4142n$). Hence, by erroneously shifting the production possibilities frontier, the DUPE literature overestimates the welfare cost associated with rent-seeking dramatically.

4. Rent-Seeking and Factor Demand

The discussion so far has examined what we call rent-seeking by consumption, that is rent-seeking proceeds by way of the purchase of final commodities. An alternative form is rent-seeking by factor usage. This describes those situations in which entrepreneurs engage factors of production, such as lawyers and lobbyists, in their bid to acquire rents. A convenient setting in which to examine this case is Buchanan's analysis of rent-seeking where he explored the gains which accrue from converting common to private property (Buchanan, 1980b). While the discussion below follows, to

some extent, Buchanan's argument we have found it useful to supplement his discussion with a simple algebraic model. It is useful in the sense that it enables us to consider some cases which Buchanan did not address and which are difficult to handle in a purely geometrical treatment.

Suppose that there are two industries that produce under identical technologies, and for simplicity assume that the price in both industries is equal to unity. The production functions in the industries are:

$$(42) \quad Q_1 = aL_1 + (b/2)L_1^2 \quad a, b > 0$$

$$(43) \quad Q_2 = aL_2 + (b/2)L_2^2$$

where Q_1 and L_1 denote output and input in industry 1 respectively. The total supply of inputs (L) is fixed and the input market is assumed to clear:

$$(44) \quad L = L_1 + L_2$$

Using this simple model one can analyze the two different cases.

(a) Common Property in Industry 1.

Assume that initially industry 1 is operating under common property whilst industry 2 is in a private property regime. This implies the following first order conditions:

$$(45) \quad W = a - (b/2)L_1$$

$$(46) \quad W = a - bL_2$$

Where W is the nominal (and real) wage rate, which is equalized between industries since the labor input is perfectly mobile. Equations (44)-(46) determine the equilibrium levels of the wage rate and employment levels:

$$(47) \quad W_C^* = a - bL/3$$

$$(48) \quad L_{1C}^* = 2L/3$$

$$(49) \quad L_{2C}^* = L/3$$

In terms of Figure 6.1, L_{1C}^* units of labor are applied to the commons and L_{2C}^* to the privately owned resource. The loss in welfare due to common ownership is BOF. The fourth panel in the diagram describes the labor market. The total demand for labor is $AP_1 + MP_2$; the fixed supply of labor is L , and therefore the equilibrium wage rate is W_C^* . Following Buchanan's lead, a comparison can be made of the welfare costs under the two alternative regimes. In the absence of rent-seeking the gain in scarcity rents from the conversion from common to private property is equivalent to MOF in Figure 6.1. This is relatively easy to establish with the aid of some simple geometry. As a result of the transition the total demand for labor shifts to the left and is now

represented by $MP_1 + MP_2$ in the fourth panel. Owners of labor therefore sustain a loss in payments of W_C^*STU , which equals W_C^*ODN plus W_C^*HJP . Now except for BOM, the loss to labor is transferred to rent recipients; area BOM represents the loss to factors of productions resulting from the change in property rights. The social gain to "society" is therefore ABW_C^* minus BOM which is equal to MOF.¹⁵ Buchanan examines the limiting case in which prospective owners waste ABW_C^* worth of resources in the attempt to capture the scarcity rents. In such a case society is made worse off by BOM as a result of the change to the private regime. The central message is clear; 'society' would have been better off if there had been no attempt to correct here the tragedy of the commons. Buchanan goes on to qualify his discussion as he recognizes that there may be some residual rents by "...successful seekers of ownership rights, by politicians-bureaucrats through explicit payments or through the enjoyment of perquisites..." (1980b: 190). So his discussion is not at all susceptible to the misleading conclusions which arise when one adopts the position that rent-seeking generates no by-products whatsoever. The analysis can and should be qualified even further.

Buchanan asserts, without explicitly introducing the process of rent-seeking into the analysis, that the loss due to rent-seeking is equal to ABW_C^* . This is the aspect of his analysis we wish to explore further. Consider the case of rent-seeking by factor usage. The entrepreneurs who are attempting to capture the scarcity rents hire units of labor to carry out lobbying. Does this explicit consideration of the rent-seeking process significantly

alter the conclusions put forward on the rent-seeking cum common property case?

(b) Rent-Seeking in Industry 1.

Suppose that the rent-seeking occurs in industry 1. Assume that the rent-seeking is successful but that the rents are exactly dissipated. Now the first order conditions are:

$$(50) \quad W = a - bL_1$$

$$(51) \quad W = a - bL_2$$

As the rent-seeking is input using, an expression for the rents available in industry 1 needs to be derived in order to determine the total demand for labor. Here the total rents are equal to:

$$(52) \quad R = Q_1 - WL_1$$

This implicitly defines a demand for the input devoted to rent-seeking (L_3):

$$(53) \quad W = R/L_3$$

The re-defined market clearing condition, which takes into account the inputs devoted to rent-seeking activity, is given by:

$$(54) \quad L = L_1 + L_2 + L_3$$

Equations (50)-(54) again determine the equilibrium levels of the endogenous variables:¹⁶

