The Economics of Labour-Managed Firms in a Capitalist Economy

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SUMMARY

This thesis explores the behaviour and performance of labour-managed firms in a capitalist economy through comparisons between labour-managed and capitalist enterprises and by examining interactions, market and non-market, between the two organisational forms. These investigations are pursued in the context of monopsonistic or oligopsonistic labour markets and product market duopoly. The scarcity of managerial skills may mean that day to day control is delegated to a specialist. We demonstrate that the existence of managerial discretion can have important consequences for the short-run behaviour of labour-managed firms. Finally we consider the factors which determine whether labour-management will emerge under capitalism. This involves an assessment of the theoretical and empirical literature on the relative efficiency of the two modes of production, and then an analysis of whether the outcome depends purely on relative efficiency, or whether distributional considerations are also important.

ACKNOWLEDGEMENTS

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Chapter 4 of the thesis is joint work with Peter Law.

PUBLICATIONS

(i) Chapter 2 has appeared as "Labour-Managed Firms and Monopsony Power" in the International Journal of Industrial Organisation (1984).

(ii) Section 4.3 of chapter 4 is a joint paper with Peter Law entitled "Stackelberg Duopoly with an Illyrian and Profit-Maximising Firm" in Recherches Economiques de Louvain (1983).

(iii) Chapter 5 is forthcoming in Advances in the Economic Analysis of Participatory and Labor Managed Firms, Volume II.

Contents Cont'd

CHAPTER 1

INTRODUCTION

1.1 LABOUR-MANAGED AND CAPITALIST PRODUCTION

Our starting point is the recognition that a firm is not merely a cooperating group of producers, rather it is a group with a particular organisational structure and set of property rights. In particular we are interested in the distinction between a capitalist firm (CF) and a labour-managed firm (LMF).

The former is the traditional enterprise of microeconomic theory and is referred to variously as the entrepreneurial firm, the owner-managed firm and the classical capitalist firm.(1) Following Gravelle and Rees (1981) its defining characteristic is taken to be "...the existence of a central figure, the owner, employer or *entrepreneur*, who:

(a) enters into a contract with each of the individuals who supply productive services which specifies the nature and duration of those services and the renumeration for them;

(b) either takes decisions, or has the right to insist that decisions are taken, in *his* interests, subject to his contractual obligations;

(c) has the right to the *residual income* from production, i.e. the excess of revenue over payments to suppliers of productive services made under the terms of their contracts;

(d) can transfer his right in the residual income, and his rights and obligations under the contracts with suppliers of productive services, to another individual;

(e) has the power to direct the activities of the suppliers of productive services, subject to the terms and conditions of their contracts;

(f) can change the membership of the producing group not only by terminating contracts but also by entering into new contracts and adding to the group". (p.151) (Emphasis in original)

A LMF is different in two fundamental respects. First, the workforce, or "membership", take collective responsibility for negotiating the contracts and the other aspects of operating the firm. Control is democratic, on the basis of one person one vote. This does not, however, mean that full group discussion is required for every decision, since authority for day to day control may be delegated. Secondly, any residual income or loss, which in this case is revenue minus non-labour costs, accrues to the membership collectively. In the CF we saw that labour is simply treated as a hired input.

Each of these enterprise types has, separately, been subjected to considerable theoretical analysis. On the other hand the interesting possibility that both may coexist within an economy has received little explicit attention. This is the focus of the present thesis. Specifically, our concern is with LMFs operating in an economy where production predominantly takes place in capitalist enterprises. This concern emanates from two recent developments. First of all, LMFs have been entering policy discussions with increasing frequency. For some the question is whether they might play a useful short-term counter-cyclical role, whilst others, who view the current recession as symptomatic of deep-rooted problems, are interested in whether self-management at the

enterprise level should form part of a fundamental restructuring of the economy. Among the latter group there are also those who regard economic democracy as a necessary condition for a democratic society.(2) Secondly, a number of capitalist economies already contain significant numbers of enterprises which, whilst not always "pure" LMFs as defined above, do exhibit sufficient degrees of participation and residual sharing to distinguish them from capitalist enterprises.(3) Moreover, as we shall see in the following section, these "cooperative" sectors are in many cases expanding rapidly.

1.2 COOPERATIVE SECTORS WITHIN CAPITALIST ECONOMIES

Estrin (1985) has recently brought together information from a variety of sources to provide the most detailed picture to date of cooperatives operating in Western industrial economies. In this section we simply pick out some of the main findings.

First of all, we see from table 1.1 that a number of countries have significant cooperative sectors. By far the largest in any western economy is the Italian sector which in 1981 comprised an estimated 427,900 workers in just over 11,000 enterprises. In terms of employment this is about thirteen times the French level. The table also reveals rapid growth since 1970 and especially since the mid 1970's. In Italy, for example, cooperative employment doubled from 1975 to 1981, and in the U.K. and Holland the rate of growth was higher still, although in each of these latter cases the initial employment level was low. Even the slowest growing sector, that in France, expanded by 13% over the period 1975 to 1982.

Information on the size of cooperatives and their industrial distribution is given in tables 1.2 and 1.3 respectively. In France, Italy and the U.K. approximately a third of cooperatives are engaged in manufacturing. Within this category, Estrin points out that the majority seem to be in sectors where production is likely to be labour-intensive. The remaining two-thirds of cooperatives are involved in either building or services, with the split varying markedly between countries. This industrial picture is reflected in table 1.3 where

we see that the majority of cooperatives are small. In France, for example, 45% of cooperatives employ fewer than 10 workers and 88% have no more than 50. In the U.K., they tend to be smaller still, with 71% having less than 10 workers and 95% less than 50.

Finally, table 1.4 presents, for France and the U.K., a breakdown of new cooperative formation according to whether they were set up from scratch or converted capitalist firms. The latter would comprise collapsed firms and those where, for one reason or another, the owners decided to transform a successful enterprise into a cooperative. The John Lewis Partnership is an example of the latter. In France approximately 60% of new cooperatives in recent years were set up from scratch, although because these tend to be small relative to converted firms, they account for less than a third of the new cooperative jobs created. In the U.K., with the exception of 1975, virtually all cooperative formation and the vast majority of employment is accounted for by those starting from scratch. Estrin suggests that this may be explained by the role of recently established support agencies.

TABLE 1.1 SIZE OF COOPERATIVE SECTORS

	FRANCE		ITALY		U.K.		MONDRAGON		DENMARK [1]		HOLLAND	
YEAR	COOPS	WORKERS	COOPS	WORKERS	COOPS	WORKERS	COOPS	WORKERS	COOPS	WORKERS	COOPS	WORKERS
1970	522	29,200	4,370		17	1,600	40	8,570				
1971	531											
1972	540		4,139									
1973	520		4,420									
1974	527		4,860									
1975	545	31,000	5,377	209,700	19	2,500	50	12,543				
1976	559	29,000	5,893	229,800	47	3,000			635	35,000	80	2,000
1977	552	30,200	6,690		78	3,500						
1978	573	30,500	7,854		150	5,000	66	14,676				
1979	698	32,700	9,055		201	5,400	70	15,672				
1980	811	31,400	10,140	387,300	330	6,000		16,432	800	46,000	450	6,000
1981	933	32,500	11,203	427,900	468	7,000						
1982	1,080	35,000										
1983								15,986				
1984					911	8,800						

Source: Estrin (1985)

1. Estrin suggests these may be overestimates (1985, p.12)

TABLE 1.2 DISTRIBUTION OF COOPERATIVES BY SIZE

FRANCE (1982)

Number of Workers	% COOPS	% WORKERS
1 - 9	45	7
10 - 50	43	30
51 - 100	5	11
> 100	7	52

U.K. (1980)

Number of Workers	% COOPS
1 - 9	71
10 - 19	16
20 - 49	8
50 - 99	2
100 - 249	2
≥ 250	1

Source Estrin (1985)

Table 1.3 Distribution of Cooperatives by Industry (% coops)

Sector						
Building	44		61		10	
Services	19		9		52	
- general		12		-		46
- consultancy		7		9		6
Manufacturing	37		30		38	
- building materials				6		
- Printing		6		2		18
- engineering		16		2		6
- wood/furniture		7		6		
- clothing/textiles		7		4		6
- food processing		1				
- water supply				3		

Source: Estrin (1985)

Table 1.4 MODE OF COOPERATIVE FORMATION IN FRANCE AND THE U.K.

	FROM SCRATCH		CONVERSIONS	
	% FIRMS	% WORKERS	% FIRMS	% WORKERS
FRANCE				
1977	55	25	45	75
1978	55	37	45	63
1979	66	40	34	60
1980	64	28	36	72
1981	58	30	42	70
1982 (Jan-May)	57	28	43	72
U.K.				
1975	0	0	100	100
1976	88	63	12	37
1977	92	92	8	8
1978	96	98	4	2
1979	97	96	3	4
1980	86	69	14	21
1981	82	80	18	20

Source: Estrin (1985)

1.3 AN OVERVIEW

Although the impetus for the now considerable volume of LMF literature was provided by the labour-managed sectors of socialist countries, particularly Yugoslavia, much of the work is equally applicable to LMFs operating in capitalist economies. For example, we know a great deal about responses to changes in demand, the impact of uncertainty and the implications of different financing arrangements. In this thesis, however, the intention is, for the most part, to concentrate on analysis which has specific relevance to capitalist economies. First of all, we shall make explicit comparisons between the behaviour and performance of CFs and LMFs. Secondly, market interactions between the two types of firm will be explored, and, finally, we consider the possibility that capitalist organisation has an indirect influence on LMFs through the supportive institutions and technology which have evolved under capitalism.

The starting point for a large part of the theoretical literature on LMFs is the classic paper by Ward (1958) which suggested that LMF behaviour can be analysed using the conventional neoclassical framework, but with the maximisation of income per member replacing profit maximisation as the assumed maximand. One of the central themes has been to compare the equilibrium of this "Illyrian" LMF with that of a CF operating in the same product and capital markets with the same technology, but facing an exogeneous, competitively-determined, wage rate. If the product market is perfectly competitive then both firms can be shown to have identical long-run equilibria, but if monopoly pertains then income per worker would exceed the wage rate, but the LMF produces a lower level of output than its capitalist twin. A surprising feature of

these comparisons is the ubiquitous assumption of perfect competition in the labour market. Given that we might expect the treatment of the labour input to be a possible source of differences in behaviour, it would seem to be important to examine the implications of labour market imperfections. The thesis begins therefore with a consideration of labour-market monopsony power.

In chapter 2 we first of all examine the equilibria of both a CF and a LMF facing an upward-sloping labour supply schedule. This reveals that the usual result concerning their relative output levels is capable of being reversed. The second half of the chapter explores the effects on short-run employment adjustment in the LMF. Although its relevance is not restricted to capitalist economies this is a topic which has been the subject of considerable interest following Ward's demonstration of the "perverse" supply response of the Illyrian firm. Chapter 3 extends the analysis to oligopsony and the process of entry into labour markets, which allows us, among other things, to investigate market interactions between the two types of firm. In the following chapter the focus is wholly on interactions, but in the product rather than labour market. Using a simple duopoly model, some interesting results are obtained with regard to Cournot equilibrium and Stackelberg leadership-followership.

The Illyrian LMF, we noted above, is the analogue to the profit-maximising CF. A frequent criticism of the latter model is that, particularly in the case of large corporations, it fails to take account of the interests of those who actually have day to day control, namely managers. Numerous alternative models have been proposed in which managerial discretion plays a central role. Given that management

skills are concentrated among a small section of the workforce in capitalist economies, LMFs may also decide to delegate the managerial role to a specialist. In Chapter 5 we demonstrate that managerial discretion may have important consequences for short-run LMF behaviour.

The remainder of the thesis is concerned with the much larger question of what factors determine whether LMFs will emerge in a capitalist economy. In chapter 6 we consider the efficiency of the two modes of production. This requires that the "black box" treatment of the firm be dispensed with and that the production process, the nature of contracting, and the utility derived from work be brought to the centre of analysis. The theoretical discussion is followed by a review of the rapidly expanding empirical literature in this area. Whilst a number of authors argue that it is relative efficiency alone which dictates the choice between organisational forms, others claim that distributional considerations are also important. This fundamental issue is explored in chapter 7.

Finally, a short concluding chapter summarises the main findings of the thesis.

NOTES TO CHAPTER 1

1. The latter is due to Alchian and Demsetz (1972)

2. Vanek (1971) regards both political and economic democracy as necessary conditions for social stability

3. These cooperatives may for example take on some hired workers, and not all members may be workers. For further discussion see chapter 6.

CHAPTER 2

LABOUR MARKET MONOPSONY

2.1 INTRODUCTION

A CF has monoposony power when, as a buyer facing many potential sellers, it has latitude in fixing the wage rate due to an upward-sloping labour supply schedule. For convenience we shall also refer to a LMF in this situation as a monopsonist even although it admits members rather than hires workers and hence its behaviour, unlike that of the CF, is frequently unaffected by the supply curve.

Samuelson (1970) recognises that monopsony power may exist in some areas of agriculture but argues in general that "...it is more important in isolated places like the tin mines of Bolivia or the lumber camps of American history, than it is in a modern economy where people are, in fact, mobile in moving to better opportunities" (p. 562). Even were monopsony power to be limited to such cases it would merit attention, but there are a number of reasons for thinking it may be a more general phenomenon, even in a "modern economy". Firstly, imperfect worker information on the existence and nature of alternative jobs may convey a degree of monopsony power to firms. Addison and Siebert (1979) report a number of questionnaire studies which suggest that workers do only have limited information on alternative opportunities. Secondly, there are many social and institutional barriers to geographical mobility. For example a recent empirical study by Hughes and McCormick (1984) concludes, amongst other things,

that "...council tenancy inhibits migration by either reducing the probability that search, once begun, is successfully completed, or by considerably extending the time required and thus the cost of arranging the migration. It is an unfortunate and striking feature of the British housing system that migration is even more arduous to arrange from the main category of rental housing than it is from owner-occupation" (p.123). Finally, the literature on segmented labour markets emphasises the barriers to mobility even within a region. Empirical evidence from the United States has pointed to the existence of monopsony power in markets for newspaper workers (Landon, 1970), teachers (Landon and Baird, 1971) and nurses (Link and Landon, 1975). In each case the inclusion of an employer concentration term in cross-section wage equations suggests that higher levels of concentration are associated with lower wages. On both theoretical and empirical grounds, then, it seems important to consider labour market monopsony power as part of an analysis of LMFs in a capitalist economy.

As noted in the introductory chapter, a central theme in the literature is to compare the equilibria of a LMF and a CF operating in the same markets with the same technology. In the following section we show that the replacement of the exogenous wage rate in these comparisons by an upward-sloping labour supply curve has important consequences. A second area of concern in the literature is the criteria used by LMFs when contemplating reductions in the size of the membership. Section 2.3 demonstrates that, once again, the shape of the labour supply schedule is an important determinant of LMF behaviour. A short conclusion completes the chapter.

2.2. LMF AND CF MONOPSONY EQUILIBRIA

To examine the implications of monopsony for comparisons of Illyrian LMF and profit-maximising CF equilibria we take the simplest model in which both enterprise types produce an identical product Q subject to an identical production function in which the number of workers, N is the only variable input. In order to focus solely on the impact of monopsony each firm is assumed to operate in identical but separate product markets. Both firms have the same fixed costs of production, F.

The objective of the CF is to

$$\underset{N}{\text{Max}}\ \pi = R - wN - F \qquad (2.1)$$

where $R = P.Q$

w = wage rate

subject to $P = P(Q)$ with $P_Q \leq 0$

$Q = Q(N)$ with $Q_N > 0$, $Q_{NN} < 0$

$w = g(N)$ with $g_N > 0$.

Maximisation yields the expression:

$$R_N = w + Nw_N \qquad (2.2)$$

or $$R_N = w(1+1/\phi) \qquad (2.3)$$

where ϕ is the elasticity of labour supply. Thus under conditions of monopsony power in the labour market, the wages received by workers will be below their marginal revenue product. This equilibrium can now be contrasted with that of an Illyrian LMF.

The objective of an Illyrian LMF is to:

$$\underset{N}{\text{Max}} \quad y = \frac{R-F}{N} \tag{2.4}$$

subject to $P = P(Q)$ with $P_Q \lesseqgtr 0$

$Q = Q(N)$ with $Q_N > 0$, $Q_{NN} < 0$

$y \gtreqless g(N)$ with $g_N > 0$.

Given the existence of fixed costs and with the above production and product market assumptions the y schedule has the general shape depicted in Figure 2.1.

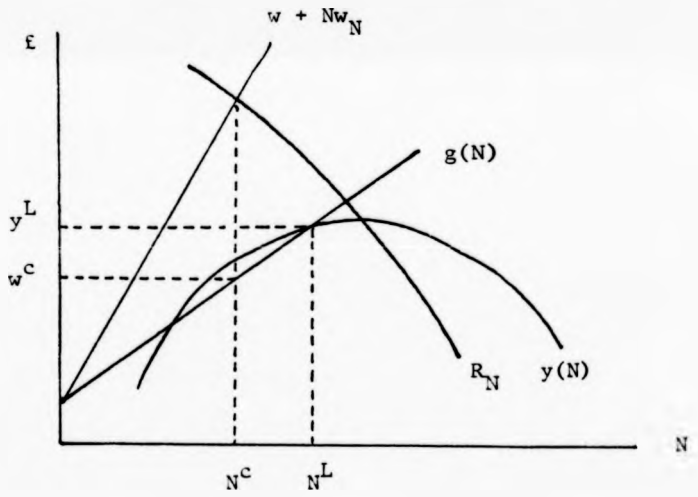

Figure 2.1

Two kinds of equilibrium are possible.

The first is where the labour supply constraint is binding, that is, it prevents the LMF attaining the maximum of the income per

member schedule. Domar (1966) refers to this as a condition of "moderate labour shortage". This situation is shown in Figure 2.1 together with the CF monopsonist equilibrium. From (2.2) we see that the CF employs N^C workers at a wage w^C. From (2.1) and (2.4) we obtain:

$$\pi = (y-w)N \tag{2.5}$$

so that provided the CF is earning positive profits we must have $y > w$ at N^C and hence $y(N)$ must cut $g(N)$ to the right of N^C.

Thus, where the labour supply constraint is binding on the LMF and if the CF can earn positive profits,then the LMF equilibrium (N^L, y^L) produces both higher employment and higher worker incomes than does the CF. If the CF could only earn zero profits then the two equilibria would be identical, since $y(N)$ would be tangential to $g(N)$.

Suppose now that the labour supply constraint is not binding on the LMF. Domar suggests that the LMF equilibrium would be at the intersection of labour supply and income per member schedules. However, there is no reason why an income per member maximising firm would expand membership beyond the Illyrian equilibrium and hence the latter is used in our comparisons. Figures 2.2a and 2.2b demonstrate that we can have either $N^L > N^C$ or $N^L < N^C$ in equilibrium depending on whether the marginal outlay curve cuts the $y(N)$ schedule to the left or right of its maximum. In both cases worker incomes will be higher in the LMF.

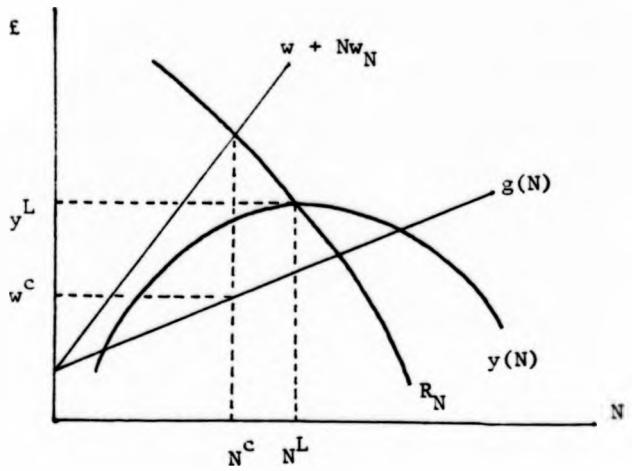

Figure 2.2a

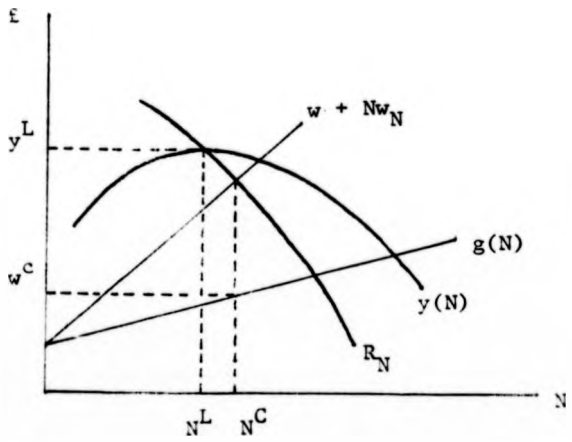

Figure 2.2b

A non-binding supply constraint, also raises an interesting issue concerning the identities, or characteristics, of the membership of a LMF. The labour supply function depicts the minimum income at which the various workers in the labour market would be willing to work for the LMF. Since the supply of workers exceeds the membership level, LMF's with the same y and N can differ with respect to the distribution of "reservation incomes" among the membership. It will be seen later that this can have important consequences for short-run membership adjustment.

In this section two results have been obtained. Firstly, if, as a result of monopsony power, a CF is able to earn positive profits then income per worker in a LMF will exceed the wage paid in the CF. As noted earlier the same would be true if the source of profit was product market power. Secondly the equilibrium employment and output levels may be greater or less than in the CF. The former possibility also carries with it the possibility that the deadweight welfare loss will be less with the LMF and contrasts with the product market monopoly case.

What caveats should be attached to those results? A major limitation is the assumption of identical production functions. The debate on the relative efficiency of the two modes of production is addressed in Chapter 6. What we have shown here is that, whatever efficiency differences there might be, any comparative analysis of the two types of firm must take account of conditions in the labour market. A second assumption that has been made is that firms are not able to discriminate among workers in making payments. If either the LMF or CF were able to discriminate then it would appear that output and employment will expand. Inegalitarian cooperatives have been analysed

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by Domar (1966), Meade (1972) and others. However, a danger is that if discrimination takes place there may be consequences which cannot be accommodated by those models. Thus for example "...the social situation can be rather difficult" (Domar 1966, p.744) or the LMF's "essential character is weakened" and "a number of LMFs which began hiring labour as a short-run expendient degenerated into capitalist-like firms fairly quickly" (Ireland and Law 1982, p.24). Hence we shall retain the assumption that all members are treated equally and note in addition the possible shortcomings of the neoclassical analysis employed thus far. There may be less danger in permitting a CF to discriminate where possible (perhaps between males and females?), but even here we should note Reich's (1978) argument that CFs use wage differentials as a means of reducing solidarity among the workforce.

A final point to consider is whether, in a situation of excess labour supply as depicted in figures 3a and 3b, the Illyrian maximand is appropriate. An alternative possibility is that the LMF may take some social responsibility for expanding employment and hence maximise $U = U(y,N)$. Such a model has been analysed by Law (1977). Altruistic behaviour by the LMF may therefore be particularly plausible where there is a tight-knit community. Wiles (1977, p.74) has argued in relation to Yugoslavia, that the traditional Illyrian analysis breaks down in country places where a neighbourhood has only one factory since the existing labour force is now more concerned in getting jobs for its family than in increasing its own income. An example from a capitalist economy is the Mondragon cooperatives in Spain which include the expansion of employment among their stated objectives.[1] In general, however, consideration of social objectives may take place at a level above that of the individual enterprise.

2.3 MEMBERSHIP ADJUSTMENT IN THE SHORT-RUN

In this section we examine the implications of an upward sloping labour supply schedule for membership adjustment by both the traditional Illyrian LMF and more recent models which incorporate compensation schemes or voting procedures.

Consider first the comparative static response to a change in either P or F. It is well known that in the simple single output, single variable input model an Illyrian firm operating in a competitive labour market would reduce N following either a fall in F or rise in P. The latter is often referred to as the "perverse supply response".

Domar, however, showed that such paradoxical behaviour disappears if the LMF faces a labour supply constraint which is binding. As can be seen from figure 2.2 an upward shift in the y-schedule following a reduction in F or increase in P enables the LMF to operate further up the labour supply schedule thus achieving a higher level of both income and employment.

Conversely a rise in F or fall in P might be expected to result in a fall in N as some workers leave for more desirable opportunities outside the firm. However, by leaving these workers cause a further reduction in the incomes of remaining members. Meade (1972) argues that if the fixed costs had been willingly incurred by all the members it is not a true participatory cooperative if any individual member can without any obligation just walk out and leave the remainder with the full debt burden. We shall return to this point below.

If the labour supply constraint is not binding we suggested above that the LMF will simply operate at the maximum of the y schedule. In this case, then, the comparative static response of an Illyrian firm will be identical to the traditional analysis with a competitive labour market. An interesting consequence of monopsony, however, is that the movement to a new level of N may involve workers joining and workers leaving the firm at the same time. Consider for example a fall in price. This causes an expansion in membership, but since income per member falls it is possible that some of the initial members will leave. As noted earlier, individuals are located along the labour supply schedule according to their reservation income level. If the price fall causes incomes inside the LMF to drop below the reservation income of any of the initial members then they would leave and be replaced by workers further down the labour supply schedule.

A major focus of recent criticism of the Illyrian model concerns the prediction that a rise in P causes a fall in N. A number of authors have pointed out that what is being maximised here is the incomes of <u>those that remain</u> with no account taken of the fate of dismissed workers. Steinherr and Thisse (1979) suggest that for a membership reduction to be fair to all members one of two procedures must be followed. Either those who leave be fully compensated by remaining members such that any worker is indifferent between staying and leaving, or a vote is taken on the optimum membership size and the process of selection is random with everyone having an equal chance of being selected. Models incorporating such rules have recently been proposed. In all cases it is assumed that the supply curve of labour is horizontal. After a brief discussion of the existing analysis we shall examine the implications of replacing this assumption with one

of monopsony

Following Ireland and Law (1978, 1982) we shall consider a compensation scheme which is ex post egalitarian in that after the payment of transfers each worker receives the same income.[2]

Let N_0 be the equilibrium membership at an initial price P_0. If price now changes to P_1 the compensation rule requires the replacement of (2.4) with

$$V = \begin{cases} \dfrac{P_1Q - F}{N} & N \geq N_0 \qquad (2.6a) \\ \dfrac{P_1Q - F}{N} - \dfrac{(N_0 - N).C}{N} & N < N_0 \quad . \qquad (2.6b) \end{cases}$$

C, the amount of compensation, is given by

$$C = V - A \qquad (2.7)$$

where A is the income available to workers who leave the LMF and is assumed to equal the income received at the initial price P_0.

The scheme has no effect in situations where membership would otherwise be increased so (2.6a) is identical to (2.4). However, (2.6b) is different because if employment is reduced the $N_0 - N$ workers who leave must be compensated by an amount C. It is perhaps useful here to draw a distinction between membership and employment. In the Ireland and Law scheme the number employed within the enterprise may be reduced but all N_0 remain members in the sense that they are entitled to equal incomes. Although rigid downwards membership would be increased if it raised income per worker, Bonin (1984) makes the same distinction but in his model membership is assumed rigid in both directions.

Ireland and Law (1982 p.22) demonstrate that compensation has the effect of replacing a perverse employment response to a price increase with rigidity - V is maximised by remaining at N_0.[3] Intuitively this is easily understood if we use (2.7) to simplify (2.6b) to

$$V = \frac{P_1Q + (N_0 - N)\,A - F}{N_0} \qquad N < N_0 \quad . \qquad (2.8)$$

It can be seen that income per member depends upon the contributions of both those who remain in the firm, (P_1Q), and those who leave $(N_0 - N)A$. Figure 2.3 reveals that the marginal worker contributes more by remaining in the firm than by leaving to earn A.

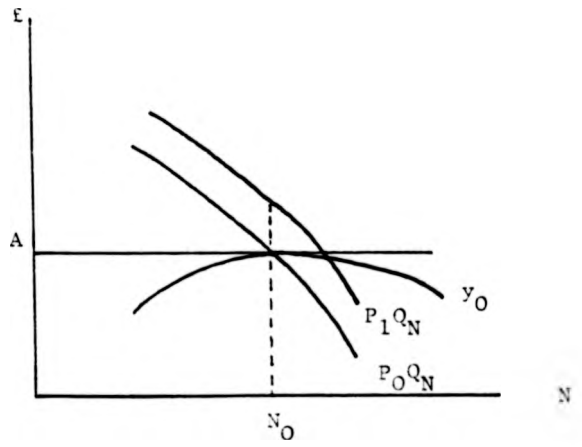

Figure 2.3

A second possibility is to require that each member has the same chance of being selected for dismissal. For simplicity, assume that individuals, in voting on the optimum membership level, aim to maximise expected income, Z:

$$Z = \begin{cases} \dfrac{P_1Q - F}{N} & N \geq N_O \quad (2.9a) \\ \dfrac{(P_1Q - F)}{N} \cdot \dfrac{N}{N_O} + \dfrac{(N_O - N)}{N} \cdot A & N < N_O \; . \quad (2.9b) \end{cases}$$

Since 2.9 can be rearranged to produce 2.6, this yields the same N as the compensation scheme. That is, if N_O maximises y at price P_O and this maximum value of y equals A, then an increase in price will not affect membership.

So, by introducing compensation or voting with random selection the "perverse" membership response to a rise in price (or fall in fixed costs) is removed. Instead, the membership level remains rigid.[4] A further development of these models is to consider the LMF response in situations other than simply a rise in price or fall in fixed costs. Brewer and Browning (1982) show that in certain circumstances the membership level might be reduced even with compensation or voting schemes. For example an increase in both price and A could make it optimal to reduce membership from N_O to a lower level satisfying $R_N = A$ and maximising (2.9).

Let us now introduce an upward-sloping labour supply schedule into the analysis. As noted above, each point on the schedule relates to a specific individual and shows the minimum income level at which they are prepared to work in the LMF. Equivalently, we can think of it as depicting the alternative income level, A, that they would receive were

they to leave the firm. Thus, whereas in previous analyses each departing member is assumed to receive the same alternative income, with monopsony there is a different A_i for each worker, corresponding to their position on the supply schedule.

Consider first the prediction that with compensation or expected income maximisation a LMF will not alter its membership in response to a rise in P or fall in F. This result assumed that the outside income available to all workers, A, equalled the initial level of LMF income, y_0. With the introduction of an upward-sloping labour supply curve the maximum value of A_i must be $\leq y_0$ and for all other members $< y_0$. Thus the prediction that membership will not be reduced remains unaltered.

The consequences of monopsony become more interesting, however, if we move away from the simple comparative static response to a rise in P or fall in F. Suppose instead that we wish to examine the behaviour of a firm which, in figure 2.4 has an initial membership, N_0, and income, y_0, somewhere along the segment $a \rightarrow b$ of the y schedule.

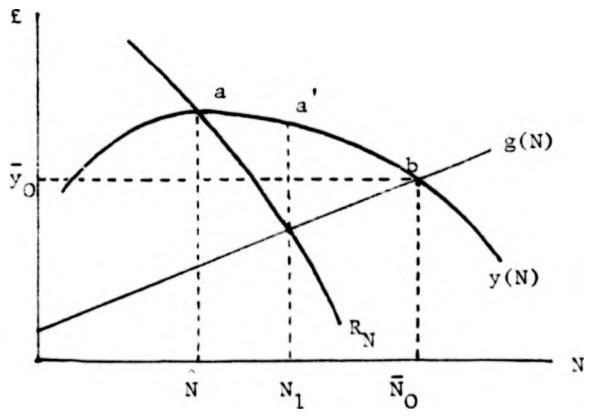

Figure 2.4

Such a situation might be explained as a disequilibrium - perhaps it was the group of size N_0 who got together and decided to form the co-operative. Alternatively, as with Brewer and Browning (1982), there may have been a previous Illyrian equilibrium at different values of both P and F. If this equilibrium had been below $a \rightarrow b$ the change in parameters would cause the N_0 members' incomes to rise to y_0. However, if it had been above $a \rightarrow b$ there may have been some workers with values of A_i exceeding the income per member associated with the new y schedule. In this case our starting point (N_0, y_0) might have been preceded by some voluntary quitting.

Consider, for simplicity, an initial combination, $\bar{N}_0$, $\bar{y}_0$, at point "b" in figure 2.4.[5] Would the firm reduce membership towards the Illyrian level, $\hat{N}$, if departing members had to be compensated? As each member would receive a different outside income the compensation paid would also need to vary across individuals if the post compensation earnings are to equate. If such a scheme were possible, then membership would be reduced up to the point where:

$$g(N) = R_N \quad . \tag{2.10}$$

Thus in figure 2.4 membership falls from $\bar{N}_0$ to N_1. This is because the initial membership will, as a group, gain by a membership reduction if the income that could be earned outside by the marginal worker exceeds his or her contribution to the revenue of the LMF.[6]

It may not, however, be possible to discriminate among workers in the payment of compensation. Suppose instead that a single level of compensation was offered and each worker decided whether or not to leave.

Let C be the amount of compensation. Then the marginal leaver receives $g(N) + C$ after compensation. Define V_2 to be the income per remaining member after compensation has been paid. That is:

$$V_2 = y(N) - C \cdot \left(\frac{\bar{N}_O - N}{N} \right) . \tag{2.11}$$

Since this must equal the income of the marginal leaver we have:

$$V_2 = y(N) - C \left(\frac{\bar{N}_O - N}{N} \right) = g(N) + C \tag{2.12}$$

$$\text{so,} \quad V_2 = y(N) \frac{N}{\bar{N}_O} + \left(\frac{\bar{N}_O - N}{\bar{N}_O} \right) . \; g(N) . \tag{2.13}$$

Maximisation with respect to N yields the first-order condition:

$$g(N) - \left(\bar{N}_O - N \right) . g_N = R_N . \tag{2.14}$$

Comparison of (2.14) and (2.10) reveals that the membership reduction will be lower in the single compensation level case than if individual compensation is possible. Intuitively this is because in the former case all of the leavers, except the marginal one, are being over-compensated in that they receive more than is required to make them leave. Thus it costs the remaining LMF members more in compensation for any given membership reduction.

The second suggested scheme is that no compensation is paid but workers vote on the optimum membership size in the knowledge that they have an equal chance of being selected in any dismissals. As before, we assume that individuals aim to maximise expected income. For

individual i this is given by:

$$Z_i = \begin{cases} \dfrac{P_1Q - F}{N} & N \geq \bar{N}_0 \qquad (2.15a) \\ \dfrac{(P_1Q - F)}{N}\dfrac{N}{\bar{N}_0} + \dfrac{(\bar{N}_0 - N)}{\bar{N}_0}.A_i & N < \bar{N}_0 \; . \qquad (2.15b) \end{cases}$$

Maximisation of (2.15b) with respect to N gives the first-order condition:

$$A_i = R_N \; . \qquad (2.16)$$

Thus individuals vote for different optimum membership levels. This contrasts with the previous literature in which everyone votes identically. With monopsony the pattern of voting depends upon the shape of the labour-supply schedule. If decisions are taken by majority vote then the outcome depends on the membership level desired by the median voter. It is clear from figure 2.4 that employment may be reduced from N_0 but not to the Illyrian equilibrium. Also, there is clearly no reason to expect the same reduction as in either of the compensation models.(7)

Thus far we have discussed situations in which, in the absence of compensation, remaining members would benefit from the dismissal of others. A further interesting situation is where some workers desire to leave but this makes the remainder worse off. As noted earlier, this arises following a price fall or rise in fixed costs when the labour supply constraint is binding (figure 2.1). Meade (1972) argued that in a true participatory co-operative, members would not be able

to leave without obligation; instead they may have to compensate those who remain. If the amount of compensation required from workers could be set individually, and both stayers and leavers end up with the same net income then, as before, membership will be reduced as long as $g(N) > R_N$. It can be shown that membership would not now fall in response to a rise in F and may, or may not, do so following a fall in P. Once again, any contraction in employment would be less if a single level of compensation was set.

2.4 CONCLUSIONS

The most important results in this chapter concern the implications of monopsony power in the labour market for comparisons between an Illyrian LMF and a profit-maximising CF operating in the same markets with the same technology. It was demonstrated that, under conditions in which the CF earns positive profits, income per worker in the LMF will exceed the wage rate paid in a CF. The same result obtains if the firms operate in a perfectly competitive labour market but have monopoly power in the product market. However, whereas in the latter case the CF employs more workers than the LMF we have shown that with monopsony power the LMF might employ more. Imperfections in the labour market, in the form of monopsony power, therefore have important consequences for the welfare levels associated with the two enterprise types.

A limitation of the comparisons between LMF and CF is the assumption of identical production functions. However, it is not the intention here to enter the debate over the relative efficiency of LMFs and CFs. Rather, we have shown that, whatever efficiency differences there might be, any comparative analysis of the two modes of production must take account of the degree of competition in the labour market.

The second half of the chapter examined short-run membership adjustment by LMFs. As noted by Domar (1966), an upward-sloping labour supply schedule which prevents the attainment of the peak of the income per member schedule will reverse the direction of response of membership to a price rise or fall in fixed costs, compared with

the usual Illyrian analysis. If the labour supply constraint is not binding we suggested that the Illyrian firm behaves in the traditional way. However, dissatisfaction with the 'perverse' membership response has recently led to the introduction of models which incorporate either compensation, or voting combined with random selection for dismissal. Assuming a horizontal labour supply curve these models predict that the LMF will not adjust membership following a price rise or fall in fixed costs from a previous Illyrian equilibrium. Brewer and Browning (1982) show, however, that with particular initial conditions a LMF which has voting or compensation schemes may engage in some membership reduction. It was shown in section 2.3 that upward-sloping labour supply schedules did not alter the prediction of no response to a price rise or fixed cost fall. However, in the type of situation examined by Brewer and Browning monopsony did lead to interesting consequences. Thus, for example, schemes which would produce identical results under perfect competition no longer do so under monopsony. Under the compensation scheme it became necessary to distinguish between cases where compensation could be set individually and where there was just a single rate. The likelihood and extent of a membership reduction will be lower in the latter. Secondly, there was now no reason to expect the voting procedure to yield the same outcome as the compensation scheme (in either form).

NOTES TO CHAPTER 2

1. See Thomas and Logan (1982) p.43.

2. In contrast, remaining workers do worse than leavers in the Steinherr and Thisse scheme. See Ireland and Law (1982 p.22) for a comparison of the two procedures.

3. Similarly a reduction in F would not lead to a fall in N.

4. A membership reduction remains a possibility in the event of a price fall if initial membership is not at the Illyrian optimum. See Ch.5 note 15.

5. An equilibrium at "b" would occur if the LMF allowed anyone who wished to join the firm to do so. Such a model has been suggested by Pauly and Redisch (1973) in the context of U.S. non-profit hospitals. Our analysis could then be interpreted as an examination of what happens if such a firm decided to maximise the particular utilitarian objective function given by (2.13).

6. If the initial position was to the left of "b" the analysis would not be so simple because the supply of workers would exceed the LMF membership, and hence a priori, the A_i's of workers inside the firm would not be known. Without this information membership adjustment is indeterminate over a range. Thus if the starting point was between a' and b there would be a reduction in membership at least to N_1 and possibly beyond. From an initial position between a and a' there may or may not be a membership reduction. Membership will never of course fall below the Illyrian equilibrium, N.

7. It is interesting to note that if membership is reduced following a vote, a subsequent vote could produce a further contraction. This could happen if, by chance, it was predominantly those workers with low A_i's who were selected for dismissal in the initial reduction.

CHAPTER 3

OLIGOPSONY AND ENTRY IN THE LABOUR MARKET

3.1 INTRODUCTION

In the previous chapter monopsony power in the labour market was seen to have interesting implications for LMF behaviour and performance, and for comparisons with CFs. We now extend the analysis beyond the case of a single monopsonist. The following section is concerned with a group of CF oligopsonists and derives a relationship between wage rates on the one hand and market structure and firm conduct on the other. Section 3.3 then contrasts this situation with a LMF duopsony and also examines a mixed duopsony comprising one CF and one LMF. The focus then shifts to the entry process, with section 3.4 analysing the response of both CF and LMF incumbents to the threat of potential entry, in each case comparing CF and LMF potential entry.

As in chapter 2, we assume that all firms have identical fixed costs, production functions and revenue functions. To concentrate attention on the labour market we also assume, except for an extension in the appendix, that there are no product market interactions between the firms.

3.2 CAPITALIST FIRM OLIGOPSONY

In the previous chapter we saw that a profit-maximising monopsonist would pay a wage below the marginal revenue product of labour, the extent of the shortfall being determined by the labour supply schedule as follows:

$$\frac{R_N - W}{W} = \frac{1}{\phi} \tag{3.1}$$

where ϕ is the elasticity of labour supply:

$$\frac{dN}{dW} \cdot \frac{W}{N} \quad . \tag{3.2}$$

Whilst this monopsony result is well-known there has been no theoretical analysis of wage-productivity margins under oligopsonistic conditions. In this section we formulate a model of oligopsony by adapting the Cowling and Waterson (1976) analysis of structure, conduct and performance in oligopoly.

Consider a labour market in which S firms demand the homogeneous labour input, N. Firm i aims to

$$\max_{N_i} \pi_i = R_i(N_i) - WN_i - F_i \tag{3.3}$$

where the market wage rate, W, is given by

$$W = g(N) = g(N_1 + N_2 + \ldots\ldots + N_s) \quad . \tag{3.4}$$

Remembering that there are assumed to be no product market interactions, the first-order conditions for a maximum are

$$\frac{d\pi_i}{dN_i} = R_{N_i} - \left[W + N_i \frac{dW}{dN} \cdot \frac{dN}{dN_i} \right] = 0, \quad (i=1,\ldots,S) \tag{3.5}$$

$$\text{or} \qquad R_{N_i} - \left[W + N_i \frac{dW}{dN} (1 + \delta_i) \right] = 0, \quad (i=1,\ldots,S) \tag{3.6}$$

$$\text{where} \quad \frac{dN}{dN_i} = 1 + \frac{d \sum_{i \neq j} N_j}{dN_i} \equiv 1 + \delta_i \, . \tag{3.7}$$

As our interest is in different organisational forms it seems sensible at this stage to assume that the CFs have identical production functions[1] and conjectures, δ_i. Equation (3.7) then becomes

$$R_N - W + \frac{N}{S} \frac{dW}{dN} (1 + \delta) = 0 \tag{3.8}$$

which can be rewritten as

$$\frac{R_N - W}{W} = \frac{1 + \delta}{S\Phi} \, . \tag{3.9}$$

Thus in the case of identical firms the proportionate excess of the marginal revenue product over the wage rate is related inversely to the number of firms, S, and the market elasticity of labour supply, Φ, and directly to the conjectural variation term, δ. Note that if $S = 1$ then $\delta = 0$ and so we obtain the familiar monopsony result (3.1).[2]

The conjectural variation term depends both on the number of rivals and each firm's expectations about the response of rivals to its own employment decision. This latter element can be interpreted as the degree of apparent collusion. If each firm expects its rivals to fully match any adjustment to its own employment level then $\frac{dN_j}{dN_i} = 1, \ \forall j = i,$ and so we would obtain the joint profit-maximising

solution $\frac{R_N - W}{W} = \frac{1}{\phi}$. This would be interpreted as perfect (apparent) collusion. At the other extreme, the competitive outcome is generated by $\delta = -1$.

Employers may collude formally but, paradoxically, high values of $\frac{dN_j}{dN_i}$ may also result from rivalry between firms. This coexistence of rivalry and collusion has been discussed by Cowling (1982) in relation to product markets. Its basis is that the closer the rivalry the more immediate will be the response to any attempt to secure an advantage. This in turn makes a breakaway movement unprofitable and hence serves to maintain collusion. In terms of our model, then, close rivalry leads firms to expect that any attempt to reduce their employment level would immediately be followed by other firms (that is, a high value of δ for given S). It may further be argued that the degree of apparent collusion is likely to increase with concentration since any attempt to secure an advantage by one firm will more easily be detected when the number of firms is small.(3) This analysis of collusion therefore suggests that the value of δ will fall less than in proportion to a reduction in S and hence is further reason for believing that the wage-productivity margin will rise as the number of firms falls.