$$(55) \quad W_R^* = (b/3)((a/b) - L) + ((b^2/9)(L - (a/b))^2 + a^2/3)^{1/2}$$

$$(56) \quad L_{1R}^* = L_{2R}^* = (a - W_R^*)/b$$

$$(57) \quad L_{3R}^* = (Q_{1R}^* - W_R^* L_{1R}^*)/W_R^*$$

Armed with this model it is useful to restate the ruling orthodoxy. The change in welfare which results from the change to private property depends, in part, on what happens to the wage rate from this conversion. The traditional finding in this area is that the privatization of the commons will lower the wage rate (Samuelson, 1974; Weitzman, 1974). And it is precisely this result which drives Buchanan's conclusion that rent-seeking will make 'society' worse off. As we have seen the gain in producer surplus arising from the privatization of the commons is lost in the rent-seeking process, and it is labor that is made worse off due to the reduction in factor payments. But it is easy to see that no such unequivocal conclusion is possible within the context of rent-seeking by factor usage. If a comparison is made between the wage rate under common property (W_C^* , given in equation (47)), and that with input using rent-seeking (W_R^* , given in equation (55)), then it turns out that W_C^* can be greater than, equal to, or less than W_R^* . This has been illustrated in Figure 7. If labor supply is less than $2a/b$, then the wage rate will fall in the presence of rent-seeking

because the rent-seeking inclusive market clearing loci, W_R^* , lies below the input market clearing loci under the common property regime. Whereas if the labor supply is greater than $2a/b$, then the wage rate will rise in the presence of rent-seeking. In Figures 6.1 to 6.3 several cases have been depicted to reflect the fact that W_C^* may be greater than, equal to, or less than W_R^* .¹⁷ How does all of this affect the above conclusion about the desirability of privatizing the commons?

In Figure 6.2 the gain from privatizing the commons is represented by ABW_C^* . In this particular case the demand for labor for rent-seeking purposes exactly offsets the labor released from industry 1 and therefore there is no change to the returns to labor. To the extent that this expenditure on labor does not lead to additional output then ABW_C^* is wasted in the process of trying to capture the rents from the privatization of industry 1. 'Society' is therefore no better off nor worse off from the attempt to promote efficient resource usage.

In Figure 6.3 the gain from efficient resource usage is $ABL_{1R}^* W_C^* - CL_{2R}^* L_{2C}^*$. To the extent that the producer surplus in industry 1, ABW_R^* , is wasted in rent-seeking, then the gain is $W_R^* BL_{1R}^* W_C^* - CL_{2R}^* L_{2C}^*$. In this particular case there is a net gain in social value as a result of the definition of private property rights. To be sure this point should be qualified if labor itself rent-seeks and thereby waste some of this net gain. Even with this in mind it follows that the conclusion that society would be better off if it abandoned the attempt to privatize the commons cannot be unequivocally sustained.

While these results are interesting in their own right, attention should not be diverted away from one point which has been implicit in all of our discussion. An understanding of the effects of rent-seeking on economic welfare requires explicit consideration of the resources used in the rent-seeking process. Buchanan's analysis is a case in point; his failure to examine the possibility that the labor released from industry 1 could be re-employed in lobbying for that industry led him to believe that rent-seeking will make 'society' worse off. As we have seen, however, this unequivocal result can only be sustained by ignoring the demand for labor which arises from the rent-seeking itself. To be fair, Buchanan is not alone in failing to consider these resource effects; the problem permeates almost the entire literature on rent-seeking. And to be sure, the rent-seeking may not be of this particular form. But equally clearly, if the analysis ignores these effects, then one runs the risk of making potentially misleading conclusions due to the sin of omission.¹⁸

5. Conclusions

The paper here has attempted to model rent-seeking processes in two simple general equilibrium contexts. On this basis we have analysed what we believe to be some of the major flaws in the DUPE and rent-seeking schools of thought.

The DUPE literature simply asserts rather than explores why lobbying is wasteful and therein lies its major flaw. The DUPE

school cannot offer any explanation why the government would enact the policy in the first place. It has to simply assert that regulatory policies exist. Moreover in their evaluation of such policies the DUPE school overestimates the welfare cost of monopoly as they have assumed away the possibility that some groups, particularly the bureaucracy, might benefit from the 'competitive process'.

The rent-seeking literature is flawed too, but for fundamentally different reasons. This school has attempted to exemplify its general equilibrium explanations of why competition can be wasteful with partial equilibrium techniques and therein lies its major flaw. The partial equilibrium techniques provide a reasonable, though not entirely accurate, depiction of what is going on in the market which is the subject of the regulation. These techniques do not, however, provide a clear idea of what is happening in the other sectors of the economy. If these other sectors are explicitly taken into account, then the welfare cost of a monopoly in a rent-seeking environment can be markedly different from that contained in the partial equilibrium diagrams of the existing rent-seeking literature.