One final point to note briefly is that collusion need not relate only to levels of employment (and thus wage levels). Another possibility is that firms may collude to restrict the choice of firms available to workers. This is, for example, the purpose of the "reserve clause" in professional baseball which is referred to in the

appendix below. Similarly a study by Lester (1955) of manufacturing firms in New Jersey revealed the existence of an agreement between firms not to attract workers from each other. This type of collusion cannot be captured in our model since its effect is to make the number of alternatives facing a worker already employed differ from the number facing a worker outside.

3.3. LABOUR-MANAGED AND MIXED DUOPSONY

In this section LMFs are introduced into the analysis. First of all we examine a duopsony comprising a pair of identical LMFs and then the mixed case with one LMF and one CF is considered.

As in the monopsony discussion of chapter 2 we need to distinguish between situations when the labour supply constraint is binding and when it is not. One possible equilibrium for a pair of LMFs is where both are able to attain the maximum point on their income per member schedules. Denoting this income level y_i^* and the associated employment level N_i^*, the requirement for this unconstrained equilibrium is $y^* \geq g(N_1^* + N_2^*)$. Or, equivalently, the total labour supply forthcoming at y^*, $N(y^*)$, must be at least as great as $N_1^* + N_2^*$. Figure 3.1 depicts such a situation.

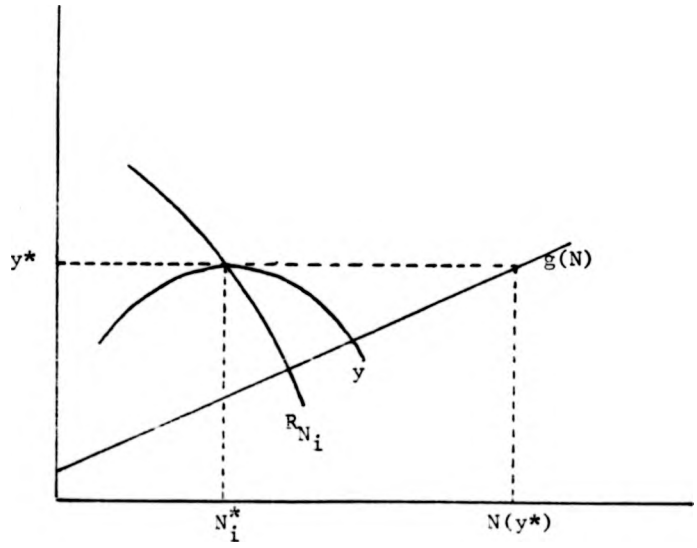

Figure 3.1

Comparisons between this equilibrium and that generated by a CF duopsony are as we would expect from the analysis of monopsony - income per member will exceed the wage rate but employment in the LMFs could be more or less than in the CFs. In the previous section we saw that the actual value of the wage rate (and hence also employment) may vary systematically with labour market structure and firm conduct. An important distinguishing characteristic of the LMF duopsony is that there is no such relationship involving income and employment.

Simply by inspecting Figure 3.1 we can see, firstly, that labour supply conditions can change without having any effect on the two enterprises and, secondly, there need be no interaction between the firms - either could alter its own membership without necessarily having any impact on the other.

A second type of equilibrium is one in which one of the firms attains (y_i^*, N_i^*) but the other faces a binding labour supply constraint. Thus in Figure 3.2, firm 1 is not constrained and comprises N_1^* members each earning y_1^*.

The equilibrium of the second firm will depend upon which of the individuals arrayed along segment $a \rightarrow b$ of the labour supply schedule happen to be in firm 1. The best that firm 2 could hope for is that all of $c \rightarrow b$ are members of firm 1, in which case it can attract $N_2 = N(y_1^*) - N_1^*$ workers and each would earn y_2. In other cases, such as where members of firm 1 are a random selection of all individuals along $a \rightarrow b$, both membership and income per member in firm 2 would be smaller.

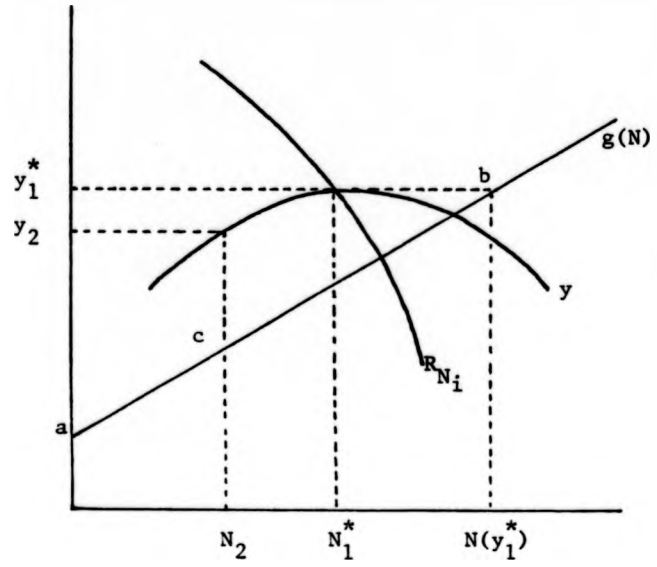

Figure 3.2

An obvious and important difference between this and both the CF and unconstrained LMF equilibria is that here an income differential exists between the workers in the two enterprises. It is interesting to note that this equilibrium is inefficient because marginal revenue products are not equated across the two firms. If transfer payments were feasible then a reallocation of workers between the firms would yield a Pareto improvement. It is well known that this type of inefficiency can occur in the absence of a labour supply constraint if the enterprises differ with respect to fixed costs, technology or the revenue function. Figure 3.3 illustrates this point.

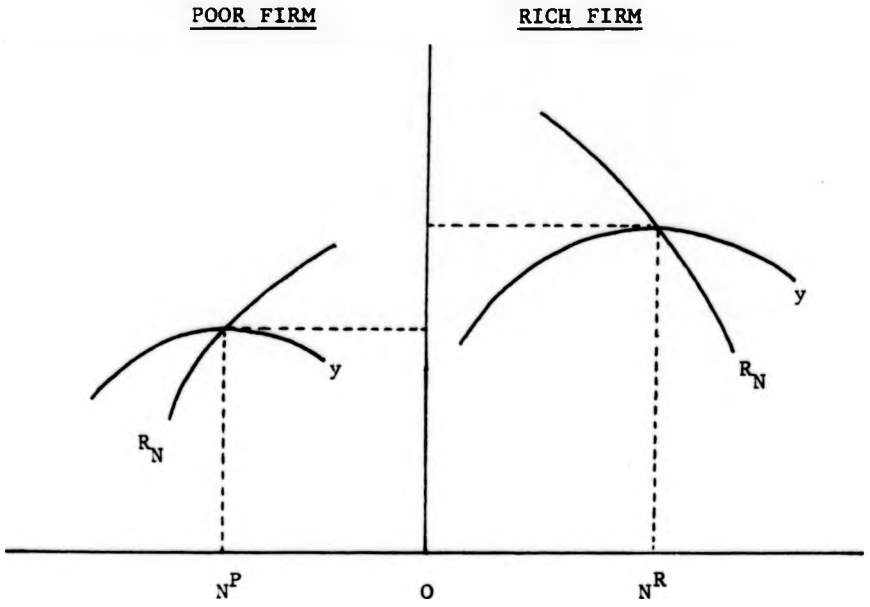

Figure 3.3

In our duopsony equilibrium, on the other hand, the firms are identical in all of these respects. They only differ in income and employment because, perhaps by chance, one firm attained $(y_i^* \quad N_i^*)$ before the other was able to.

The final possible equilibrium involves both of the LMFs being constrained by the labour supply schedule. Unless some restriction is imposed upon members who wish to leave, one of the firms in this equilibrium will consist of just a single member. To see this, suppose initially that both firms have at least two workers and that neither has attained $(y^* \; N^*)$. In this situation an individual worker could raise his or her income by moving from one enterprise to the other.

If employment levels were equal to begin with then the initial direction of movement is arbitrary, but thereafter it will be the larger enterprise which grows at the expense of the smaller one. Provided the labour supply constraint continues to bind on the larger firm the exodus will continue to the point where a single member remains. This individual now carries the full fixed debt burden. Given the assumption of a declining marginal revenue product of labour (s)he will be better off in the short-run as a one-person enterprise than moving to the larger firm.

As noted in the previous chapter, Meade (1972) suggests that it may be considered unfair for members to leave if, as a result, those who remain become worse off because all members voluntarily took on the fixed debt burden in the first place. The LMF may therefore devise rules which prevent this happening. One obvious possibility would be the egalitarian compensation scheme discussed in chapter 2. This would require a departing member to compensate those who remain such that all end up with identical post-compensation incomes. As we saw in the previous discussion membership would only contract if an individual contributes more to the total receipts of the original membership by departing to work elsewhere than if (s)he remained in the firm. The contribution made by remaining in the firm is the marginal revenue product. Since this must exceed the income per member in the other firm there will be no contraction of membership.(4) With the compensation scheme, then, we can have an equilibrium with two constrained LMFs, both of which contain two or more members.

Turning now to consider a mixed duposony of one LMF and one CF, one possible equilibrium is where the LMF operates at the maximum of its income per member schedule and there is an excess supply of labour at this income level. Thus in Figure 3.4 the LMF has N^* members each receiving y^* and the supply of labour is $N(y^*) > N^*$.

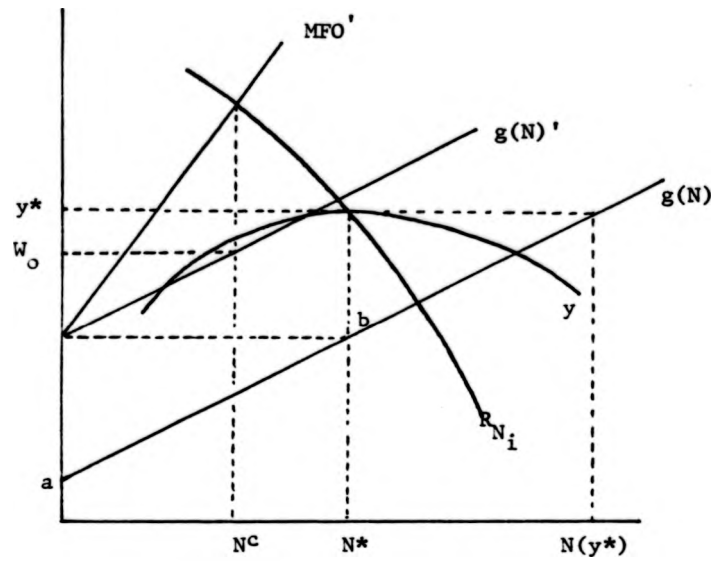

Figure 3.4

The CF equilibrium depends on the residual labour supply and this in turn depends on which of the $N(y^*)$ workers happen to be in the LMF. Figure 3.4 illustrates the situation where, by chance, it is those individuals located along $a \rightarrow b$ who comprise the LMF membership. The CF then faces the residual labour supply function $g(N)'$ and an associated marginal factor outlay schedule MFO' and hence will employ N^c workers at a wage of W_o. In this particular

example the LMF is the larger of the two firms. However, if the N^* members had come from points further up the supply schedule the CF would employ more than N^c workers and it could be the bigger of the firms in equilibrium.

Finally, there may be a mixed equilibrium in which the LMF operates below the maximum of the y-schedule. Clearly there cannot be such an equilibrium if $y \geq W$ because an individual will have an incentive to move from the CF to the LMF. Moreover, if $y^* > W > y$ a coalition of workers of sufficient size would be able to increase their earnings by switching to the LMF. It would be in the interests of the LMF to encourage such a coalition by announcing the prospect of y^*. It is interesting to note that conjectures about possible CF responses are irrelevant here because the workers must actually transfer to raise their incomes. (This is discussed further in the following section). Thus the only possible mixed equilibrium in which the LMF operates below (y^*N^*) is one in which the CF sets $W = y^*$. However, the CF would then only earn zero profits at best and hence it may well prefer the equilibrium discussed above in which the LMF operates at (y^*N^*) and it accepts the residual labour supply schedule.

3.4. ENTRY

Our analysis of monopsonistic and oligopolistic labour markets has neglected the possible implications of entry and potential entry. In the CF literature very little attention has been paid to entry into labour, as opposed to product markets. Indeed it seems that, apart from a footnote in Modigliani's (1958) examination of scale economies as a barrier to entry, the only paper to focus on this issue is Williamson (1968). Williamson showed that where a trade-union was able to enforce a common wage rate across the industry an established firm may make use of this by agreeing a wage which would deter entry. Our starting point is the observation that an existing firm can also influence wage rates if there exists an upward-sloping labour supply schedule.

For us an obvious question to consider is whether the situation facing an incumbent CF will differ depending upon whether the potential entrant is a CF or LMF. The same question will also be asked when the established firm is labour-managed. We assume, as before, that firms have identical technologies and fixed costs.

Fixed costs play an important role in the CF literature on product market entry because they preclude entry at a negligibly small scale. The crucial difference between "small-scale" and "large-scale" entry, to use Scherer's(1980) terminology, is that in the latter entry will have an impact on the incumbent firm(s) and hence potential entrants must take account of possible reactions. Much of the literature is devoted to ways of modelling this interplay. Since it is not our intention to focus on this issue throughout the remainder of the thesis

we shall adapt to the analysis of the labour market the simplest and most well-known assumption concerning incumbent reactions - the Sylos Postulate. According to the Sylos Postulate the potential entrant believes that the incumbent firm will maintain its pre-entry level of output in the event of entry, and the incumbent knows that this is the expectation. We shall assume that this holds with respect to the employment level, although of course in our one - variable - input model it makes no difference whether employment or output is used. This simple approach will suffice to illustrate, firstly, that there are important differences between the two organisational forms with regard to labour market entry and, secondly, that there is an interesting contrast between product and labour market entry where the LMF is concerned.

We begin with the situation where the incumbent firm is labour-managed. This is easily dealt with because potential entry is irrelevant - if the LMF is constrained by the labour supply schedule then entry is not possible and if it is unconstrained then entry will have no effect on it.

More detailed analysis is required when the established firm is capitalist. In figure 3.5 we consider potential entry by another CF.

Suppose the incumbent CF chose the short-run profit-maximising wage-employment combination (W_0 N_0). The potential entrant would, under the Sylos postulate, perceive a residual supply schedule $g(N)'$ facing it. There is a range of employment levels for which the y-schedule lies above the labour supply schedule and, remembering that $\pi = (y-w)N$,

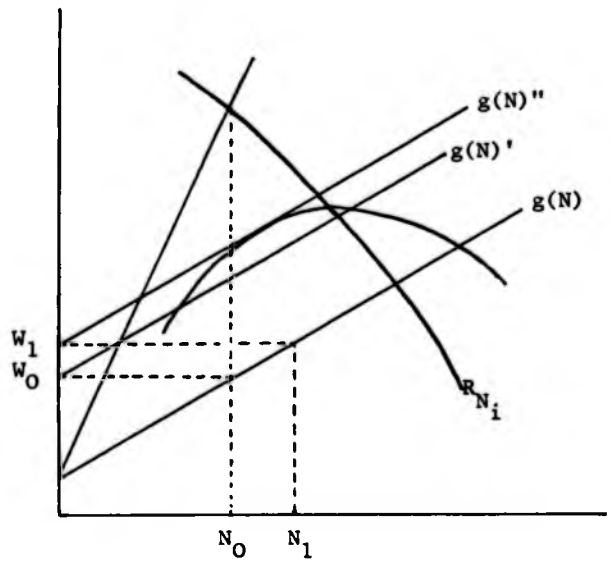

Figure 3.5

entry will therefore take place. In order to deter entry the established firm must expand employment to N_1 since the residual supply schedule, $g(N)''$, is then nowhere below the y-schedule. The wage rate associated with this entry deterring employment level may be termed the "limit wage". In figure 3.5 the limit wage is W_1.

We now turn to potential entry by a LMF rather than a CF. Workers will be attracted to a LMF provided the income available exceeds their "reservation income" depicted by their position on the labour supply schedule. Since for any initial wage offered by the CF below W_1 there will be a membership level for which the residual labour supply schedule lies below the income per member schedule,

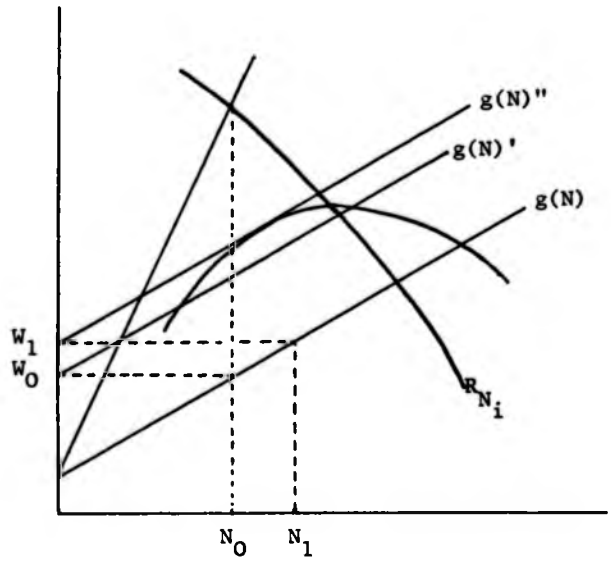

Figure 3.5

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entry will occur. Thus wage rates below W_1 will attract either a CF or LMF into the market. The question we now ask is whether W_1 remains the limit wage when faced with potential entry by a LMF.

Consider first a group of one or more workers not employed in the CF who are contemplating establishing a LMF. In figure 3.6 these individuals are located to the right of point b on the labour supply function.

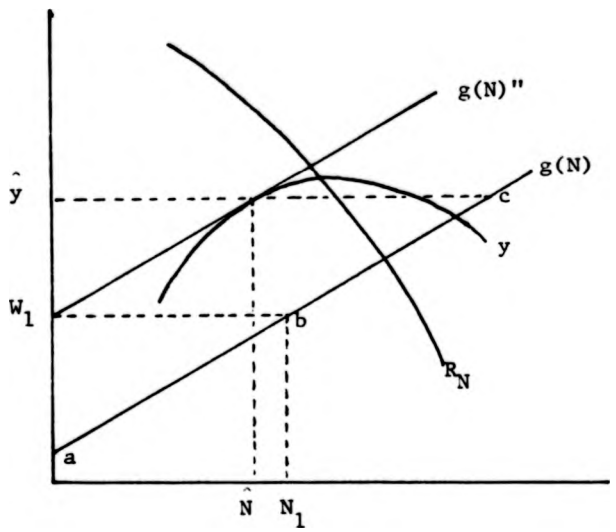


Figure 3.6

According to the Sylos Postulate they recognise that the CF will retain a workforce of size N_1, if necessary by raising the wage rate to match the income available in the LMF. The potential membership of the LMF therefore consists of the individuals located to the right of b.

This residual labour supply function can be depicted by g(N)" and at no point lies above the y-schedule. The closest to a viable LMF is one of size $\hat{N}$ comprising the individuals between b and c. However, the income that would be obtained, $\hat{y}$, is just insufficient to attract the marginal individual located at point c.(5)

Now suppose instead that among the coalition considering the establishment of a LMF there is at least one individual presently working for the CF. A possibility now is that there could be a coalition of size $\hat{N}$ which consists of only individuals to the left of point c. If they formed a LMF each would earn $\hat{y}$. This would also be the wage rate paid by the CF to maintain a workforce of size N_1, so, ex post, the coalition members from the CF are no better off in the LMF than remaining CF workers. However, they are better off than previously and the only way to achieve $\hat{y}$ is to form a LMF. Hence entry will take place and thus W_1 is no longer a limit wage. What underlies this result is an asymmetry between those involved in the coalition and those outside. The former realise that earnings can only rise through membership of the LMF whereas the latter only see the ex post situation in which $W = \hat{y}$ and hence remain in the CF.

The crucial difference between entry by CF and LMF becomes clear when we contrast the above finding with that of Miyamoto (1980). Miyamoto examined product market entry under the Sylos Postulate and found that the same limit price applies whether the entrant is capitalist or labour-managed. The difference between our results arises because in the labour market case the effect of entry is to raise the wage rate whilst in the product market the consequence is a price fall. The fundamental distinction is that a fall in price would reduce revenue for both types of firm whereas a rise in the wage rate is a cost only to the CF.

3.5. CONCLUSIONS

This chapter examined oligopsonistic interactions in the labour market. First of all we considered a market consisting only of CFs and suggested a model which related the wage rate, or more accurately the wage-productivity margin, to the number of firms, the degree of apparent collusion and the elasticity of labour supply. The following section then used a duopsony model to demonstrate that such a systematic relationship would not exist if the market was populated by LMFs rather than CFs. A further interesting feature of LMF duopsony is that income per member may differ between the two firms even although they have identical fixed costs, production functions and revenue functions. In turn this could mean that members of the smaller enterprise receive a lower income than if they had been employees in a CF duopsony. This contrasts with the monopsony case in the previous chapter where LMF members always earn more. An examination of a mixed duopsony comprising one CF and one LMF again revealed no systematic determinants of workers' earnings. If the LMF was able to operate at the top of its income per member schedule then its members would earn more than workers in the CF. However, there is also the possibility of an equilibrium in which the LMF is operating below its optimum and in which the CF employees do better. Finally, section 3.4 analysed the process of entry using the Sylos Postulate. This simple treatment suggested that a strategy used by an incumbent CF to successfully deter entry by another CF may not necessarily prevent entry by a LMF. The underlying rationale is that an increase in the wage rate following entry represents a cost to a CF entrant but not to a LMF.

APPENDIX TO CHAPTER 3

EXTENSIONS TO THE CF DUOPSONY MODEL AND SOME NOTES ON THE EMPIRICAL LITERATURE

Studies which have attempted to measure the impact of CF monopsony power on wages may be divided into two groups according to their methodology. The first approach involves attempting to estimate a worker's marginal revenue product. This is then compared with the wage paid and the proportional difference is sometimes referred to as the rate of monopsonistic exploitation. Using this procedure, Scully (1974) concluded that the monopsony power conveyed by the "reserve clause" in U.S. professional baseball players' contracts resulted in considerable exploitation of players. The second approach, which is the focus of our analysis, is to include an employer concentration term in cross section wage equations. This approach has been used, for example, by Landon (1970) to study the wages of newspaper workers, Landon and Baird (1971) for teachers, and Link and Landon (1975) for nurses. (All using U.S. data.) In each case the results suggest that increases in concentration are associated with lower wages. However, in none of the studies was the estimating equation relating wages and market structure variables the outcome of an explicit theoretical model. It is simply asserted that since a monopsonist will pay a wage below the competitive level then increases in the degree of employer concentration will lead to lower wages. The model presented in section 3.2 and extended below generates a relationship between concentration and wage rates and hence may provide a useful theoretical framework for empirical analysis.

Non-Identical Firms

In order to derive the expression (3.9), it was assumed that firms were identical in both their production functions and conjectures. We can now examine the effect of relaxing this assumption.

Multiplying each term in (3.6) by N_i and summing over the S firms yields

$$\Sigma N_i R_{N_i} - WN - \left(\frac{dW}{dN} \Sigma N_i^2 (1+\delta_i)\right) = 0 \qquad \text{(A3.1)}$$

or $$\frac{\Sigma N_i R_{N_i} - WN}{WN} = \frac{G(1+\mu)}{\phi} \qquad \text{(A3.2)}$$

where $G = \Sigma \left(\frac{N_i}{N}\right)^2$ is the Herfindahl index of concentration in the labour market and $\mu = \frac{\Sigma N_i^2 \sigma_i}{\Sigma N_i^2}$ is a weighted average of conjectural variation terms.

Comparing (A3.2) with the expression for identical firms (3.9), we see that the left-hand side is now the proportionate excess of a weighted average of marginal revenue products over the wage rate. Similarly on the right-hand side the conjectural variation terms are weighted according to firm size. The model suggests the Herfindahl as the appropriate measure of concentration in explaining market outcome.

If the marginal product of labour is constant then the left-hand side of (A3.2) is the share of wages in total revenue. It is therefore interesting to relate this to the finding of Cowling and Molho (1982) that, for the U.K., higher degrees of product market concentration

are associated with lower wage shares. Their estimating equation is based upon Cowling's (1981) oligopoly model in which marginal costs are assumed constant. Such an assumption would imply a horizontal labour supply curve. Our analysis has shown that with an upward sloping labour supply schedule wage shares will vary inversely with concentration in the labour market. Thus, if there is an overlap between product and labour markets, the Cowling and Molho results may reflect market power in the labour market rather than product market. This discussion suggests that, ideally, both product and labour market conditions should be incorporated into the analysis. In the following section, therefore, oligopoly in the product market is incorporated into our model.

Oligopsony with Oligopoly

This section incorporates product market power into the model. For simplicity it will be assumed that the product and labour markets coincide exactly (that is, it is the same firms in each) and the analysis will be restricted to identical firms. This will serve to illustrate the general form of the result; relaxing either restriction would introduce substantial complications.

Each aims to

$$\underset{N_i}{\text{Max}} \quad \pi_i = PQ_i(N_i) - WN_i - F_i \qquad \text{(A3.3)}$$

where P is the market price given by

$$P = P(Q) = P(Q_1 + Q_2 + \ldots + Q_s) \ . \qquad \text{(A3.4)}$$

As before, the wage rate is determined by $W = g(N_1 + N_2 + \ldots + N_2)$.

The first-order conditions for a maximum are

$$\frac{d\pi_i}{dN_i} = \left[P\frac{dQ_i}{dN_i} + Q_i \frac{dP}{dQ}\frac{dQ}{dN_i} \right] - \left[W + N_i \frac{dW}{dN}\cdot\frac{dN}{dN_i} \right] = 0, \quad (i=1,\ldots,s) \tag{A3.5}$$

where $$\frac{dQ}{dN_i} = \frac{dQ_i}{dN_i} + \sum_{j\neq i} \frac{dQ_j}{dN_j}\frac{dN_j}{dN_i} . \tag{A3.6}$$

Given identical firms, $\frac{dQ_i}{dN_i} = \frac{dQ_j}{dN_j}$, $\forall_j$ so we can write

$$\frac{dQ}{dN_i} = \frac{dQ_i}{dN_i}(1+\delta) . \tag{A3.7}$$

Substituting (3.7) and (A3.7) into (A3.5) gives

$$\left[P\frac{dQ_i}{dN_i} + Q_i \frac{dP}{dQ}\frac{dQ_i}{dN_i}(1+\delta) \right] - \left[W + N_i \frac{dW}{dN}(1+\delta) \right] = 0 . \tag{A3.8}$$

Therefore

$$P\frac{dQ_i}{dN_i}\left[1 + \frac{1+\delta}{Nn} \right] - W\left[1 + \frac{1+\delta}{N\emptyset} \right] = 0 \tag{A3.9}$$

where $n = \frac{dQ}{dP}\cdot\frac{P}{Q}$

$$\text{or} \quad \frac{P\dfrac{dQ_i}{dN_i} - W}{W} = \frac{\left[\dfrac{1+\delta}{N\emptyset}\right] - \left[\dfrac{1+\delta}{Nn}\right]}{1 + \left[\dfrac{1+\delta}{Nn}\right]} \quad . \qquad \text{(A3.10)}$$

Comparing (A3.10) with (3.9) it can be seen that the effect of incorporating product market power into the analysis is to introduce terms involving the market elasticity of demand, n, into the right hand side. It is easily verified that as $n \to \infty$ (product market power tends to zero) then (A3.10) $\to$ (3.9). As we would expect, the presence of product market power increases the size of the right hand side term and hence increases the proportionate excess of $P.\dfrac{dQ_i}{dN_i}$ over the wage rate. (6)

A problem for empirical work is that both $\emptyset$ and δ will typically be non-observable. However, since the value of $\emptyset$ depends on the availability of substitutes some of the effect may be captured in cross section analysis by the ratio of vacancies to unemployment and the average level of wages in the region. The latter proved to be a significant variable in the studies by Landon (1970) and Link and Landon (1975) referred to earlier. The apparent collusion term, it was suggested above, may very inversely with the number of firms in the market.

NOTES TO CHAPTER 3

1. It is not necessary that the goods be physically identical, as long as they sell for the same price and are produced under identical conditions.

2. In the appendix to this chapter we extend the model to non-identical firms and to the coexistence of oligopsony in the labour market and oligopoly in the product market. Also, it is pointed out that our analysis may provide a useful theoretical framework for empirical analyses of labour market buyer power which to date have not been based upon an explicit theoretical model.

3. See for example Stigler (1964). Stigler's model relates to the product market with price as the decision variable, but the same idea could be applied to quantity setting in the labour market.

4. If the firms are initially of equal size then $MRP_1 = MRP_2$ and, because of the labour supply constraint, $MRP > y$. If firm 1 is smaller then $MRP_1 > MRP_2 > y_2$.

5. Note that point C represents a total labour supply equal to the sum of the two employment levels, $N_1 + N$.

6. With a downward-sloping demand curve for the product, $P \frac{dQ_i}{dN_i}$ is no longer the marginal revenue product of labour.

CHAPTER 4

COURNOT-STACKELBERG MODELS OF PRODUCT MARKET DUOPOLY

(Joint work with Peter J. Law)

4.1 INTRODUCTION

One of the most interesting research areas arising from a concern with LMFs operating within capitalist economies is the analysis of markets which comprise both capitalist and labour-managed enterprises. In the previous chapter we looked briefly at a labour market duopsony comprising one firm of each type. We now shift our attention to the product market and explore some aspects of interaction in a simple mixed duopoly.

Using the same CF and LMF models as chapters 2 and 3, and assuming away any labour market imperfections, the following section describes a mixed Cournot equilibrium and derives the responses of the firms to cost and demand changes. Section 4.3 then considers Stackelberg leadership and followership. It is well-known that, under fairly general conditions, profit-maximising CF Cournot duopolists will have negatively inclined reaction functions in output space. Consequently, if one firm can act as a Stackelberg leader while the other follows, the leader's profits will exceed those attainable by that firm in Cournot equilibrium. But if both CF firms try to lead, Stackelberg disequilibrium results. Vanek (1970) shows that under some circumstances LMF Cournot duopolists who seek to maximise income

per member will have positively sloped reaction functions. In the case of LMF duopolists the income per member associated with one firm acting as a Stackelberg follower can exceed that which results from Stackelberg leadership and a fortiori that associated with Cournot equilibrium. This is demonstrated below by means of a simple example. If both act as followers the outcome is Cournot equilibrium.

This contrast between LMF and CF duopolists suggests the interesting possibility that in a mixed duopoly, composed of one LMF and one CF, a determinate Stackelberg equilibrium may be attained in which the optimal strategy is for the CF firm to lead and the LMF to follow. Our example will generate such an equilibrium. The example we adopt has the virtue that it is sufficiently tractable to be easily solved by analytic methods.

4.2 COURNOT MODEL

Firm 1 (the Illyrian LMF) and firm 2 (the profit-maximising CF) produce identical products and face a downward-sloping market demand function.

$$P = P(Q_1 + Q_2, \lambda) \; ; \; {}^{\partial P}/_{\partial Q_i} < 0, \; {}^{\partial P}/_{\partial \lambda} > 0, \frac{\partial^2 P}{\partial Q_i \partial \lambda} = 0, \; i=1,2 \qquad (4.1)$$

where P is market price, Q_i is output of the ith firm and λ is a slope-preserving demand shift parameter. Labour (number of members or number of workers), N_i, is the only variable input and each firm is constrained by the same production function.

$$Q_i = f(N_i); \; {}^{\partial Qi}/_{\partial N_i} > 0, \; \frac{\partial^2 Qi}{\partial N_i^2} < 0, \; i = 1,2 \; . \qquad (4.2)$$

Revenue of firm i, R_i, is thus written

$$R_i = R_i \; (N_1, N_2, \lambda); \; i = 1,2 \; . \qquad (4.3)$$

Both firms have the same level of fixed costs, F. The LMF maximises income per worker, y, by choice of the labour input, N, where

$$y = \left[R_1 \; (N_1, N_2, \lambda) - F \right] \; /N_1 \; . \qquad (4.4)$$

The CF hires workers at a wage rate, w, and maximises profits, π, where

$$\pi = R_2(N_1, N_2, \lambda) - wN_2 - F \tag{4.5}$$

Under the Cournot assumption that $\frac{dQ_2}{dQ_1} = \frac{dQ_1}{dQ_2} = 0$ and thus $\frac{dN_2}{dN_1} = \frac{dN_1}{dN_2} = 0$, maximisation of (4.4) and (4.5) yield the two first-order conditions:

$$\frac{\partial R_1}{\partial N_1}(N_1, N_2) - y(N_1, N_2) = 0 \tag{4.6}$$

$$\frac{\partial R_2}{\partial N_2}(N_1, N_2) - w = 0 \tag{4.7}$$

These are the reaction functions in N_1, N_2 space and their simultaneous solution (the point of intersection of the reaction functions) yields the Cournot equilibrium values of N_1 and N_2.

Assuming a Cournot equilibrium exists, how would the firms respond to changes in the parameters w, F and λ? Total differentiation of (4.6) and (4.7) yields

$$\alpha\, dN_1 + \beta\, dN_2 = -\frac{dF}{N_1} - \left(\frac{\partial Q_1}{\partial N_1} - \frac{Q_1}{N_1}\right)\frac{\partial P}{\partial \lambda}\, d\lambda \tag{4.8}$$

$$\gamma\, dN_1 + \theta dN_2 = dw - \frac{\partial Q_2}{\partial N_2}\frac{\partial P}{\partial \lambda}\, d\lambda \tag{4.9}$$

where

$$\alpha = \frac{\partial R_1}{\partial Q_1}\frac{\partial^2 Q_1}{\partial N_1^2} + \frac{\partial^2 R_1}{\partial Q_1^2}\left(\frac{\partial Q_1}{\partial N_1}\right)^2 < 0$$

$$\beta = \frac{\partial Q_2}{\partial N_2}\left(\frac{\partial^2 R_1}{\partial Q_1 \partial Q_2}\frac{\partial Q_1}{\partial N_1} - \frac{1}{N_1}\frac{\partial R_1}{\partial Q_2}\right) \gtrless 0$$

$$\gamma = \frac{\partial^2 R_2}{\partial Q_2 \partial Q_1}\frac{\partial Q_2}{\partial N_2}\frac{\partial Q_1}{\partial N_1} < 0$$

$$\theta = \frac{\partial R_2}{\partial Q_2}\frac{\partial^2 Q_2}{\partial N_2^2} + \frac{\partial^2 R_2}{\partial Q_2^2}\left(\frac{\partial Q_2}{\partial N_2}\right)^2 < 0 \quad .$$

Terms α and θ are negative by diminishing marginal revenue productivity of labour; γ is negative on the assumption that an increase in the output of firm 1 reduces marginal revenue in firm 2; and β cannot be signed in general but is positive if the demand function is linear and average labour productivity is falling.

To examine the comparative statics of the above system requires knowledge of the sign of $\Delta \equiv \alpha\theta - \beta\gamma$. In the appendix it is shown that assuming stability of the system ensures that Δ is positive. Equations (4.8) and (4.9) can now be solved by Cramer's rule for $\frac{\partial N_i}{\partial w}$, $\frac{\partial N_i}{\partial F}$ and $\frac{\partial N_i}{\partial \lambda}$ (see appendix).

Assuming $\beta > 0$ the following results are obtained, where a plus (minus) indicates an increase (decrease) in N_i in response to a parameter increase.

	w	F	λ
N_1	-	+	-
N_2	-	-	+

Table 4.1: Comparative Statics of Mixed Cournot Duopoly

An increase in the wage rate will induce the profit maximiser to cut employment and output. The Illyrian firm then reacts to the consequent rise in market price by reducing membership in order to maximise income per worker - the well-known "perverse" membership response. An increase in fixed costs causes the LMF to expand membership in order to spread the cost burden. The rise in output leads to a fall in market price and hence a contraction in the profit maximiser's employment and output levels.

The response of the CF to a slope-preserving demand increase is as expected. The Illyrian firm again exhibits the "perverse" response (see appendix for demonstration), which accords with Ward's (1958) for an Illyrian monopolist.

The properties of the mixed Cournot duopoly can be illustrated using a simple example. Figure 4.1 shows the two firm's reaction functions when the demand curve is linear:

$$P = a - b\,(Q_1 + Q_2) \tag{4.10}$$

and the production function has the simple form

$$Q_i = N_i^{\frac{1}{2}} ; \quad i = 1,2 \ . \tag{4.11}$$

Objective functions (4.4) and (4.5) are now given by

$$y = \frac{[a - b\,(Q_1 + Q_2)]Q_1 - F}{N_1} \tag{4.4}'$$

and

$$\pi = [a - b\,(Q_1 + Q_2)]Q_2 - wN_2 - F \ . \tag{4.5}'$$

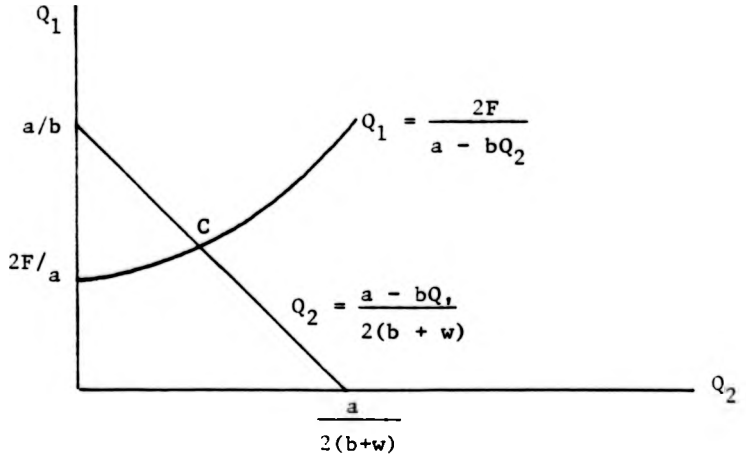
The LMF's reaction function is then

$$Q_1 = \frac{2F}{a - bQ_2} \tag{4.12}$$

and that of the profit maximiser is

$$Q_2 = \frac{a - bQ_1}{2(b + w)} \ . \tag{4.13}$$

Figure 4.1: Reaction Functions; Mixed Cournot Duopoly



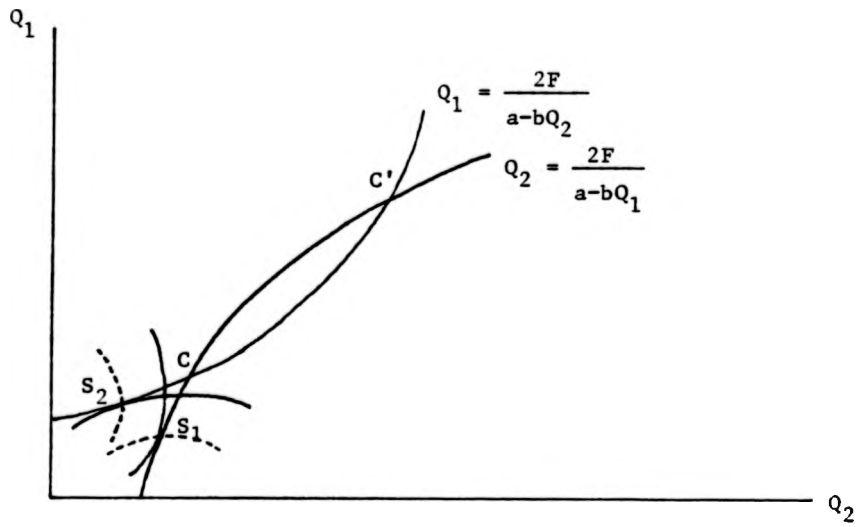
Point C denotes the Cournot equilibrium, which can be shown to be stable (see appendix). The consistency of this example with the results stated in Table 4.1 is easily checked by considering how the curves shift with a change in w, F or a (demand shift) and where the new equilibrium will be established.

4.3 STACKELBERG MODELS

In the Cournot duopoly firms take the output level of the rival to be constant. An alternative set of assumptions about conjectural variation is contained in the Stackelberg model. A follower obeys its reaction function and selects its optimum level of output given the quantity decision of its rival, which it assumes to be a leader. A leader does not obey its reaction function but rather assumes the rival acts as a follower and chooses its optimal output given the rival's reaction function. It is a familiar result that profits are typically higher for a CF leader than a follower. Thus both firms desire to be leaders but since neither of the reaction functions is obeyed a situation described by Fellner (1949), in his classic treatment of oligopoly, as "Stackelberg disequilibrium" emerges. We will contrast this well-known case with those of the LMF duopoly and mixed duopoly.

Figure 4.2 depicts reaction functions and iso-y curves for identical LMF duopolists, each firm having a reaction function of the type described in equation (4.12). It can easily be demonstrated that the iso-y curves are concave to the relevant axis and that income per worker in the firm is higher the nearer to its axis are the iso-y curves.

Figure 4.2



The Cournot equilibrium, C, is found by simultaneous solution of the reaction functions which yields a quadratic in Q_i. Only the smaller of the two real roots would be relevant as C' is unstable. The effect of changes in fixed cost or demand on Cournot equilibrium can easily be examined in the figure but it is the issue of Stackelberg leadership and followership that particularly concerns us here. If firm 1 acts as a leader and firm 2 follows the solution is at S_1. If firm 2 leads and firm 1 follows it is at S_2. It can clearly be seen from the diagram that both firms achieve a higher level of income per worker by following (dashed iso-y curves) rather than leading (solid iso-y curves). In this example both firms have identical

fixed costs but this result persists even if there are substantial differences in fixed costs. This is demonstrated in Table 4.2 using a numerical example where $a = 10$ and $b = 0.5$.

Thus in contrast to the profit-maximising duopoly in which both firms typically prefer the leadership position, our example shows that in the LMF duopoly both firms prefer followership In this latter case we again have disequilibrium because their expectations are not realised, since each assumes that the other will act as a leader. The duopolists must revise their expectations. The Cournot solution is achieved if each acts as a follower.

We now turn to the case of mixed duopoly and examine whether each firm would prefer the leadership or followership role. Relaxing the previous requirement of equal fixed costs presents no problem so (4.4)' and (4.5)' become

$$y = \frac{[a - b(Q_1+Q_2)]Q_1 - F_1}{N_1} \tag{4.14}$$

$$\pi = [a - b(Q_1+Q_2)]Q_2 - wN_2 - F_2 \tag{4.15}$$

and hence the LMF and CF reaction functions are, respectively

$$R_1 : \quad Q_1 = \frac{2F_1}{a-bQ_2} \tag{4.16}$$

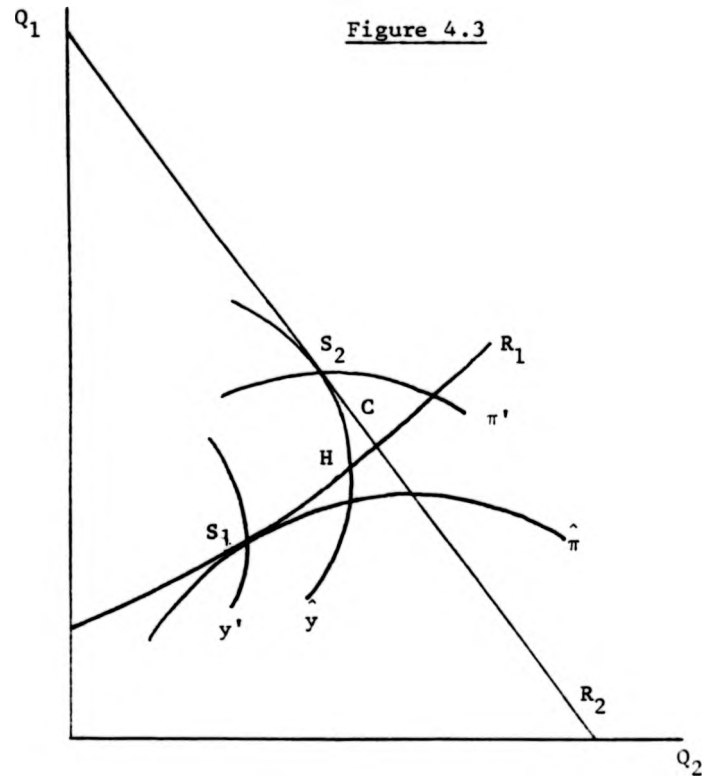
Table 4.2: Output and Income levels in Cournot-Stackleberg LMF Duopoly.