FIGURE 1

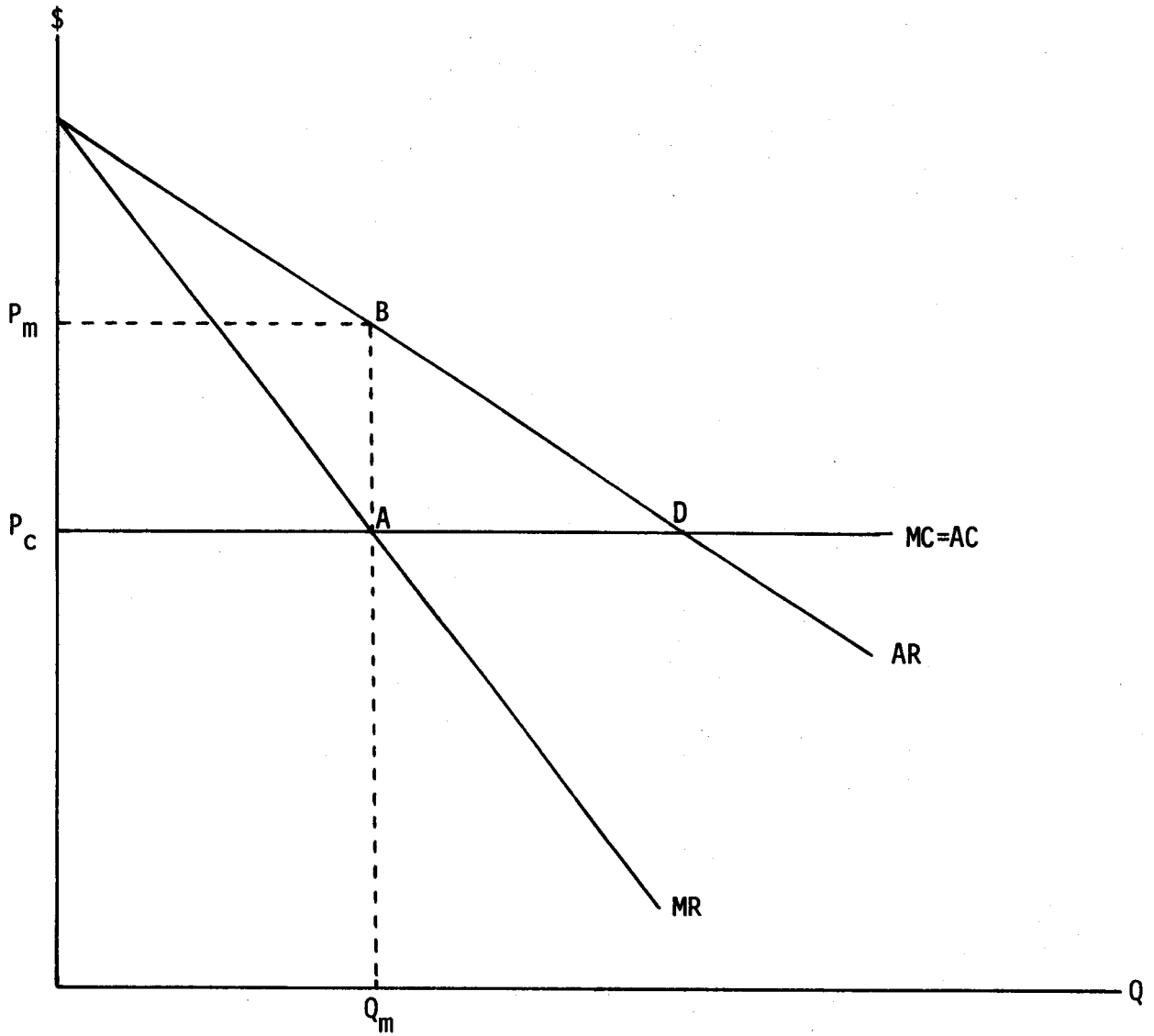


FIGURE 2

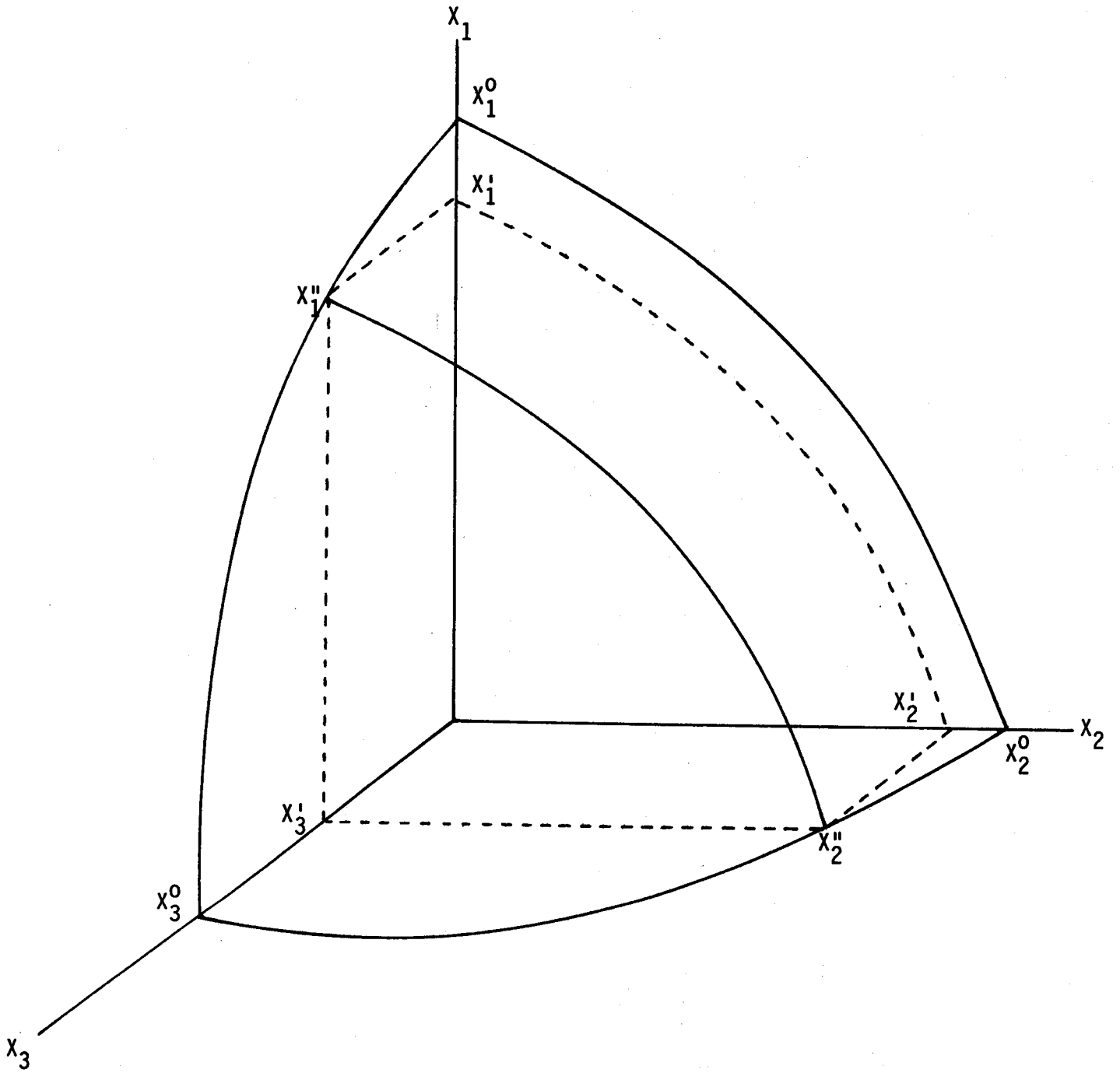