	Monopoly F = 16	Cournot $F_1 = F_2 = 16$	Firm 1 leads Firm 2 follows $F_1 = F_2 = 16$	Cournot $F_1 = 1, F_2 = 48$	Firm 1 leads Firm 2 follows $F_1 = 1, F_2 = 48$	Firm 2 leads Firm 1 follows $F_1 = 1, F_2 = 48$
Q_1	Q = 3.2	4	3.7708	0.3918	0.3845	0.3851
Q_2		4	3.9435	9.7918	9.7882	9.6138
y_1	y = 1.0025	0.5	0.5038	6.0129	6.0153	6.2421
y_2		0.5	0.5289	0.0006	0.001	0.0008

$$R_2: \quad Q_2 = \frac{a - bQ_1}{2(b+w)} \quad . \tag{4.17}$$

Equation (4.17) is of course identical to (4.13) because fixed costs play no role in the determination of the CFs output. The two reaction functions are depicted in figure 4.3. We shall assume that the parameters are such that y and π are positive and $y \geq w$ in Cournot equilibrium.

Figure 4.3



A determinate leadership-followership equilibrium will emerge if leadership is more favourable than followership to one of the firms while followership is preferred by the other. If the CF acts as a Stackelberg leader (while the LMF follows) the equilibrium would be at S_1, in Figure 4.3. Here the profits earned by the CF, indicated

by iso-profit schedule $\hat{\pi}$, clearly exceed the profits corresponding to the iso-profit schedule through C (the Cournot equilibrium) and certainly exceed π', the profits available from followership (with the LMF as leader). The CF will thus prefer leadership. But will the LMF accommodate the CF's policy by following, or will it too attempt to lead, resulting in Stackelberg disequilibrium?

If the LMF leads its members expect to receive $\hat{y}$, the income per member associated with the isc-y schedule tangential to R_2 at S_2. Now the $\hat{y}$ iso-y schedule intersects R_1 at point H. If, as in the diagram, H lies to the right of S_1 the LMF will prefer to follow than to lead ($y' > \hat{y}$). However, if point H lies to the left of S_1 on R_1, the LMF would attempt to lead. In the present example we can establish that if $\hat{y} > 0$, H does indeed lie to the right of S_1 and hence a determinate leadership-followership equilibrium results.

We obtain the leadership value of Q_2 by maximising (4.15), subject to (4.16), which yields:

$$\frac{\partial \pi}{\partial Q_2} = a - \frac{2F_1 b}{a-bQ_2} - \frac{2F_1 b^2 Q_2}{(a-bQ_2)^2} - 2(b+w)Q_2 = 0 \qquad (4.18)$$

Rather than attempt to solve for Q_2 directly in (4.18) (and then evaluate Q_1 at S_1 and hence y') our method is to determine the value of Q_2 at point H, denoted Q_2^H. We can then substitute this value into the left-hand side of (4.18) to yield $\left.\frac{\partial \pi}{\partial Q_2}\right|_{Q_2 = Q_2^H}$.

Then it follows that:

$$\left.\begin{array}{ll} S_1 & \text{lies to the left of } H \\ S_2 & \text{and } H \text{ coincide} \\ S_1 & \text{lies to the right of } H \end{array}\right\} \quad \text{as} \quad \left.\frac{\partial \pi}{\partial Q_2}\right|_{Q_2 = Q_2^H} \left\{\begin{array}{l} < 0 \\ = 0 \\ > 0 \end{array}\right. \qquad (4.19)$$

To obtain Q_2^H, we first locate the co-ordinates of S_2, (Q_1^S, Q_2^S), by maximising (4.14) subject to (4.17), which yields:

$$Q_1^S = \frac{4F_1(b+w)}{a(b+2w)} \quad , \quad Q_2^S = \frac{a}{2(b+w)} - \frac{2F_1 b}{a(b+2w)} \qquad (4.20)$$

hence $\hat{y}$ can be expressed in terms of the parameters F_1, a, b and w thus:

$$\hat{y} = \frac{(b+2w)\left[(b+2w)a^2 - 8F_1\, b(b+w)\right]}{16F_1(b+w)^2} \quad . \qquad (4.21)$$

Now, $\hat{y}$ is the value of y at H on R_1; so substituting (4.16) in (4.14) (which defines y) and setting $y = \hat{y}$ we derive Q_2^H as:

$$Q_2^H = \frac{a - \sqrt{4F_1(\hat{y}+b)}}{b} \quad . \qquad (4.22)$$

Finally, substituting (4.22) in the left-hand side of (4.18) and using (4.21), we obtain:

$$\left.\frac{\partial \pi}{\partial Q_2}\right|_{Q_2 = Q_2^H} = \frac{1}{4F_1 b(y+b)}\left[\sqrt{A^2+B} - A - \frac{a(b+w)B}{A^2+B}\right] \qquad (4.23)$$

where

$$A \equiv (b+2w)a \quad , \quad B \equiv 8F_1(b+w)b^2 \; . \qquad (4.24)$$

Equation (4.23) will be negative for all b, w, F_1, a, if:

$$D \equiv (A^2+B) - \left[A + \frac{a(b+w)B}{A^2+B}\right]^2 < 0 \; . \qquad (4.25)$$

After some manipulation and using (4.24) the left-hand side of (4.25) can be rewritten as:

$$D \equiv \frac{B}{(A^2+B)^2}\left[(A^2+B)b\left[8F_1 b(b+w) - a^2(b+2w)\right] - a^2(b+w)^2 B\right] . \qquad (4.26)$$

Thus, from (4.26) it is sufficient for $D < 0$ that $a^2(b+2w) \geq 8F_1 b(b+w)$. This last condition simply requires $\hat{y} \geq 0$ (compare (4.21)).[1]

We conclude that for this particular example, the fairly weak condition $\hat{y} \geq 0$ is sufficient to yield a determinate equilibrium in which the LMF acts as a follower while the CF acts as a Stackelberg leader.

4.4 CONCLUSIONS

Writing subscripts ℓ, f and c for leadership, followership and Cournot, our example has suggested the following rankings:

CF Duopoly $\quad \pi_\ell > \pi_c > \pi_f$

LMF Duopoly $\quad y_f > y_\ell > y_c$

Mixed Duopoly $\quad \begin{cases} \pi_\ell > \pi_c > \pi_f \\ y_f > y_\ell > y_c \end{cases}$

so that in the mixed case a stable leadership-followership equilibrium would emerge. Three caveats are, however, in order. First the outcome varies with the technology assumed. If, for example, the production function took the form $Q_i = \delta N_i$ firm 1's reaction function is a horizontal line and firm 2's is a negatively sloped line so that $y_\ell > y_f = y_c$ and $\pi_\ell = \pi_c > \pi_f$, implying that both firms would prefer leadership. A fortiori if the LMFs reaction function is also negatively sloped our results are affected.(2) Secondly, the analysis is limited by the assumption that the number of workers is the only variable input. It is well known that a number of Illyrian LMF results may be changed in the case of more than one variable input. Finally, it may also be interesting to explore the implications of alternative maximands to the Illyrian assumption of y-maximisation.(3) Nevertheless, our example demonstrates that "mixed duopoly" may be capable of yielding determinate Stackelberg equilibria where homogeneous firm types would not. Such a result is of some interest, at least as a first step in the investigation of product market interactions between labour-managed and capitalist firms.

APPENDIX TO CHAPTER 4.

(a) Comparative Statics

By Cramer's rule from (4.8) and (4.9)

$$\frac{\partial N_1}{\partial F} = -\frac{\theta}{N_1\Delta} \quad ; \quad \frac{\partial N_2}{\partial F} = \frac{\gamma}{N_1\Delta}$$

$$\frac{\partial N_1}{\partial w} = -\frac{\beta}{\Delta} \quad ; \quad \frac{\partial N_2}{\partial w} = \frac{\alpha}{\Delta}$$

$$\frac{\partial N_1}{\partial \lambda} = \frac{1}{\Delta}\begin{vmatrix} \frac{Q_1}{N_1} - \frac{\partial Q_1}{\partial N_1}\frac{\partial P}{\partial \lambda} & \frac{\partial Q_2}{\partial N_2}\left\{\left(\frac{\partial P}{\partial Q_2} + Q_1\frac{\partial^2 P}{\partial Q_1 \partial Q_2}\right)\frac{\partial Q_1}{\partial N_1} - \frac{Q_1}{N_1}\frac{\partial P}{\partial Q_2}\right\} \\ -\frac{\partial Q_2}{\partial N_2}\cdot\frac{\partial P}{\partial \lambda} & \frac{\partial R_2}{\partial Q_2}\frac{\partial^2 Q_2}{\partial N_2^2} + \left(\frac{\partial Q_2}{\partial N_2}\right)^2\left(2\frac{\partial P}{\partial Q_2} + Q_2\frac{\partial^2 P}{\partial Q_2^2}\right) \end{vmatrix}.$$

With a linear demand function $\frac{\partial^2 P}{\partial Q_1 \partial Q_2} = \frac{\partial^2 P}{\partial Q_2^2} = 0$ and hence

$$\frac{\partial N_1}{\partial \lambda} = \frac{1}{\Delta}\left\{\left(\frac{Q_1}{N_1} - \frac{\partial Q_1}{\partial N_1}\right)\frac{\partial P}{\partial Q_2}\frac{\partial P}{\partial \lambda}\left(\frac{\partial Q_2}{\partial N_2}\right)^2 + \left(\frac{Q_1}{N_1} - \frac{\partial Q_1}{\partial N_1}\right)\frac{\partial P}{\partial \lambda}\frac{\partial R_2}{\partial Q_2}\frac{\partial^2 Q}{\partial N_2^2}\right\}$$

Therefore $\frac{\partial N_1}{\partial \lambda} < 0$

$$\frac{\partial N_2}{\partial \lambda} = \frac{1}{\Delta} \begin{bmatrix} \alpha & \left(\frac{Q_1}{N_1} - \frac{\partial Q_1}{\partial N_1} \right) \frac{\partial P}{\partial \lambda} \\ \gamma & - \frac{\partial Q_2}{\partial N_2} \frac{\partial P}{\partial \lambda} \end{bmatrix} \quad \text{(note: } \frac{Q_1}{N_1} > \frac{\partial Q_1}{\partial N_1} \text{ from (4.6)} .$$

(b) Stability

Take linear approximations of the reaction functions around the Cournot solutions (N_1^O , N_2^O) and lag one period to yield

$$(N_1 - N_1^O)_t = - \frac{\beta}{\alpha} (N_2 - N_2^O)_{t-1}$$

$$(N_2 - N_2^O)_t = - \frac{\gamma}{\theta} (N_1 - N_1^O)_{t-1}$$

which can be combined to give the second order difference equation

$$(N_1 - N_1^O)_t = \frac{\beta\gamma}{\alpha\theta} (N_1 - N_1^O)_{t-2} .$$

For stability $\left[\frac{\beta}{\alpha} \right] < \left[\frac{\theta}{\gamma} \right]$ (The CF has the steeper reaction function).

Cournot stability can be demonstrated in the example as follows (in output space to accord with the diagrams).

The reaction functions for LMF and profit maximiser are respectively:

$$Q_1^{-3}\,(-aQ_1 + bQ_1Q_2 + 2F) = 0 \qquad (1)$$

$$-2(b + w)Q_2 - bQ_1 + a = 0 \quad . \qquad (2)$$

Assume the Cournot solution is (Q_1^0, Q_2^0) then the reaction functions may be linearly approximated and subjected to a one period lag so that for the LMF and profit-maximising firm respectively

$$A(Q_1 - Q_1^0)_t + B(Q_2 - Q_2^0)_{t-1} = 0 \qquad (3)$$

$$C(Q_1 - Q_1^0)_{t-1} + E(Q_2 - Q_2^0)_{t-1} = 0 \qquad (4)$$

Now, from (3) $(Q_1 - Q_1^0)_t = -\frac{B}{A}(Q_2 - Q_2^0)_{t-1}$

and from (4) $(Q_2 - Q_2^0)_t = \frac{-C}{E}(Q_1 - Q_1^0)_{t-1}$

So, $(Q_2 - Q_2^0)_t = \frac{CB}{EA}(Q_2 - Q_2^0)_{t-2}$.

This second order difference equation (with unreal roots, $\frac{CB}{EA} < 0$) will be stable if

$$|EA| > |CB|$$

where $A = Q_1^{-3}(-a + bQ_2) < 0$

$B = Q_1^{-3}(bQ_1) > 0$

$C = -b < 0$

$E = -2(b + w) < 0$.

Therefore $|EA| > |CB|$ if

$$Q_1^{-3}(a - bQ_2)2(b + w) > Q_1^{-3}b^2Q_1$$

i.e. $(a - bQ_2)2(b + w) > b^2Q_1$

i.e. $(b + 2w)(a - bQ_2) + b(a - bQ_2) > b^2Q_1$

i.e. $(b + 2w)(a - bQ_2) + b(a - bQ_1 - bQ_2) > 0$

i.e. $(b + 2w)(a - bQ_2) + bP > 0$.

Since $P > 0$ and $(a - bQ_2) = P + bQ_1 > 0$ the equilibrium is stable. In terms of the diagram stability is ensured because the profit-maximiser has the steeper reaction function:

$$\left| \frac{dQ_1}{dQ_2} \Big|_{R^{CF}} \right| > \left| \frac{dQ_1}{dQ_2} \Big|_{R^{LMF}} \right|$$

i.e. $\left|\frac{E}{C}\right| > \left|\frac{B}{A}\right|$.

NOTES TO CHAPTER 4

1. We would like to thank Yoshinari Miyamoto for his help in determining this result.

2. See Miyato (1982) for a discussion of the determinants of the slope of the LMF reaction function.

3. It may also be possible to extend the analysis of "mixed duopoly" by recasting it in the type of framework recently developed by Moulin (1981).

CHAPTER 5

MANAGERIAL DISCRETION

5.1 INTRODUCTION

In the analysis of the previous three chapters the objective of the LMF was taken to be the maximisation of income per member.[1] However, as Wiles (1977 p.63) reminds us, we should be careful not to simply subsume the theory of the firm under the theory of the individual - the firm, strictly speaking, has no interests of its own. Account must be taken of the interplay between the various individuals and groups who make up the firm. The possibility of an alternative model suggests itself as soon as we consider the mechanism by which workers attempt to translate their preferences into firm-level decisions on matters such as prices, output and employment. They might choose to do this through collective discussion, by rotating the decision-making role among themselves, or by appointing a specialist manager. It is the third of these options which is to be examined in this chapter.

The possibility that delegating decision-making to a specialist manager has important consequences for firm behaviour is a familiar theme in the literature on CFs. For example, Baumol (1959), Marris (1964) and Williamson (1963, 1964) have each proposed models in which managerial discretion plays a central role. More recently, Fama (1980) examines the role of the labour market in disciplining managers and Cubbin and Leech (1983a) consider the importance of the degree of dispersion among shareholders. In addition there have been numerous attempts to test empirically the various theoretical predictions, the latest of which include Cubbin and Leech (1983b) and Smirlock and Marshall (1983).

In the LMF literature a number of authors claim to have found evidence of managerial discretion. In separate studies of Yugoslav enterprises, Poole (1978 p. 168), Granick (1975 Ch.12) and Obradovic (1978) all conclude that workers have relatively little impact on decision-making relative to management.(2) Turning to LMFs operating within capitalist economies, Bradley (1980) claims that in the French, British and Canadian cooperative ventures of the early 1970's there is little evidence that managers acted within a framework determined by workers; rather that "Data show that worker directors tended to endorse management strategies instigated by experts..." (p.165).

In spite of these case studies and the extensive literature relating to CFs, only two theoretical papers, Atkinson (1973) and Law (1977), have analysed the possible consequences of managerial discretion for LMF behaviour. Atkinson suggests that managers are interested in growth and presents a model which examines the implications for both LMF and CF growth rates. In contrast our focus,along with that of Law, who we return to below, will be short run behaviour. In particular we examine the implications for the adjustment of employment to changes in demand.

The remainder of the chapter is organised as follows. We begin in section 5.2 with a consideration of why LMFs operating in a capitalist economy might decide to appoint a specialist manager. The following section then looks at the likely motivation of managers and the constraints to which they are subject. Section 5.4 then sets up a simple model based upon this discussion and examines the response

of employment to changes in demand.

An important feature of the model, one that it shares with the Illyrian LMF, is that decisions concerning employment reductions take no account of the fate of the workers who leave. The Illyrian model has been criticised in this regard and a modification involving the payment of compensation to departing members has been proposed in the literature. In section 5.5 we similarly incorporate such a scheme and analyse the implications for employment adjustment. A short concluding section summarises the main results.

5.2. THE NEED FOR SPECIALIST MANAGEMENT

A labour-managed firm, just like any other, must undertake managerial as well as production tasks. Each requires distinct skills. As noted above, the appointment of a specialist to the managerial role is just one of three options open to the membership. However, both the case studies referred to earlier and the following theoretical argument concerning the capitalist environment, suggest that this may be an important clsss of LMF to examine.

Consider the distribution of managerial skills across the population. To the extent that such skills are acquired through on-the-job experience a crucial determinant will be the organisation of work within CFs. Although there are conflicting viewpoints on the underlying rationale, it is generally accepted that CFs exhibit a sharp division of labour between managerial and production tasks. Williamson (1980) for example emphasises the efficiency gains, in terms of superior assignment and contracting performance, which emanate from hierarchy. Radical economists such as Braverman (1974) and Marglin (1974), on the other hand, claim that "the separation of conception from execution" serves to benefit owners at the expense of workers rather than to improve efficiency. Whatever the explanation the result is that on-the-job management experience is restricted to a small subset of the population. Managerial skills may also be obtained through education. Here again we might expect relatively few people to be provided with such skills if it is the case, as Bowles and Gintis (1976) and Putterman (1982) suggest, that the system is geared to the requirements of capitalist enterprises. A LMF, then, facing a situation in which managerial skills are scarce, may on efficiency grounds, choose to

appoint a specialist rather than adopt collective decision-taking or rotation.

A further argument advanced by Bradley (1980), one which is not specific to capitalist economies, concerns the need to prevent information leaking out to competitors. To make management information available to all members would, it is argued, run the risk of leakage and hence might threaten the survival of the enterprise. However, as Ireland and Law (1982 p.174) point out, restricting the information set to specialist management provides no guarantee of security since there is nothing to stop them leaving for another firm.

5.3 MANAGERIAL UTILITY AND CONSTRAINTS

Based on the work of organisational theorists, Williamson (1963, 1964) suggests that managers of capitalist firms are motivated by the following: Salary and other material rewards[3], power status and prestige (collectively termed "dominance"), professional excellence and security. In the absence of theoretical arguments or evidence to the contrary we shall assume that LMF managers are similarly motivated. Leaving aside professional excellence, which plays an insignificant role in Williamson's model and would similarly appear to have little to contribute here, and security, which is best viewed as a constraint on behaviour, we now need to consider how these objectives may be pursued within the LMF.

Salary, we assume, will be related by a constant differential to the incomes of production workers. Another source of material rewards, and possibly also of status and prestige, are "emoluments" which the manager may be able to consume out of the surplus prior to the distribution of incomes. "Emoluments" are defined by Williamson (1963 p. 1035) as rewards which have zero productivities and, if removed, would not cause the manager to seek alternative employment. Examples of activities which might contribute to emoluments include entertaining clients, travel, and use of a company car. In Williamson's model the power, status and prestige of the manager is enhanced by the expansion of staff. Given that our interest is in short run comparative statics we shall take the number of staff as constant and, for simplicity, fix it at one - the manager. A final possibility to consider is that the number of production workers is a contributor to utility perhaps, as Law (1977) suggests, because it is a determinant of managerial salary. We shall, however, not include this term in the

utility function since, as noted above, we have chosen an alternative assumption regarding salary and in any case the implications for short-run adjustment have already been examined in Law (1977).

Our managerial utility function thus contains two elements - salary and emoluments. As will be seen presently, even this extremely simple specification, in combination with the constraints to which we now turn, generates some interesting predictions on short-run employment behaviour.

Atkinson (1973) suggested that the constraint faced by a LMF manager would be some minimum level of income per worker required by the workforce. This is consistent with the assumption, on which much of the literature is based, that the objective of a (non-managerial) LMF will be the maximisation of income per worker. However, Atkinson did not attempt to explore the determinants of this minimum level, but simply treated it as an exogenous parameter. By contrast we shall demonstrate that a consideration of the factors determining the constraint is no less important than the specification of the managerial utility function in the determination of LMF behaviour.

The extent to which managerial utility can be increased at the expense of production workers is limited by two factors - the utility available to the workers outside the firm, and their ability to monitor the manager.(4) The first of these, which we term the "exit-constraint", is simply that if production workers' incomes, y, fall below those available outside the LMF, $\bar{y}$, they will leave. Our "monitoring constraint" is adapted from a specification suggested by Yarrow (1976) in his analysis of monitoring by shareholders in a CF.

The potential benefit per worker if the manager is perfectly monitored is (y^*-y) where y^* is defined as the income level attainable if the manager acts solely in the interests of the workers. Thus for any coalition of workers of size N_i the total benefit would be $N_i(y^*-y)$.