FIGURE 3

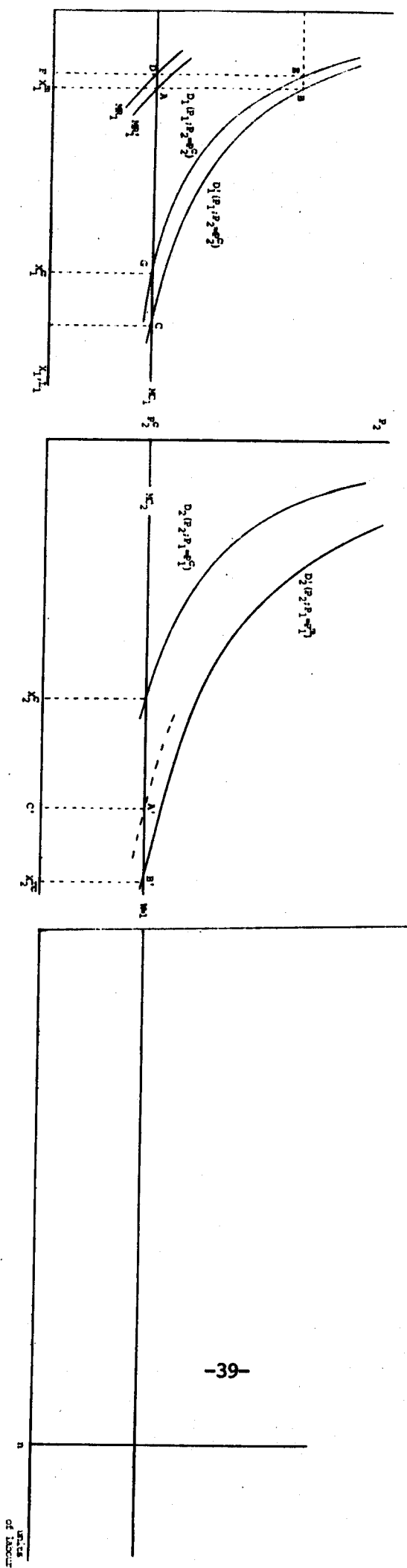


FIGURE 4

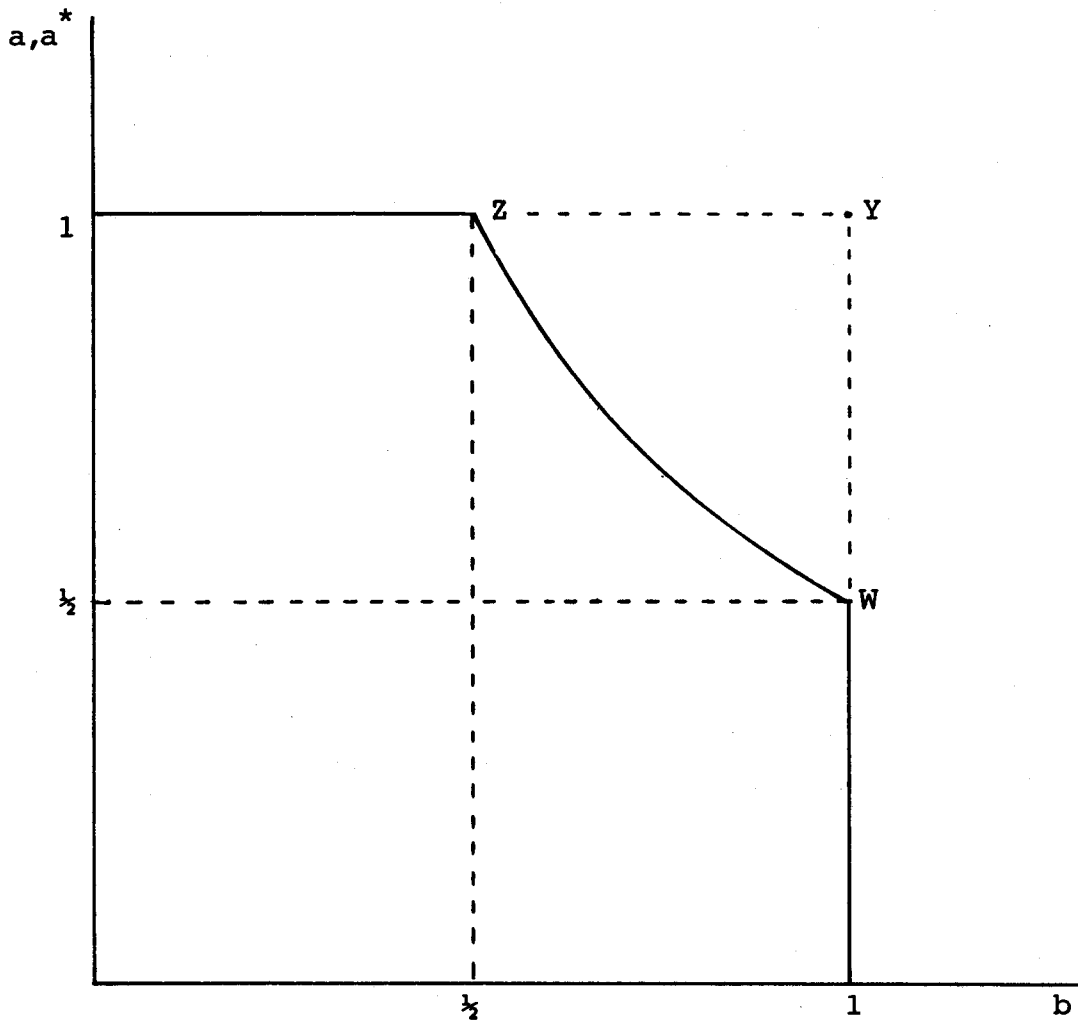


FIGURE 5

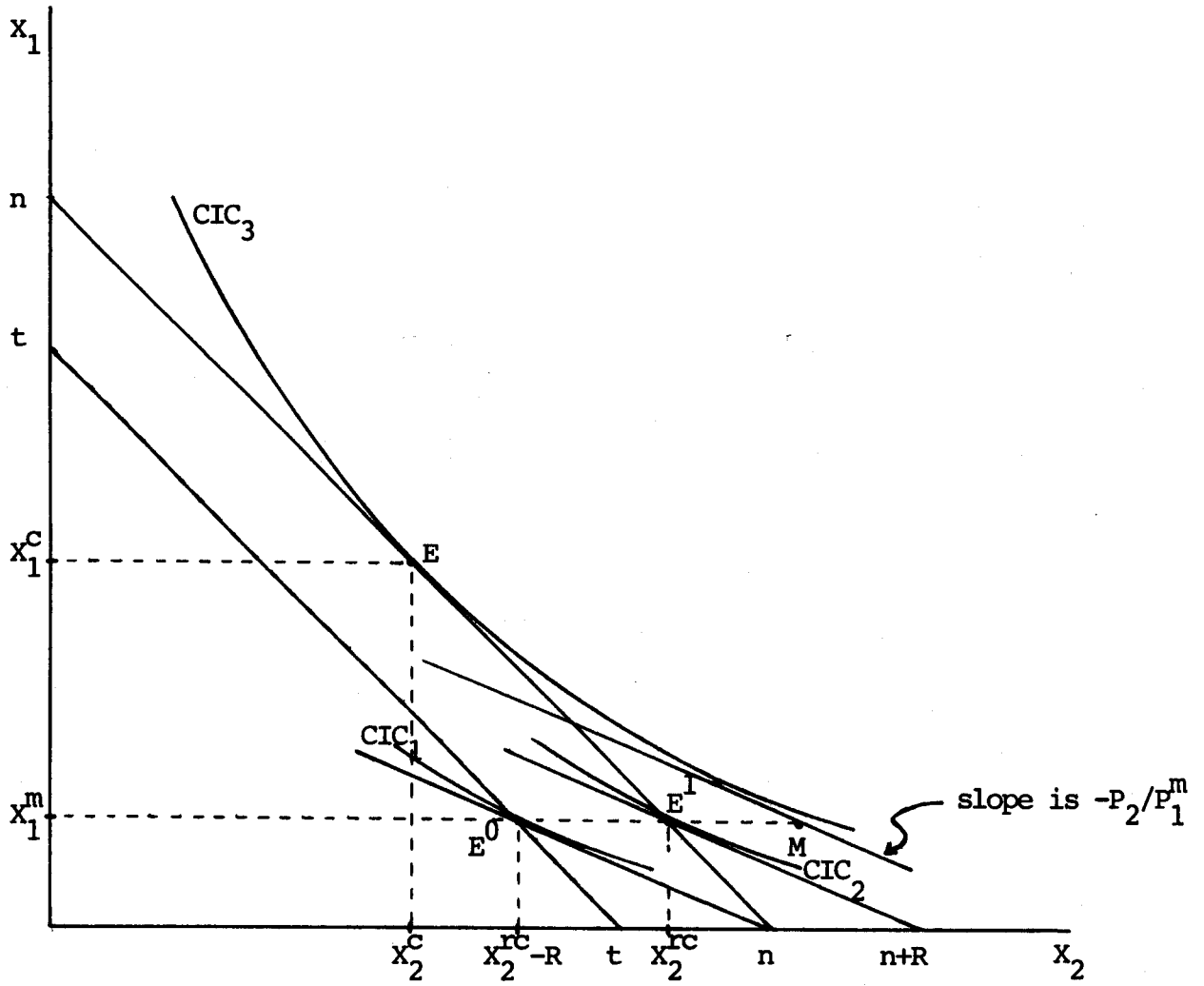


FIGURE 6.1