Let K_i be the cost to coalition i of intervening to enforce actions which yield y^* and let $Z = \max_i \{N_i(y^*-y) - K_i\}$. The manager is safe as long as $Z \leq 0$. The monitoring constraint may therefore be written

$$y \geq y^* - k \quad \text{where} \quad k \equiv \min_i \{K_i/N_i\} \quad .$$

The level of monitoring costs, k, will depend on a variety of structural factors. One important consideration will be the rules concerning the relationship between manager and production workers. Under this heading would come, for example, statutory requirements to reveal certain types of information or to discuss particular issues with the workforce, the frequency of workers' meetings, and whether or not trade unions are present.(5) A second structural characteristic which may be relevant is the technology involved. This could affect monitoring costs in at least two ways. First, the more complex the technology the more difficult it may be for workers to decide whether optimal policies are being pursued by the manager. The second effect is through the spatial arrangements dictated by technology - the less on-the-job contact between workers the more difficult it may be for them to communicate and organise.(6) A further element of structure which may be important is the educational and skill level of the workforce - education and training may be expected to facilitate monitoring

although, as Espinosa and Zimbalist (1981 p.97) point out, it may be true only of specialist and not general education.

Since our concern is with short-run behaviour, we shall be holding these factors, and hence monitoring cost, constant. However, as we shall see, the value of k is an important determinant of both the initial equilibrium and comparative static response of the enterprise.

A further simplification is that monitoring costs are assumed to be independent of the level of emoluments. In practice, changes in level are likely to involve variations in the type of emoluments consumed and some will be more easy to monitor than others. Recognition of this might be important in any attempt to compare LMFs and CFs since outside shareholders and workers will differ in their capacity to directly observe the actions of managers.

5.4 THE BASIC MODEL

In order to focus attention on the role of managerial discretion we assume that the LMF produces a single output, Q, using just one variable input, the number of workers, N. Management, by contrast, is an element of overheads and therefore does not vary with output. The output is sold on a competitive market at a price, P. This last assumption is adopted so that when compensation is introduced in the following section we are able to compare our results with non-managerial models involving compensation, all of which assume price-taking.(7)

Income per worker is given by

$$y = \frac{PQ - F - M}{N} \tag{5.1}$$

where F denotes the level of fixed costs and M the manager's emoluments.

Following the discussion in section 5.3 above, the manager's utility is assumed to depend upon salary θy, where θ is a parameter, and emoluments. For simplicity we shall set θ equal to unity, this having no qualitative effect on the results. The objective of the manager is then to

$$\max_{N,M} \; U = U(y,M); \quad U_y, U_M > 0, \quad U_{yy}, U_{MM} < 0 \tag{5.2}$$

subject to a production function

$$Q = Q(N), \quad Q_N > 0, \quad Q_{NN} < 0 \tag{5.3}$$

and to the monitoring and exit constraints discussed above. These are, respectively,

$$y \geq y^* - k \tag{5.4}$$

$$y \geq \bar{y} \ . \tag{5.5}$$

Three types of equilibrium are possible. First, neither the monitoring nor exit constraint may be binding on the manager. This will be more likely the greater the weight given to y in $U(\cdot)$, the higher is k and the lower is $\bar{y}$. Secondly, the monitoring constraint may be binding. Finally, the larger is k, the higher is $\bar{y}$ and the more weight given to M, the more likely it is that the exit constraint will be binding. Each of these cases is now analysed in turn.

Neither constraint binding.

The equilibrium of the LMF is given by the maximisation of (5.2) subject to (5.1) and (5.3). This yields a pair of first-order conditions

$$U_{y/_N} (PQ_N - y) = 0 \tag{5.6}$$

$$- U_{y/_N} + U_M = 0 \ . \tag{5.7}$$

Since $U_{y/_N} > 0$, (5.6) implies

$$PQ_N - y = 0 \tag{5.6'}$$

We wish to examine how employment responds to demand changes, so totally differentiating (5.6') and (5.7) respectively we obtain

$$PQ_{NN}dN + \frac{1}{N}\,dM = \left(\frac{Q}{N} - Q_N\right)\,dP \tag{5.8}$$

$$U_y/_{N^2}\;\; dN + \left[\frac{U_{yy}}{N^2} - \frac{2U_{yM}}{N} + U_{MM}\right] dM = \left[\frac{U_M}{U_y}\cdot U_{yy} - U_{yM}\right]\frac{Q}{N}\,dP \tag{5.9}$$

and hence

$$\frac{dN}{dP} = \frac{\begin{vmatrix} \frac{Q}{N} - Q_N & 1/N \\ \left[\frac{U_M}{U_y}\cdot U_{yy} - U_{yM}\right] Q/N & A \end{vmatrix}}{H} \tag{5.10}$$

where $A = \frac{U_{yy}}{N^2} - \frac{2U_{yM}}{N} + U_{MM}$

and $H = PQ_{NN}\cdot A - \frac{U_y}{N^3}$.

Now, $(Q/N - Q_N)$ is positive from (5.6') and A is negative by convexity of the indifference curves to the origin (see appendix). Also, if, as we assume, the second-order conditions for a maximum are satisfied then H is positive. To sign $\left(\frac{U_M}{U_y}\cdot U_{yy} - U_{yM}\right)$ consider (5.9) and set $dN = 0$:

$$\frac{\partial M}{\partial P} = \frac{\left(\frac{U_M}{U_y} \cdot U_{yy} - U_{yM}\right) Q/N}{A} \quad . \tag{5.11}$$

This indicates how a manager adjusts emoluments in response to a change in revenue if employment was fixed. A reasonable assumption would be that emoluments (and income) would be increased if revenue rose. Thus if emoluments are a "normal good" then (5.11) is positive and hence $\left(\frac{U_M}{U_y} U_{yy} - U_{yM}\right)$ is negative.

As a consequence, the sign of dN/dP could be either positive or negative. In the event of a price rise the former possibility is of particular interest since it contrasts with the "perverse" response of the Illyrian firm. It is illustrated in figure 1.

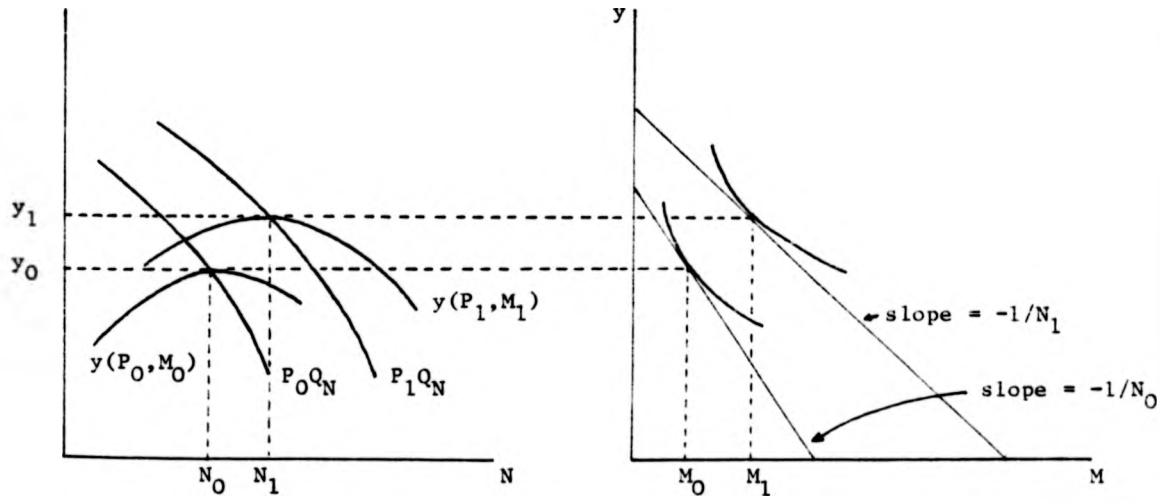


Figure 5.1

At the initial price, P_0, managerial utility is maximised with employment N_0 and emoluments M_0. The two first-order conditions (5.6') and (5.7') are depicted in the left- and right-hand sectors respectively. First, for given M there is the familiar condition that membership is chosen to equate income per worker with the marginal revenue product. Secondly, for a given N the manager allocates revenue between income and emoluments so that the marginal rate of substitution equals the marginal rate of transformation.

A rise in price to P_1 then generates two opposing forces on N. For a given M there is the usual Illyrian tendency to reduce N but if M is "normal" it will increase and this acts, as would an increase in fixed costs, to raise the optimal size of the workforce.(8) In certain circumstances the second effect may dominate as it does in figure 5.1, where membership expands from N_0 to N_1 following the price rise.(9)

Monitoring constraint binding.

If the monitoring constraint is binding then $y = y^*-k$ where y^* is the income generated if the manager acted purely in the interests of the workforce and hence is given by

$$y^* \equiv \max_N \left\{\frac{PQ-F}{N}\right\} \quad . \tag{5.12}$$

Since the level of income is given at $y^* - k$ the objective for the manager is simply to

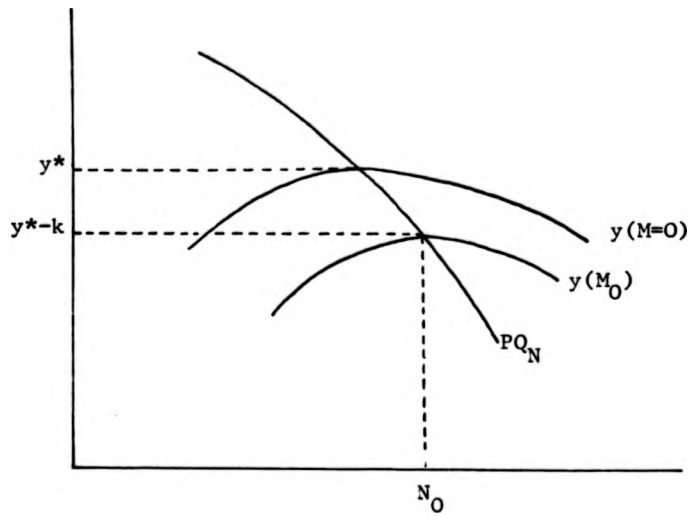
$$\max_N M = PQ - F - (y^*-k)N \quad . \tag{5.13}$$

This yields the first-order condition

$$PQ_N - (y^*-k) = 0 \quad . \tag{5.14}$$

The equilibrium is depicted in figure 5.2.

Figure 5.2



Since the income level is given the manager behaves just as would the manager of a CF maximising profit subject to an exogenous wage rate, choosing an employment level such that the marginal revenue product equals the payment to workers.

When we proceed to examine the comparative static response to a price change, however, the situation is no longer analogous to a profit maximising firm because in our case (y*-k) is itself a function

of P. Taking account of the endogeneity of y*, differentiation of (5.14) (see appendix) yields

$$\frac{dN}{dP} = \frac{Q^*/_{N^*} - Q_N}{PQ_{NN}} \qquad (5.15)$$

where Q* and N* are the values of Q and N which satisfy (5.12).

This can be signed unambiguously as follows. The point (y*,N*) is generated by the condition $PQ_N = \frac{PQ - F}{N}$ as can be seen in figure 5.2. This tells us that $\frac{Q^*}{N^*} > Q_N\Big|_{N^*}$.

Since the employment level, N_0, which satisfies (5.14) is greater than N* and Q_{NN} is negative the numerator of (5.15) is positive and the term as a whole is negative.

Thus we find that if the manager is constrained by the monitoring activities of the workers there will be an inverse relationship between membership size and the price level. The firm therefore responds to price changes in the same direction as Ward's Illyrian LMF.

Exit constraint binding.

Finally, we consider the case where it is the ability of members to earn some income level $\bar{y}$ outside the LMF which is the binding constraint on the manager. As in the previous case the manager, faced with a given income level, will simply choose employment to obtain the highest possible level of emoluments. Thus the objective is to

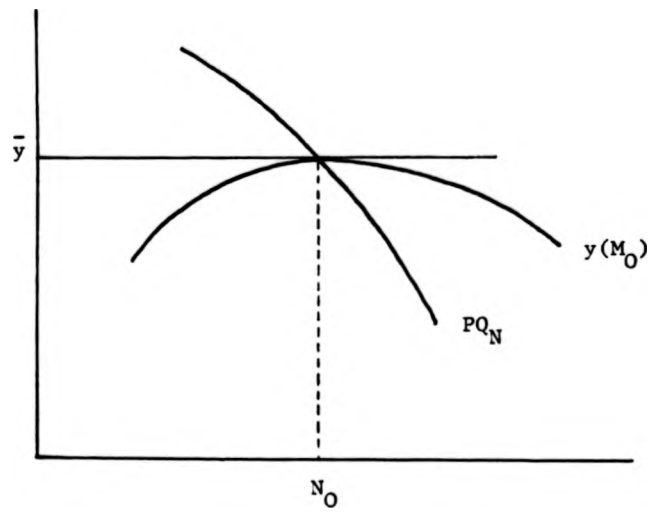
$$\max_{N} M = PQ - F - N\bar{y} \tag{5.16}$$

which yields the first-order condition

$$PQ_N - \bar{y} = 0 \quad . \tag{5.17}$$

The equilibrium is shown in figure 5.3.

Figure 5.3



Since $\bar{y}$ is exogenous it is not only the first-order condition but also the comparative static response that is analogous to a profit maximising firm in this case. Thus we find that

$$\frac{dN}{dP} = - \frac{Q_N}{PQ_{NN}} \tag{5.18}$$

which is positive. A binding exit constraint therefore causes the manager to adjust employment in the opposite direction to the Illyrian firm.

What is emerging from our analysis so far, then, is, first, that the incorporation of a managerial utility function into the LMF model has important consequences for short-run behaviour of the enterprise and secondly that it is not only the elements in the utility function but also the nature of the constraints facing the manager which play a central role.

5.5 EMPLOYMENT ADJUSTMENT WITH COMPENSATION

The Illyrian prediction that a price rise leads to a contraction in employment has been criticised by a number of authors on grounds that what is then being maximised is the incomes of those that remain with no account taken of the fate of dismissed workers. As noted in chapter 2, Steinherr and Thisse (1979) suggest that for an employment reduction to be fair to all members one of two procedures must be followed. Either a vote is taken on the optimum membership level with everyone having an equal chance of being selected for dismissal in the event of a desired contraction, or those who leave be compensated by the remaining workers such that all are indifferent between staying and leaving. For our purposes an important difference between the procedures is that the voting rule requires membership involvement in decision making whereas with the compensation scheme control can still rest with the manager. We shall therefore restrict ourselves to the latter.(10) More generally, it is interesting to note that a vote plus random selection is only ex ante fair whereas it is possible to design a compensation scheme which is ex post egalitarian. The procedure suggested by Ireland and Law (1978), and examined in chapter 2, is of this type since it requires compensation to be paid such that, after payment of transfers, each workers receives the same income.(11) In the remainder of the chapter we apply their scheme to the managerial model presented above. Thus whereas in the previous section the rules of the LMF stipulated that all current members receive the same income, the new rule requires that all the initial members be paid the same whether or not they are currently working in the LMF. It is important to be clear that the manager has no discretion in this matter - the rules are laid down by the membership and enforcement is assumed to be costless.(12)

Let N_0 be the equilibrium membership at an initial price P_0. If price now changes to P_1 the compensation rule requires the replacement of (5.1) with

$$y = \begin{cases} \dfrac{P_1Q - F - M}{N} & N \geq N_0 \qquad (5.19a) \\ \dfrac{P_1Q - F - M}{N} - \dfrac{(N_0 - N)}{N} C & N < N_0 \qquad (5.19b) \end{cases}$$

where C, the amount of compensation, equates the post-transfer incomes of stayers and leavers and hence is given by

$$C = y - \bar{y} \quad . \qquad (5.20)$$

The scheme has no effect in situations where the manager would otherwise increase membership so (5.19a) is identical to (5.1). However, (5.19b) is different because if employment is reduced the $N_0 - N$ workers who leave must be compensated by an amount C. If we use (5.20) to simplify (5.19b) to

$$y = \frac{P_1Q + (N_0 - N)\bar{y} - F - M}{N_0} \qquad N < N_0 \qquad (5.21)$$

we see that income per worker now depends, in part, on the earnings of the $N_0 - N$ who leave. The manager will, as a result of the scheme, therefore take account of the fate of departing workers.

It is useful at this stage to recall the distinction between membership and employment suggested in chapter 2. In the Ireland and Law scheme the number employed within the enterprise may be reduced but all N_0 remain members in the sense that they are entitled to equal incomes. Although rigid downwards membership would be increased if it raised income per worker (in the Ireland and Law version) or managerial utility (in our model).

We now proceed to examine the consequences for employment adjustment, beginning with the case where neither the monitoring nor exit constraint is binding.

Neither Constraint Binding

The introduction of the compensation scheme means that for $N < N_0$ (5.2) is now maximised subject to (5.21) rather than (5.1). The following pair of first-order conditions are obtained.

$$U_y/_{N_0}\,(PQ_N - \bar{y}) = 0 \quad , \quad N < N_0 \tag{5.22}$$

$$U_m - U_y/_{N_0} = 0 \quad , \quad N < N_0 \; . \tag{5.23}$$

Since $U_y/_{N_0} > 0$, (5.22) implies

$$PQ_N - \bar{y} = 0 \quad , \quad N < N_0 \; . \tag{5.22'}$$

Notice that, unlike (5.6') in the model without compensation, (5.22') is not a function of M.

Intuitively, the reason why we no longer have a pair of simultaneous equations to consider is that membership, that is, the number entitled to equal incomes, is now fixed at N_0. In deciding on N the manager is thus simply concerned to maximise total "revenue", which includes the earnings, $\bar{y}$, of each of the departing workers. The level of emoluments is irrelevant here. Once N has been chosen the manager proceeds to decide on the distribution between y and M. Hence the decision regarding N and M has been transformed from a simultaneous to a sequential process. Whatever the final choice of M, we can therefore simply look to

$$\partial y / \partial N = \frac{P_1 Q_N - \bar{y}}{N_0} \quad , \quad N < N_0 \qquad (5.24)$$

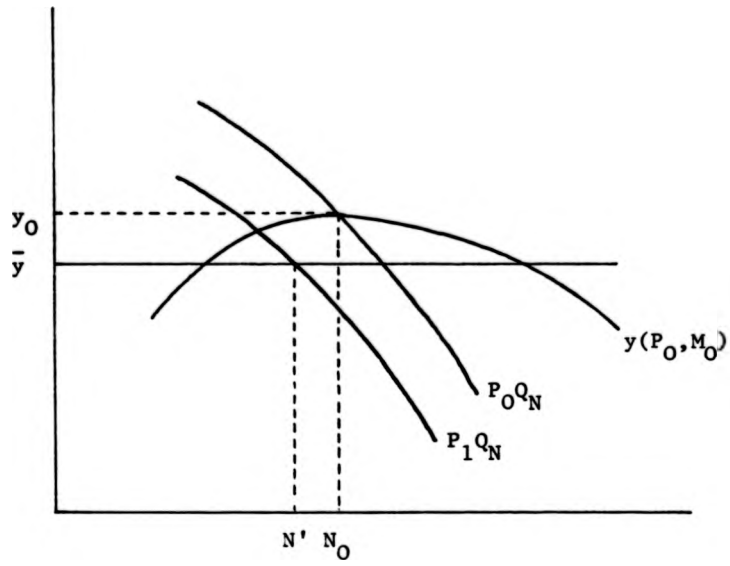
which is obtained from (5.21), to see whether the manager will benefit from a reduction in employment. As we would expect, it simply depends upon whether a member contributes more within the firm ($P_1 Q_N$) or outside ($\bar{y}$).

In section 5.4 it was shown that, in the absence of compensation, a contraction in employment might follow either a price rise or price fall. Is this still the case when compensation must be paid?

Consider first a price increase from P_0 to P_1. From (5.6') and the assumption that the exit constraint is not binding we know that $P_0 Q_N \geq \bar{y}$. Expression (5.24) is therefore positive indicating that a contraction in employment would reduce managerial utility. Employment will not therefore be reduced following an increase in price. This result accords with the impact of the scheme when applied to the standard (non-managerial) model (Ireland and Law 1982 pp. 21-22).

In the event of a price fall, however, (5.24) could be either positive or negative. Figure 5.4 depicts a situation where it is negative.

Figure 5.4



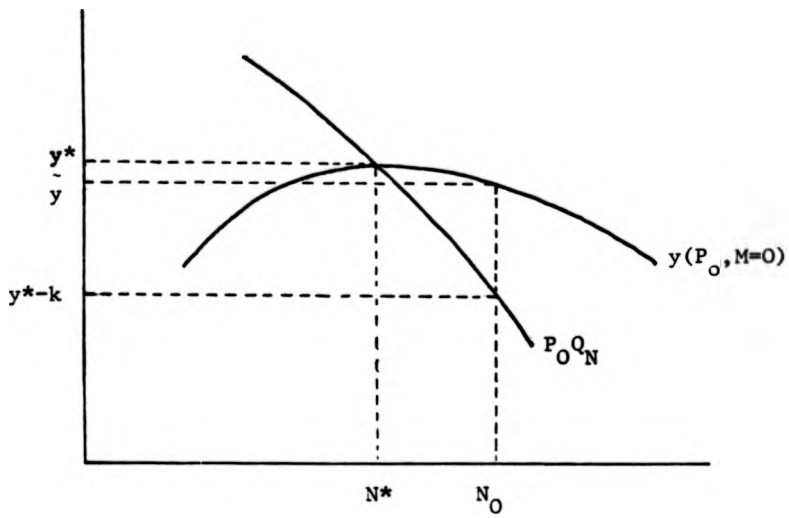
In the absence of compensation the fall in price from P_0 to P_1 could, given a sufficient reduction in emoluments from their initial level, N_0, lead to a contraction in employment. Furthermore, in order that incomes do not fall below $\bar{y}$ this contraction must be at least to N', although it could go further.[13] Consider now the impact of compensation payments. From (5.24) we see that employment will never fall beyond N', because beyond that point workers' alternative earnings are less than their contribution within the firm.

So, whilst the compensation does remove the possibility of a "perverse" response, a reduction in employment is still a possibility following a fall in price. In this latter case the scheme has the effect of limiting the extent of the contraction in employment.

Monitoring Constraint Binding

The first point of interest here is that, unlike the unconstrained case above, the compensation scheme will influence the position of the initial equilibrium. To see this, consider figure 5.5

Figure 5.5



In the absence of the compensation scheme we have seen that income per member will be $y^* - k$ and employment N_O. The workforce realise that if the manager could be prevented from consuming emoluments then income per member would increase to y^*, but since enforcement costs an amount k they are prepared to accept $y^* - k$. The important

point to note now is that to attain y^* the membership has to be reduced from N_0 to N^*. This means that if we now require that compensation has to be paid to departing members then, from an initial point N_0, y^* can no longer be achieved.