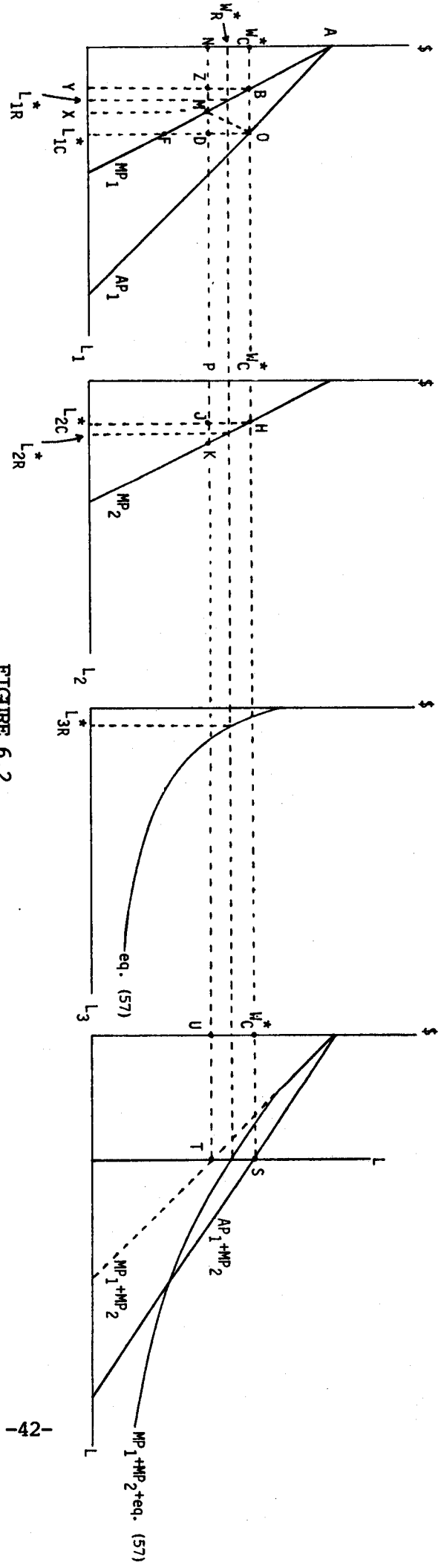


FIGURE 6.2

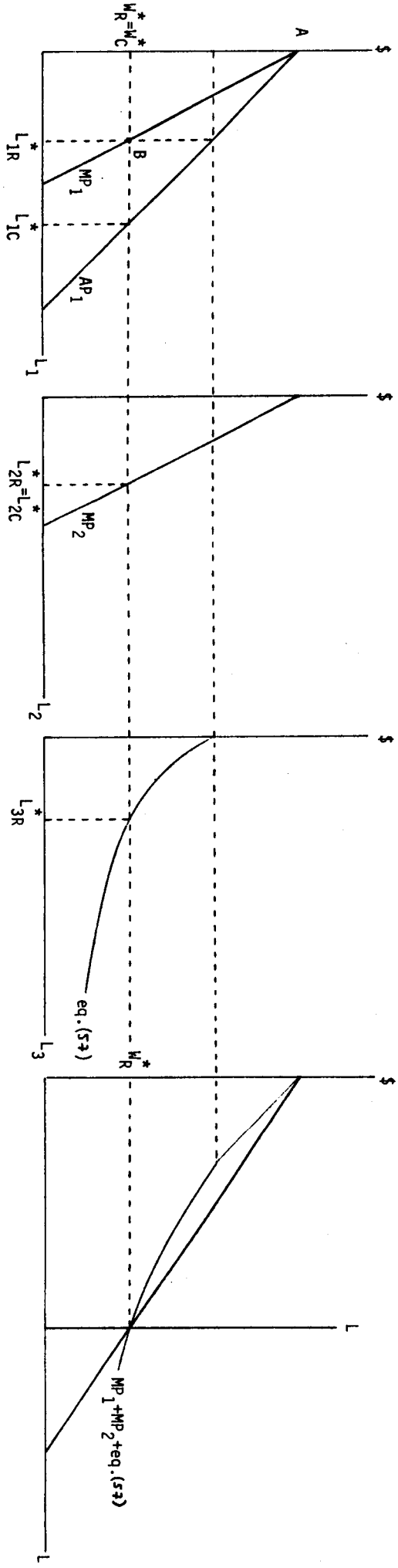