To see what income could be attained let us remove managerial emoluments and examine what happens if employment is reduced. (Obviously there is never an incentive to increase membership.) Replacing P_1 in (5.21) with P_0 and setting $M = 0$, the expression for income per member becomes:

$$y = \frac{P_0Q + (N_0 - N)\bar{y} - F}{N_0} \qquad N < N_0 \quad . \tag{5.25}$$

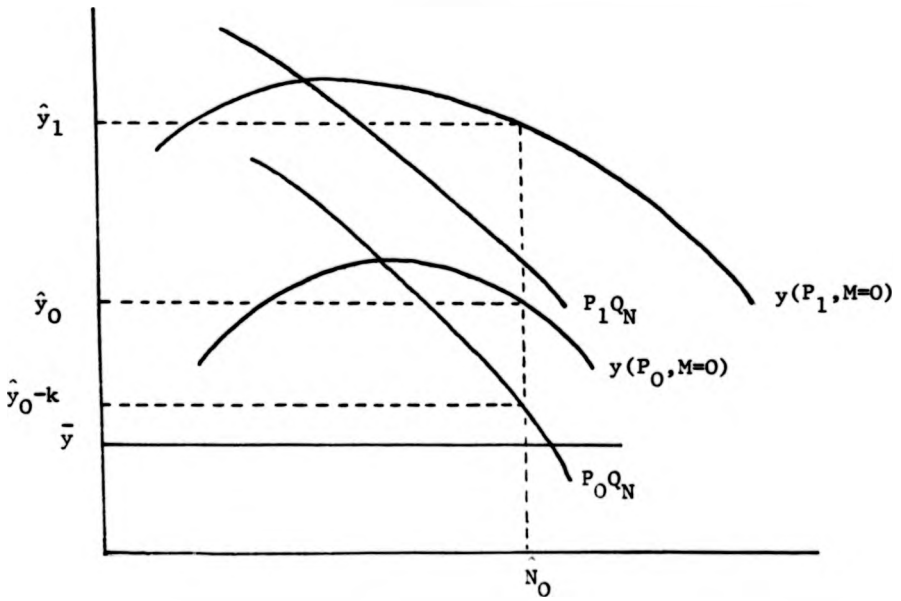
The effect of a reduction in employment is then

$$\partial y / \partial N = \frac{P_0Q_N - \bar{y}}{N_0} \quad . \tag{5.26}$$

This is non-negative because, as can be seen from figure 5.5, P_0Q_N evaluated at N_0 equals $y^* - k$ and the latter by assumption is greater than or equal to $\bar{y}$. Thus incomes cannot be raised by reducing employment and in general they would fall. The reason is the familiar one concerning contributions to total "revenue" from within and outside the firm. So the best that the members could achieve through costless monitoring would be $\bar{y}$ rather that y^*. But this in turn means that the initial equilibrium income cannot be $y^* - k$. The reason is that the difference between the two is less than the enforcement cost - given N_0 the manager could safely reduce incomes beyond $y^* - k$ to $\bar{y} - k$.

However, even this is not optimal because income is not then equated with marginal revenue product. Thus to find the equilibrium we reduce incomes from $y^* - k$ and at the same time expand employment so that income continues to be equated with marginal revenue product. The equilibrium will therefore be at an employment level where the vertical distance ν, between $y(P_0, M = 0)$ and P_0Q_N is equal to k. In figure 5.6 $(\hat{y}_0 - k, \hat{N}_0)$ represents such an equilibrium.[14] With perfect monitoring the members would receive $\hat{y}_0$ (remember they can do no better than remaining at $\hat{N}_0$) and the difference between this and actual incomes paid, $\hat{y}_0 - k$, just equals the enforcement cost.

Figure 5.6



To examine how employment will respond to a change in price we need to see what happens to the $y(M=0)$ and marginal revenue product schedules. The effect of a change in price, evaluated at $\hat{N}_0$, is

given by

$$\partial v/\partial P = Q/N - Q_N \quad . \tag{5.27}$$

This is positive because, as can be seen from figure 5.6,

$$\frac{P_0Q - F}{N} > P_0Q_N \quad \text{at} \quad \hat{N}_0.$$

A price fall will therefore reduce v and hence cause the manager to expand employment (see note 14) until v is again equated with k. A rise in price will increase v but this will not, however, lead to a reduction in employment. This is because, once again, $P_1Q_N > \bar{y}$ as can be seen in figure 5.6. The manager will, of course, have to raise incomes up to $\hat{y}_1 - k$, but employment remains fixed at $\hat{N}_0$. Thus, as in the unconstrained case, the introduction of compensation prevents a "perverse" response to an increase in price.

Exit Constraint Binding

A binding exit constraint means that, even without a compensation scheme, income per worker inside the LMF is always equal to the alternative income available outside. Introducing the scheme will therefore have no effect at all, and hence the positive relationship between employment and price described in section 5.4 continues to hold.

5.6 CONCLUSIONS

Members of a LMF sometimes decide to appoint a specialist to undertake the managerial tasks. At the outset of the chapter we noted that, whilst evidence from case studies suggests that managerial discretion may then emerge, the issue has received little theoretical attention. In the remainder of the chapter the implications of specialist management for short-run employment behaviour are explored in the context of a simple model. The results are summarised in table 5.1.(15)

Table 5.1

COMPARATIVE STATIC RESPONSES: $^{dN}/_{dP}$

	Income per Worker Maximising LMF	MANAGERIAL LMF		
		No Binding Constraint	Monitoring Constraint Binding	Exit Constraint Binding
Basic Model	-	+ 0 or -	-	+
Model with Compensation Scheme dP>0	0	+ or 0	0	+
Model with Compensation Scheme dP<0	-	+ 0 or -	-	+

Our analysis suggests first of all, that managerial discretion can have major implications for short-run behaviour. For example the top row of table 5.1 reveals that the negative relationship between employment and product price which characterises the Illyrian firm may be transformed into a positive one. Secondly, it is not only the objectives of managers but also the nature of the constraints they

face which is of fundamental importance.[16] The final points of interest concern the introduction of a rule which, in the event of a contraction of employment, requires that departing members be compensated such that all original members end up with the same income. The effects of such a scheme are described in the lower two rows. In the left hand column the scheme is applied to the Illyrian firm. The consequence, established by Ireland and Law (1982 pp. 21-23) is that employment remains unchanged following a price rise. Columns two and three reveal that the possibility of a "perverse" response is also replaced by downward rigidity in the managerial model. It is interesting to note, however, that in our model the scheme does not preclude employment contractions - they remain a possibility in the event of a fall in product price.

APPENDIX TO CHAPTER 5

1. SIGN OF TERM "A"

We have the utility function $U = U(M, y)$

Convexity of the indifference curves to the origin implies

$$\frac{U_M}{U_y^2} \cdot U_{yM} - \frac{U_{MM}}{U_y} + \frac{U_M}{U_y^2} \cdot U_{yy} \frac{dy}{dM} - \frac{U_{My}}{U_y} \frac{dy}{dM} > 0 \quad .$$

Since $dy/dM = -U_M/U_y$ this becomes

$$\frac{U_M^2}{U_y^2} \cdot U_{yy} - 2\frac{U_M}{U_y} U_{My} + U_{MM} < 0 \quad .$$

Using $\frac{U_M}{U_y} = \frac{1}{N}$ (equation 5.7) we obtain the required result:

$$\frac{U_{yy}}{N^2} - 2\frac{U_{yM}}{N} + U_{MM} < 0 \quad .$$

2. OBTAINING (5.15) FROM (5.14)

We have $PQ_N - (y^* - k) = 0$.

Totally differentiating,

$$PQ_{NN}\, dN + \left[Q_N - \frac{dy^*}{dP} \right] dP = 0$$

Now, $y^* = \dfrac{PQ^*(N^*(P)) - F}{N^*(P)}$

$$\frac{dy^*}{dP} = \frac{1}{N^*}\left[P\frac{dQ^*}{dN^*}\cdot\frac{dN^*}{dP} + Q^*\right] - \frac{1}{N^{*2}}\frac{dN^*}{dP}(PQ^* - F)$$

$$= \frac{Q^*}{N^*} + \left\{\frac{N^*P\dfrac{dQ^*}{dN^*} - (PQ^* - F)}{N^{*2}}\right\}\frac{dN^*}{dP}$$

but, $\{\cdot\} = 0$ from the first order condition for y^*

$$\therefore \frac{dy^*}{dP} = \frac{Q^*}{N^*}$$

$$\therefore \frac{dN}{dP} = \frac{Q^*/_{N^*} - Q_N}{PQ_{NN}} \quad .$$

NOTES TO CHAPTER 5

1. As we have seen it is important, in the event of membership reduction, to distinguish between those members who remain in the firm and all original members.

2. See also Comisso (1979) and Estrin and Bartlett (1982 p.86). It should be noted, however, that while workers may play minor roles in decision-making, this does not necessarily imply that management are pursuing objectives which differ from those of the workers.

3. As Williamson himself recognises, these are strictly speaking not motives in themselves but means of satisfying them.

4. In relation to capitalist firms, Fama (1980) suggests that the main factor which deters managers from pursuing non-profit goals is the existence of a managerial labour market. The monitoring activities of the market, it is argued, would reduce the price of a manager's services in proportion to any sacrifice of profits. Whatever the validity of this argument in relation to CFs it is clear that a well developed market does not exist for LMF managers within a capitalist economy. Similarly, the absence of equity in LMFs precludes monitoring by the stock market.

5. A recent study by the Wales TUC (Logan and Gregory, 1981) lists various ways in which trade unions might contribute to cooperatives. Among these is the protection of workers against managerialism or other degenerations of democratic principles.

6. See, for example, Reich and Devine (1981 p.31)

7. The CF managerial models referred to above all assume downward-sloping demand schedules on grounds that under perfect competition only profit-maximisers would survive. The context for our analysis however is a small, emerging LMF sector within a capitalist economy, and is therefore not a long-run equilibrium. Product market competition may require the LMF to be a price-taker but possible efficiency advantages may leave scope for managerial discretion. Moreover, we would anyway expect our results to go through in those circumstances where increases in demand under imperfect competition lead to a perverse response by the Illyrian firm. An elasticity-preserving demand shift is such a case (see Ireland and Law 1982 pp. 116-117).

8. This contrasts with Williamson's (1963, 1964) model of a CF since a change in emoluments has no effect on optimal output. The same is of course true of fixed cost changes in CFs.

9. $\left(\frac{U_M}{U_y} \cdot U_{yy} - U_{yM}\right) < 0$ is a necessary but not a sufficient condition for $dN/dP > 0$. On the other hand $\left(\frac{U_M}{U_y} \cdot U_{yy} - U_{yM}\right) \geq 0$ is sufficient for dN/dP to be negative. For example, if $U = y + m^{\delta}$, $0 < \delta < 1$, the indifference curves are vertically parallel, $\left(\frac{U_M}{U_y} \cdot U_{yy} - U_y\right) = 0$ and $\frac{dN}{dP} < 0$. Obviously the more strongly normal is M the more likely it is, ceteris paribus, that $\frac{dN}{dP} > 0$.

10. For further discussion of the former see Brewer and Browning (1982).

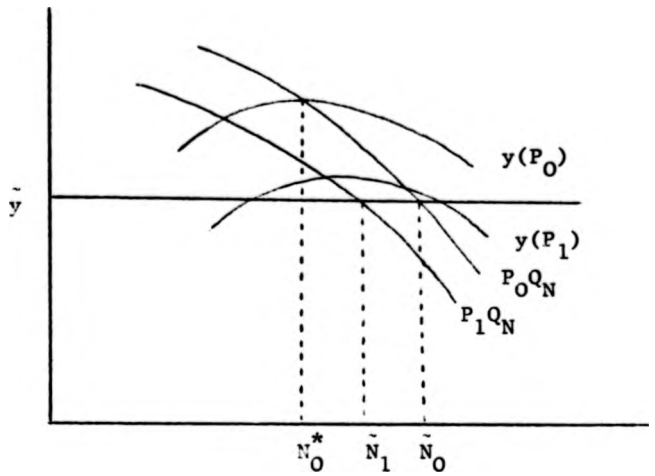
11. In contrast, remaining workers do worse than leavers in the Steinherr and Thisse (1979) scheme. See Ireland and Law (1982 p.22) for a comparison of the two schemes.

12. Also, it may be someone other than the manager who is responsible for distributing the income fund among the membership.

13. It can be seen from figure 5.4 that a maximum to the right of N' has a value of income per member below $\bar{y}$, which violates the exit constraint.

14. For this to be an equilibrium we also require $\frac{\partial v}{\partial N} > 0$. Consider what would happen if, on the contrary, $\frac{\partial v}{\partial N} < 0$. The manager would be able to reduce incomes and increase employment because v would not rise beyond k. This process would continue until the exit constraint became binding.

15. In all cases the initial equilibrium is that which would obtain in the absence of a compensation scheme. If we did not begin from this point then the responses may differ from those shown in the table. Consider, for example, the income per worker maximising LMF. If the initial employment level was not N_0^* but rather N_0 such that $\tilde{N}_1 < N_0 < \tilde{N}_0$ then a price fall from P_0 to P_1 would induce a contraction of employment to N_1.



16. Yarrow (1976) makes the same point regarding managerialism in capitalist firms.

CHAPTER 6

THE RELATIVE EFFICIENCY OF CAPITALIST AND LABOUR-MANAGED PRODUCTION

6.1. INTRODUCTION

In this chapter we aim, both theoretically and empirically, to compare the efficiency of labour-managed and capitalist production. This task requires that we complete the shift, begun in Chapter 5, away from the "black box" treatment of the firm. The previous chapter, whilst pointing to the dangers of treating the firm as if it were an individual, retained the simple production function and workers' utility functions of the earlier chapters. In contrast, now that the focus of attention is the efficiency of two different organisational forms, both the production process and workers' utility move to the centre of the analysis. Also important will be the nature of contracting involving the suppliers of labour inputs to the firm.

6.2 THEORY

This section seeks to contribute to the theoretical debate in a number of ways. Firstly, discussions of relative performance frequently fail to establish at the outset precisely what is to be understood by the "efficiency" of an enterprise. We begin, therefore, with a definition of efficiency. A further characteristic of the literature is simply the diversity of approaches. This makes it difficult to attempt an overall evaluation. We therefore suggest a number of broad categories to which the arguments can be allocated and examine how each impinges on overall efficiency. Thirdly, specific criticisms are directed at Williamson's (1980) analysis of relative contracting costs. It is argued that his

final evaluation is inconsistent with the analysis which precedes it. Finally, we point out that whilst the notion of "atmosphere" plays an important role in Williamson's (1975) examination of the relative efficiency of firms and markets, it is much less prominent in the subsequent evaluation of different forms of internal organisation. Specifically, there is no analysis of likely differences in atmosphere and also it appears to be regarded as something to set against organisational efficiency. In contrast we shall argue that atmosphere should be regarded as an element contributing to efficiency and that the work of psychologists suggests that differences will exist between labour-managed and capitalist modes of production.

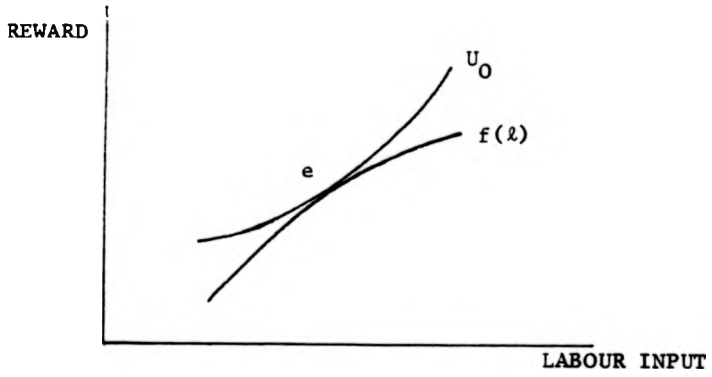
The productive efficiency of an enterprise is defined with reference to the utilities of individuals within the firm. Pareto efficiency occurs when no one individual can achieve higher utility without another getting less. The possibility that labour-managed and capitalist production might differ in efficiency is a frequent theme in the literature, with a variety of suggestions as to possible sources of such a differential. These arguments fall into one or other of the following categories.

First, the two organisational forms may have different incentive and/or monitoring properties. The debate on this issue is normally conducted with respect to the supply of effort but it is also pertinent to other aspects of performance such as product quality, care of equipment and thefts. Secondly, we need to examine the ability of firms to perform what Williamson (1980) terms "assignment" tasks. These include allocating workers to the jobs to which they are most suited. Thirdly, and again borrowing Williamson's terminology, organisations may differ in terms of "atmosphere". In this category would be included the assertion that capitalist production is alienating to workers. A fourth set of arguments concern possible difficulties

LMFs may have with regard to investment decisions. Finally, if transactions are not always conducted under perfectly competitive conditions the possibility that bargaining costs during contracting differ between the two types of firm needs to be considered.

Given the diversity of these arguments it is important, before embarking on a detailed examination, to consider how they relate to overall efficiency. The following diagram which encompasses both capitalist and labour-managed production, may provide a useful integrating framework.

Figure 6.1



The vertical axis measures the reward received by an individual from working in the enterprise. It is made up of both money income (or, more accurately, the consumption bundle thereby afforded) and the psychic rewards associated with atmosphere. On the horizontal axis is labour input, ℓ, which for present purposes we can think of as effort. For each value of ℓ the function $f(\ell)$ gives the level of individual reward generated within the firm.

If there was just one person in the firm (s)he would choose point e - the tangency between the production function and the highest attainable indifference curve. Now suppose the firm comprises a number of individuals who, for simplicity, are assumed to be identical. We can then draw a distinction between incentives and monitoring on the one hand and the remaining four attributes on the other. Performance with respect to the former dictates the position that can be achieved on a given f(ℓ) schedule. In figure 6.1 the identical individuals would each desire point e. However, if rewards are not tied perfectly to effort then in general the equilibrium will not be at e. Usually the problem will be one of shirking although in certain circumstances an over-supply of labour is possible.(1) The better the incentive and monitoring characteristics the closer to e the firm will get. In the traditional neo-classical competitive model a CF which failed to provide workers with their desired mix of effort and income would incur higher costs and hence sacrifice profit. The remaining attributes, by contrast, determine the position of the f(ℓ) schedule. Thus, for example, if labour-managed production generates a superior work atmosphere to capitalist production then, other things being equal, the LMF's schedule would lie above that of the CF. Overall efficiency is given by the highest indifference curve that can be reached and clearly this depends upon both the position of the production function and the points that are obtainable along any given schedule.

Before moving on to the debate over relative efficiency we should be clear that the above framework is intended merely as an aid to organising thoughts. An important simplification is that the attributes have been treated as though they were separable. Often this will not be the case. For example, Ireland (1981) presents a model in which

atmosphere affects the disutility of supplying effort and hence the equilibrium labour supply per individual.

Incentives and Monitoring

A seminal contribution to the analysis of incentive and monitoring properties of labour-managed and capitalist production is Alchian and Demsetz (1972). Their starting point is that gains are available to factor owners if they form a team. For example, two people may jointly lift a heavy cargo into trucks. A crucial feature of team production is that it is difficult to determine each individual's contribution to output. The output is yielded by a team and is not simply the sum of outputs produced by each of the inputs. In other words, the production function is not separable. Given that monitoring is costly there is then an incentive for each member of the team to shirk, because each receives the full benefit of shirking but only pays a proportion of the cost - the remainder is borne by the rest of the team.(2) Alchian and Demsetz then proceed to argue that the "classical" CF is the organisational form best able to minimise the degree of shirking. The distinguishing features of such a firm are as follows. First, there is a specialist monitor. In order to reap the gains from specialisation there must also be an incentive for the monitor to monitor. Thus, secondly, the specialist monitor must also be the residual claimant. That is, s(he) receives any surplus after the contractual payments to other factor owners. Finally, in order to be able to discipline the team and hence minimise shirking this individual also requires the power to alter or terminate any contract.

Alchian and Demsetz's argument is subjected to a number of criticisms by Putterman (1984). To begin with, it is not obvious on either incentive or ability grounds that centralised monitoring is superior to decentralised monitoring. With regard to the former, Putterman

draws upon Mirlees (1976). Although concerned with the situation where all monitoring is undertaken by a single agent, Mirrlees suggests that a model of the kind he presents "... would also enable one to consider under what circumstances it would pay a group of workers to have one of their number undertake all the performance observation, and when it would instead pay to have a symmetric solution in which each worker devotes some of his time to "monitoring"...." and concludes, "It is not obvious that the asymmetric solution outlined here, and assumed optimal by Alchian and Demsetz (1972), is in fact optimal when the means of production are owned in common". (1976, p.128).

Turning to the ability to monitor, the point is simply that the nature of the task may be such that workers can more easily monitor each other than could a third party. Putterman suggests that Alchian and Demsetz's own example of two people lifting a cargo may be such a case. If on the other hand there are benefits to having a specialist monitor then there is of course nothing to prevent a LMF appointing someone to the task. Alchian and Demsetz would respond that the monitor, not being the residual claimant, will lack incentive. However, account must also be taken of the incentives for workers to supply the input being monitored. It may be more efficient to use the residual as a direct incentive to the workforce rather than indirectly via the incentive to monitor.

A further argument, not considered by Putterman, concerns the sanctions which are applied to workers who shirk. In a CF the instrument available to the monitor is to terminate the contract. This may, however, involve costs and if the worker is aware of these then s(he) knows that it is safe to engage in some degree of shirking. In a LMF on the other hand, where workers collectively suffer from shirking

by an individual, an additional and relatively costless sanction, namely peer group pressure, is available. Chinn (1979), for example, describes how "team cohesion" serves to stimulate labour supply in Chinese agricultural collectives.(3)

Williamson (1980), building upon his analysis in "Markets and Hierarchies" (1975), attempts a comprehensive evaluation of the relative efficiency of a number of organisational forms.(4) Two of these, the authority relation and the peer group, are of particular interest to us. The authority relation is a mode in which the capitalist owns the equipment and product and in which control is hierarchical. In the peer group, by contrast, equipment and product are owned collectively by workers and control is democratic. For present purposes these modes can be viewed as corresponding to capitalist and labour-managed production respectively. Williamson considers eleven efficiency criteria and awards the various modes of production a score of zero or one on each. Among the criteria are five incentive attributes. These, together with the scores received by the authority relation and peer group are as follows.