FIGURE 6.3

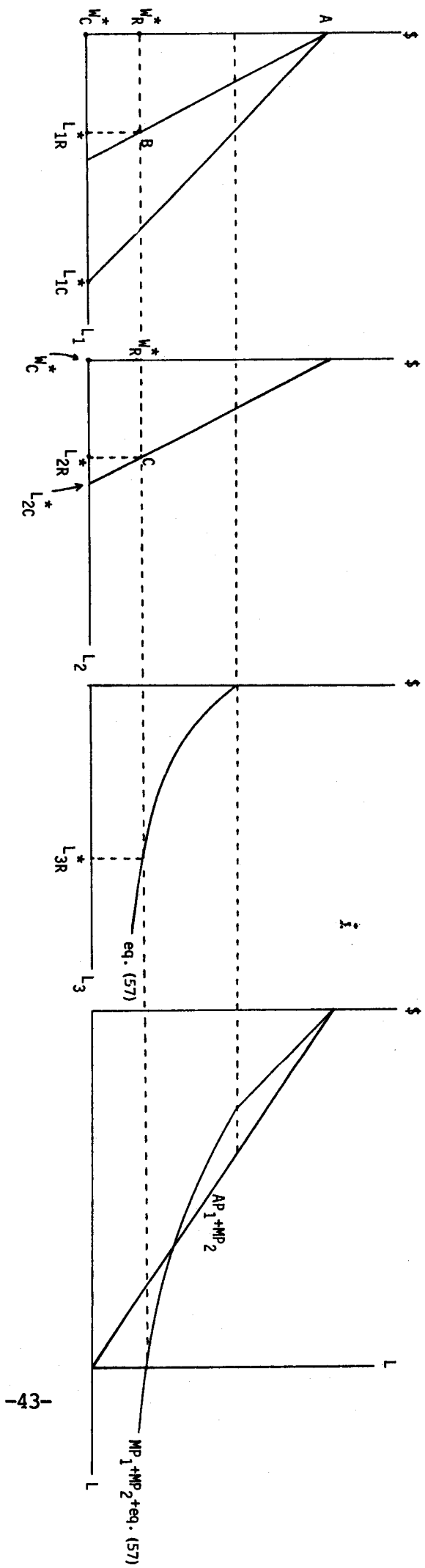
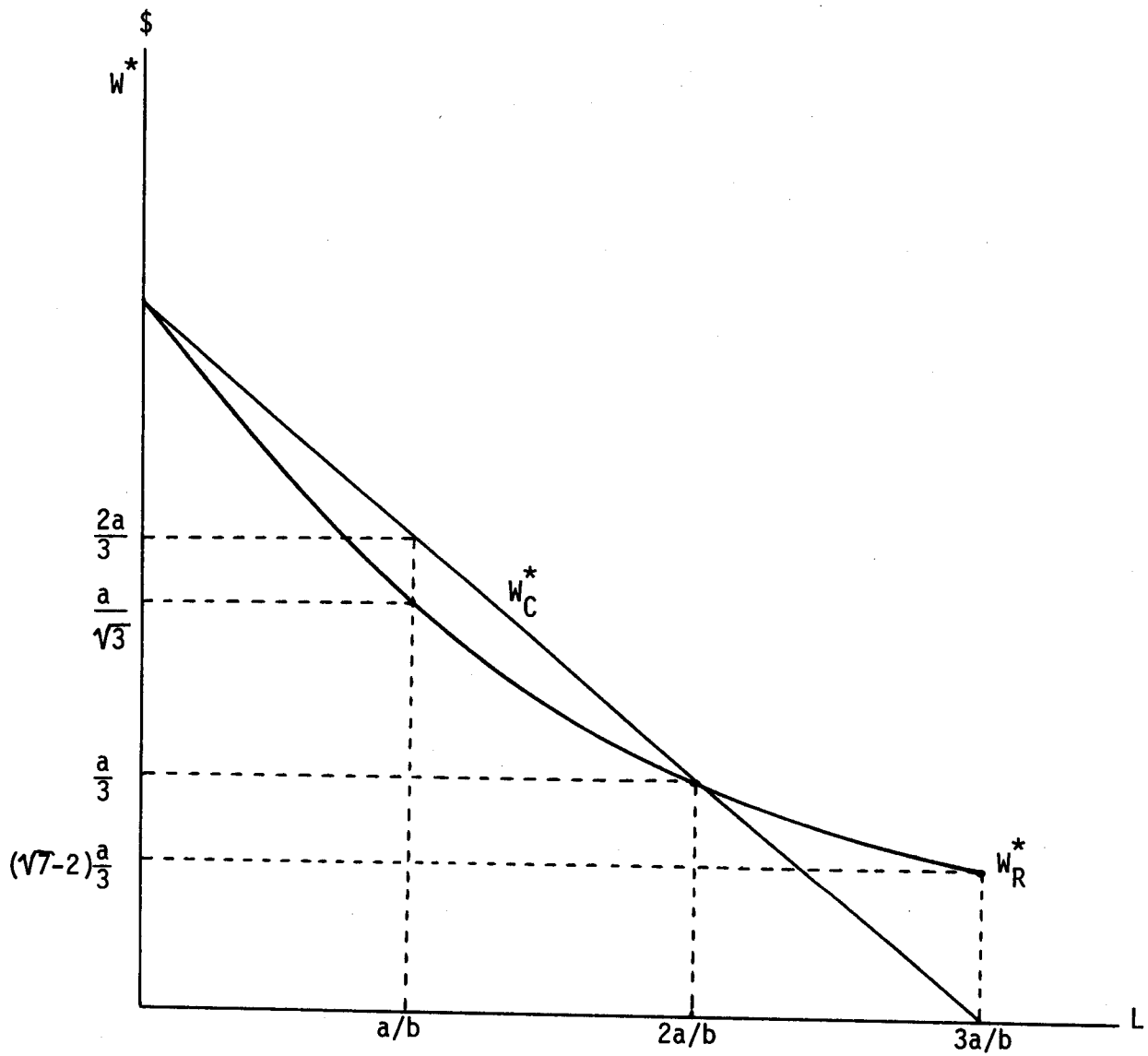


FIGURE 7



NOTES

1. The books are Buchanan et. al (1980), and Colander (1984). Some recent articles are Benson (1984), Anderson and Hill (1983), Bhagwati (1980, 1982a, 1983), and Posner (1975). A good survey article is Tollison (1982).
2. Rent-seeking is sometimes defined as "... the expenditure of scarce resources to capture an artificially created transfer" (Tollison, 1982: 578) which has been created by some governmental process. But as Tollison goes on to admit this definition is too narrow; rent-seeking does occur also in private settings (Tollison, 1982: 588). Rent-seeking can be defined instead as "... behavior in institutional settings where individual efforts to maximize value generate social waste rather than social surplus" (Buchanan, 1980a: 4).
3. Recent work by Tullock (1980) and others suggests that the cost of rent-seeking may be greater or less than the area of monopoly profits.
4. See the debate between Bhagwati (1980, 1982b), Tollison (1982), and Tullock (1981).
5. See Samuels and Mercurio (1984) for a critique of the concept of waste in a rent-seeking environment.
6. Tullock's work at times adopts the same features (and problems) of the DUPE school. For example, in discussing the social waste of the examination system for the Chinese civil service Tullock makes the point that "[t]he education given to the students preparing for the exam was of little or no use in any walk of life other than government. Further, most of the people who passed the examination and received minor

government jobs would make only modest use of their highly intensive and expensive educational backgrounds" (Tullock, 1980: 19) [our emphasis]. So Tullock tends to define waste a priori; there is no discussion of possible externalities on other individuals or the general equilibrium effects of such activity on the economy.

7. See Buchanan (1980a: 7-8) and Tollison (1982). In their discussion, rent-seeking takes place over a monopoly right which had been granted previously by the King. We have modified the story so that the rent-seeking takes place over the initial creation of the monopoly for reasons of expositional simplicity.
8. The rent-seekers, of course, treat the purchase of the commodity as an input in their production process. The term consumption is used here to signify that the expenditure on the commodity would appear as a final good in the national accounts.
9. This constant returns to scale case enables us to ignore profit redistribution issues (since profits are zero) and focus on the rent-seeking effects per se. As is shown in the text, it also obviates the restrictive assumption of non-substitution in consumption that Varian (1983) makes.
10. These values have been rounded to the nearest four decimal places.
11. The point that the rent-seekers may confer benefits on other economic agents is not new. Buchanan (1980b:187) indicates, in passing, that the bureaucrats-politicians may be made better off by the reassignment of property rights and that as a result the welfare cost of rent-seeking should be suitably modified.

12. Of course, a direct consequence of equations (35), (37), and (38) is that the manner in which the rents are distributed does not matter in the calculation of total waste. Distribution effects do matter in the feasibility calculations, however.
13. There are a few problems in fitting what is an essentially dynamic account of rent-seeking into a static geometric framework. The object, however, is not to completely re-orient the literature, but to expose the flimsy foundation on which much of it is built, and to provide some firmer footing for future work in this area.
14. It is worth noting that the DUPE literature is not alone in committing this sin of commission. For example, McCormick et. al (1984) in their article on the welfare costs of deregulation in a rent-seeking environment simply assert that that rent-seeking results in a contraction of the production possibility frontier.
15. It is easy to show that $ABW_C^* - BOM = MOF$. The net gain to 'society' is equivalent to $ABW_C^* + HJK + BZM - BZDO$. This can be rewritten as $BOF - BOM$, which equals MOF.
16. For obvious reasons the negative root is ignored.
17. Note that the W_R^* and W_C^* curves in Figure 7 are to be interpreted as input market clearing loci, and must not be confused with the derived demand curves for L_3 that appear in the third panels of Figures 6.1, 6.2, and 6.3.
18. We have thus demonstrated that in the case of quadratic production functions and input using rent-seeking, the effect on the equilibrium wage rate is dependent upon the supply of the input. This result depends, of course, on the quadratic nature of the production functions and the implied

possibility of negative marginal products in the industries. It is straightforward to show that in the Cobb-Douglas case with decreasing returns to scale, the only possible outcome is a fall in the equilibrium wage rate after rent-seeking. Nevertheless, the quadratic case seems to us to be the more general case, and therefore the more interesting of the two.

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