	Authority Relation	Peer Group
Work intensity	0	0
Care in equipment utilisation	1	1
Responsiveness to local shocks such as machine breakdown or worker illness	1	1
Propensity for local work process innovations	0	1
Responsiveness to system shocks and propensity for system innovations	1	1

The suggestion from this table is then that the LMF has superior incentive properties. However, a serious problem with the analysis is that because a total of six different modes are being evaluated the binary

scoring system may be too crude to indicate a ranking between the authority relation and peer group. Moreover the discussion in the text is of no help to us since on none of the five attributes is there any analysis of the relative performance of the two modes in question. Finally, we are given no explanation as to why there is one type of incentive for which the peer group is superior while in all the others the two types of firm are considered to be equally efficient. Given that the incentive issue is always one of individual versus collective optimality we might expect a consistent ranking for all five categories. In each case, then, it would be a consideration of the above arguments arising from the debate between Alchian and Demsetz and Putterman which would enable a view to be formed on the relative performance of capitalist and labour-managed production.

Assignment

Williamson (1980) distinguishes three types of assignment which organisations must undertake:

	Authority Relation	Peer Group
Assigning workers to tasks	1	0
Leadership	1	0
Contracting	1	1

Unfortunately, Williamson does not elaborate on the reasons behind the rankings on the first two categories. A crucial factor would appear to be his requirement that in a peer group leadership must be rotated among all of the membership. As Putterman (1981) points out, this would

put the peer group at a disadvantage since it prevents specialisation. The question to be asked is whether for our purposes a requirement to rotate the leadership role should form part of the definition of a LMF.

Williamson justifies the requirement on the grounds that a specialist manager enjoys a strategic advantage over other members of the firm as a result of having superior information. In consequence, "It is really a fiction, when such an elite develops, to maintain that a peer group any longer exists - even if, in principle, the group can always challenge and even reverse individual decisions. Simple hierarchy effectively obtains" (1975 pp. 52-53). However, whilst it is important to recognise that a degree of managerial discretion may well emerge, this does not provide sufficient grounds for discounting the ultimate authority of the workforce. As we saw in the previous chapter, the nature of the constraints faced by the manager play a major role in determining enterprise behaviour. It seems reasonable therefore to agree with Putterman (1981, 1984) that LMF members may be permitted to delegate the managerial role to a specialist without fear that the essential distinction between labour-managed and capitalist production is thereby obscured.

A further point to note here is that, whilst recognising the possibility of gains from specialist decision-taking, we should not neglect the potentially constructive role that workers may play. In certain circumstances assignments may be more efficient if workers are consulted beforehand; and in this respect a participatory structure seems likely to be superior to hierarchy since, by definition, it is more conducive to the flow of ideas from workers. This argument is also relevant to performance with regard to local innovations. Whereas

Williamson (1980) views the propensity to innovate as a function of incentives it is clear that the structure of communication channels with workers are also important.(5)

The last of Williamson's assignment categories, contracting, will be considered in a separate section below. We choose to do this for two reasons. First, there are arguments which suggest that this may be a major source of efficiency differences between the two types of firm. Williamson, we see from the above table, does not take this view. Secondly, these differences relate to bilateral monopoly considerations rather than efficiency in making assignments.

Atmosphere

In "Markets and Hierarchies", Williamson argues that whereas the "standard economic model" assumes that individuals regard transactions in a neutral, instrumental, manner, in some situations it is important to take account of the fact that the exchange process itself may be an object of value. Thus among other things individuals may be concerned with the quality of the exchange relation, or "atmosphere". Furthermore, since modes of organisation may differ non-trivially in this respect the implication is that "...organisational effectiveness be viewed more broadly than the usual efficiency calculus would dictate" (1975, pp. 38-39). The analysis which follows, however, concerns only the distinction between market exchange and internal organisation. It is only in a short footnote to his concluding remarks that the possibility of variations in atmosphere across different modes of internal organisation is raised - "...the peer group may be preferred to hierarchy in this

respect - at least in small organisations" (1975 p.258). Even when, in "The Organisation of Work" (1980), Williamson's concern is solely with different forms of internal organisation, there is no analysis of their likely atmospheric properties - he simply notes the claim of radical economists and the sociology of work literature that work in CFs may be oppressive. Moreover, and surprisingly in view of his remarks above, work satisfaction is treated as something to be set against organisational efficiency rather than as an element contributing to efficiency.

Thus, having identified a weakness in the literature on why firms exist, Williamson himself then fails to integrate atmosphere into his analysis of alternative types of firm. Theoretical analyses which do point to atmospheric differences between labour-managed and capitalist modes of production are to be found in the work of psychologists. This research suggests, according to Blumberg (1968) that utility derived from work depends upon the fulfilment of basic ego needs as well as material rewards. Participation, power and responsibility on the job, it is then argued, all contribute to the satisfaction of these ego requirements.

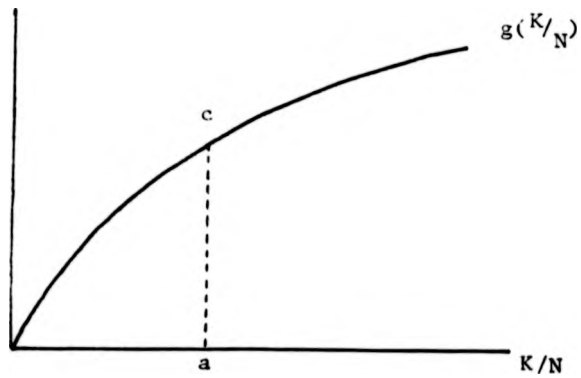
Investment

If the LMF is able to rent its capital on a perfect market then, just as with a CF, investment will be undertaken up to the point where its marginal value product is equated with the rental cost. However, it may not always be possible to rent capital. For example, Ireland

and Law (1982) argue that if the capital is to some degree firm specific then even a long-term contract may be risky for a rentier. A second instance, emphasised by Jensen and Meckling (1979) concerns "intangible" components of capital such as design and advertising. Such items by their very nature, it is argued, cannot be rented.

If the purchase price of capital is then financed from internal funds and if the capital is collectively owned (individual workers have no claim on their share) then two problems arise for the LMF. Firstly, the capital-labour ratio will be lower than in the rented model. This is variously termed the "Furubotn-Pejovich effect" (Furubotn and Pejovich, 1970), the "underinvestment" problem (Vanek, 1975) or the "horizon problem" (Jensen and Meckling, 1979). It arises because members will require a higher rate of return on investment to compensate for the fact that they are unable to recoup the principal invested. The second problem is Vanek's (1975) "self-extinction force". This is illustrated in the following diagram taken from Vanek.

Figure 6.2



It is assumed here that production is characterised by constant returns to scale: $Q = N.g(K/N)$. The slope of the $g(K/N)$ schedule is the marginal product of capital and its height, if price is set at unity for simplicity, is the level of income per worker. Suppose the firm's capital-labour ratio happened to equal a, and hence income per worker is the distance ac. Self-extinction occurs first because a member who leaves will never be replaced (since income per worker increases to the right of a) and, secondly, because the consequent fall in the marginal productivity of capital will lead to gradual disinvestment. With constant returns to scale the contraction would continue until only one worker remained. With the more usual assumption of increasing followed by decreasing returns[6] the process would stop short of this but production would occur in the region of increasing returns to scale, which is inefficient.

In Vanek's view these arguments "...are so powerful in explaining the shortcomings of traditional or conventional forms of producer cooperatives and participatory firms, that they offer an ample explanation of the comparative failure of these forms in history..." (1975 p.446).

However, Vanek (1975) himself recognises that the availability of external finance, for example from a bank, can resolve the problem. This will be the case if repayments span the lifetime of the capital because it is then the current not the initial members who are paying the principal. There would be no difference between this and the rental case. If on the other hand the repayment period is less than the life of the asset or if the bank only provides a proportion of the finance required then, as Ireland and Law (1982 pp. 49-50) demonstrate, the distinction between external and internal finance is reduced.[7]

Ireland and Law also consider the effect of relaxing the assumption that individuals have no claim on their share of capital. One alternative property rights structure would be to allow departing workers to sell their membership. If a perfectly competitive membership market existed then once again the investment decision will be identical to the rental case. However, since members could then capitalise all profits from membership at the outset there may be considerable trading in membership. In an effort to limit costly turnover the LMF may impose restrictions on such trading. A second possibility is that a departing member be permitted to remove some or all of his or her capital investment. In the latter case, and assuming perfect rental and capital markets, the optimal amount of investment is the same as in the rental model. External finance and individual ownership rights can therefore each at least mitigate the problems identified by Vanek and others.

Bargaining Costs During Contracting

Both LMFs and CFs typically negotiate contracts with a variety of parties. In most cases bargaining costs, if any, are likely to differ little across the two types of firm. However, with regard to contracting with the suppliers of labour inputs we shall argue below that there is a fundamental difference between labour-managed and capitalist firms.

We begin with Williamson's evaluation of the authority relation and peer group modes. For present purposes these are again equivalent to our CF and LMF respectively since the issue of whether decision-making must be rotated in the latter is not important in the context

of the employment contract. Under the authority relation, "...explicit and implicit understandings regarding the zone of acceptance of the employment relation (Barnard (1962),Simon (1957)) need to be reached. Once agreement has been reached, however, this is an essentially non contractual mode" (1980 p.19). The peer group mode requires membership affiliation and disaffiliation terms to be reached but thereafter requires no contracting.

In the subsequent analysis the whole emphasis is on the second-stage non-contractual property of the authority relation. Thus in terms of contracting performance it is viewed as superior to continuous contracting modes such as "inside contracting", but, as was seen earlier, equally efficient as the peer group. In the remainder of this section we examine whether Williamson is justified in ignoring the difference in the nature of first-stage contracting.

Consider first this initial contracting in the CF. Alchian and Demsetz (1972) regard the relationship between employer and employee as being no different to that of grocer and customer. "The single customer can assign his grocer to the task of obtaining whatever the customer can induce the grocer to provide at a price acceptable to both parties. To speak of managing, directing or assigning workers to various tasks is a deceptive way of noting that the employer continually is involved in renegotiation of contracts on terms that must be acceptable to both parties. Telling an employee to type this letter rather than to file that document is like my telling a grocer to sell me this brand of tuna rather than that brand of bread" (1972 p.777).

As Williamson (1975, p.67) points out, there appears to be an implicit assumption that the costs associated with employee turnover are negligible and hence employers can adapt to changes in conditions by filling jobs on a spot market basis. This view he rejects on the grounds that, although competitive conditions may prevail at the outset, the situation can be transformed into one involving "small numbers" at the contract renewal stage. This will occur if there are idiosyncratic skills associated with the job because the incumbent worker has a first-mover advantage. Given that workers will attempt to exploit this advantage when contracts are due for re-negotiation there will be costs incurred through the absorption of real resources and delays in efficient adaptations during bargaining. Such transactions costs arising from small numbers exchange are central to Williamson's account of why internal organisation may be more efficient than market exchange.

Williamson fails to recognise, however, that this analysis also implies a fundamental difference in the first-stage employment contracting of the CF and LMF. In the former the contract is renegotiated at regular intervals, often annually, and each time bargaining takes place. In the LMF on the other hand the first-stage contract is simply an agreement that any surplus is distributed, according to some rule, between the workforce. No bargaining or subsequent re-negotiation takes place. This distinction assumes even more importance when we recognise that it is not only idiosyncratic skills which can give rise to small numbers exchange relations. On the employees' side a potentially more important source of monopoly power is the ability to organise collectively into trade unions. The costs that workers collectively can impose on an employer will in general exceed those that an individual

can impose. On the employer's side, a degree of monopsony power will accrue from the costs to workers of searching for, and moving to alternative work. Thus Cable and Fitzroy argue that the "traditional firm.....becomes a bargaining arena, prone to conflict and endemic mistrust" (1980, p.165). Moreover, the costs arising from this contracting process may not be limited to those incurred during the period of bargaining. Reich and Devine (1981), for example, argue that in CF's the division of labour will be pushed beyond the point that would otherwise be most efficient (and which the LMF will choose) in an attempt to limit the degree of solidarity among the workforce.

6.3. EMPIRICS

For theoretical analysis of labour-management in capitalist economies we have found it useful to work, for the most part, with "pure" forms of labour-managed and capitalist enterprises. In reality, however, firms exist along a spectrum between these poles, exhibiting a variety of decision-making and ownership structures. Moreover, whilst empirical work spans the whole range when taken together, each individual study almost invariably deals with firms within a very narrow spread. In drawing upon this empirical literature to inform our theoretical analysis we must then be constantly aware of the fact that "...it may be misleading to think in terms of a continuous spectrum running from traditional profit-maximising firms at one extreme to pure worker cooperatives at the other, for as one moves along such a spectrum there may be signficant discontinuities in the effective locus of control" (Ireland and Law 1982 p.3).

We begin with a group of recent papers using an identical methodology to analyse workers' cooperatives in France, the UK and Italy. The French producer cooperative sector, we noted in chapter 1, is one of the largest in a capitalist economy. Using a sample of 440 firms in 1978 and 520 in 1979, Defourney, Estrin and Jones (1985) sought to discover whether the variations in decision-making participation and ownership structure across these cooperatives affected their performance. After briefly listing some of the theoretical arguments they suggest that they can be interpreted as hypotheses about the sign of participatory variables in an augmented production function.

Participation was proxied by the proportion of workers who were members. Although the minimum stake required to become a member is small, not all workers choose to be members and hence have the right to

participate in decision-making via the election of representatives to the governing General Assembly. In their sample the industry average proportions varied from 50% in construction to more than 70% in printing, although of course the range over individual enterprises would be greater than this.

Members of the firm, who are typically workers or ex workers, are required to purchase at least one share. Shares earn only a limited return and are repaid at par on departure. Share ownership beyond the minimum stake does not confer addtional voting power. The potential relationship between enterprise performance and the capital stakes of workers was investigated using two variables. The first, CONTROL, measured the proportion of individually owned member capital in the hands of the workforce and the second, SHARE, normalised workers' stakes with respect to the total financial assets of the firm. Individual loans represent a further channel through which members can make a financial commitment to their enterprise and to capture any possible effects on firm performance the variable LOANS, the proportion of total loan capital lent by workers, was included. The final organisational variable, BONUS, measured the profits per head distributed to workers.

Production functions, incorporating these organisational variables. along with capital, labour and a number of other control variables, were estimated separately for each of the two years. Three functional forms (Cobb Douglas, Kmenta's CES and translog) were tried and in each case the procedure took account of the possibility of a simultaneous relationship between BONUS and performance, measured by the value-added. Results were reported for the functional form which performed best. In 1979

this was the Cobb Douglas but in 1978 the translog proved slightly superior.

In both years the five organisational variables proved to be jointly significant suggesting a positive impact on performance. Taken individually, however, only the proxy for participation in decision-making performed consistently well, having a significantly positive coefficient in both years once it was recognised that it too was endogenous. Two variables, SHARE and LOANS, were insignificant in both years whilst the others, BONUS and CONTROL were significantly positive in just one year. Further regressions were performed with the data broken down into six industrial groups. A problem here was that it was not possible to take account of the simultaneity revealed above. On the basis of OLS estimates a tentative interpretation would be that, while there appear to be significant differences between sectors, the results are broadly in line with the whole sample regressions. Overall, then, there are some grounds for believing that workers' participation in decision-making, the receipt of a share of the surplus, and individual capital stakes may each be positively related to enterprise performance, and, at worst, there is no evidence pointing to an inverse relationship.

Jones, (1982) conducts a similar analysis of British producer cooperatives over the period 1948-68. The number of enterprises, most of which were in either the footwear, printing, or clothing industry, amounted to only 48 in 1948 and 30 in 1968.

Three alternative proxies for worker participation in decision-making were tried: the proportion of the board of management that were

worker-members, the proportion of workers who were members, and the proportion of members that were workers. The other two organisational variables included were the total share capital owned by workers and the total profits distributed to workers. Enterprise performance was measured by both value-added and value-added per worker. In contrast to the French study only the Cobb Douglas production function was used and no account was taken of possible simultaneity.(8)

In the footwear industry there was a tentative suggestion that worker participation on the management board leads to an improved performance since one performance measure, but not the other, yielded a significantly positive regression coefficient. This was also true for the printing industry but in this case splitting the sample into large and small firms rendered both coefficients insignificant. In the clothing industry the coefficient was insignificant throughout. The second participatory variable, the proportion of workers that were members generally seemed to have no effect. No results involving the third participation proxy were reported at this stage.

The variable aiming to pick up any incentive effect of surplus sharing performed reasonably well. In the undivided sample, significant positive coefficients were obtained in printing and clothing using either dependent variable. When the sample was split these industries continued to yield significant coefficients, although not always for both equations, and there was also the suggestion of a positive relationship in small footwear cooperatives.

The worker ownership variable was generally insignificant and where this was not the case (3 negative and 1 positive) it was difficult

to discern any pattern. The evidence thus far from both UK and French data does not therefore lend support to Vanek's hypothesis that cooperatives with a high degree of internal financing will have a low and inefficient output. In an earlier study using the same UK footwear data Jones and Backus (1977) did find that the cooperatives were producing on the increasing returns zone of the production function and were smaller and less capital-intensive than comparable capitalist firms. However, production function estimates, of a slightly different form to the latter study, once again yielded evidence which did not support Vanek. To further investigate the role of worker ownership Jones (1982) split the sample into low and high participatory firms using the values of the first two participation proxies. The results, he argues, suggest that in firms where participation is low worker ownership seems to reduce productivity, but when participation is high performance is enhanced by workers having capital stakes. Caution is necessary here, however, since the relevant coefficient was significant only in a minority of the formulations tried, and even then the level never reached 5%. It was also at this stage that the final proxy for participation, the proportion of members that were workers, was incorporated as an explanatory variable, but it proved insignificant.

In an unpublished paper Estrin, Jones and Svejnar (1984) estimate an identical set of production functions using the French, UK and also Italian data on producer cooperatives. The requirement that the same equation be applied to each data set means that there is less freedom in estimation than in the separate studies and hence the main interest lies in comparisons across countries. The authors find that it is in France and Italy that higher levels of participation and individual financial commitments are most likely to enhance performance. Although the study

did not seek to investigate the reasons for this they offer the observation that, in contrast to the U.K., Italy and France are "...each countries with relatively high degrees of participation on average as well as strong cooperative traditions and well-organised supporting institutions" (1984, p.26). The suggestion that the external environment may play a significant role in enterprise performance is one we have not yet touched upon but which features prominently in the following chapter.

We turn now to a study by Cable and Fitzroy (1980) of a sample of 42 West German enterprises which voluntarily adopted some degree of worker participation in decision-making and/or profit sharing. They describe these firms as lying in the middle ground between the classical CF and worker control.

Managers in each firm were asked to provide a subjective assessment of the degree of worker involvement, choosing between "no participation", "observers", "advisors" or "active participants", in various areas of decision-making. This information was then used to construct an index of participation. Although the weighting scheme used in the construction had no theoretical basis, the results proved to be fairly insensitive to the choice of weights over a fairly wide range.(9) Two further variables of interest to us were the total profits distributed to workers and workers' capital stakes. Pooled cross section and annual data over the period 1974-76 was used to estimate a production function augmented with the organisational variables in the same manner as the papers discussed above.

The OLS estimates suggest, firstly, that participation exerted a positive influence on value-added. Secondly, as with the UK cooperatives,

capital ownership by workers improved performance when combined with high levels of participation but had a negative impact when participation was low. Finally, the results raise the possibility that the incentive effects of profit sharing may also be related to participation since only when participation was high was there a significant (positive) coefficient on profits distributed to workers.

Another set of participatory enterprises in West Germany are those which have been required by a series of acts and laws in 1951, 1952, 1972 and 1976 to adopt a degree of codetermination. Svejnar (1982) used industry-level data for 14 sectors over the period 1950-1976 to examine whether the first three of these reforms had any effect on performance, the latter measured again by value-added. His results suggested that the 1951 law and 1952 act had no significant effect whilst the 1972 act may even have been mildly negative in its impact. Although perhaps surprising in view of the Cable and Fitzroy study, it may be relevant to point out that in the latter the firms voluntarily adopted worker participation. Also, Svejnar himself qualifies his findings by noting that his data is very aggregated and there were only a limited number of pre-1952 and post-1972 observations.

Two characteristics common to all of the above studies are the use of a single summary measure of performance (value-added as a proxy for physical output) and the reliance on a crude proxy for the level of participation in decision-making. In contrast the analysis of worker participation in Chilean state-owned enterprises by Espinosa and Zimbalist (1978) involves a detailed examination of the degree of effective participation and considers a variety of possible social and economic consequences.

The period under investigation, running from the election of the Allende government in November 1970 to its overthrow in September 1973, saw a rapid expansion in the size of the state, or "social", sector. At the time the new administration came to power there were 43 state enterprises of which 30 were in the industrial sector, accounting for 6.5% of industrial employment. In the space of less than three years the total had risen to 420 and those in the industrial sector employed almost a third of the industrial workforce. Espinosa and Zimbalist examined a sample of 35 industrial enterprises.

Although guidelines on participatory structure had been drawn up by the government they were implemented unevenly and flexibly, and so there was considerable variation across the enterprises. An important point to note is that, whereas these guidelines stipulated a majority of state over worker representatives on the administrative council of each firm, in practice the workforce had a working majority in all cases considered.(10)

To construct the participation index enterprises were awarded points according to: (i) the functioning of the formal structure of participation, (ii) the topics or areas discussed and (iii) the effective influence exercised by workers or their representatives. For example, under (i) an enterprise would receive more points the larger the number of participatory bodies and the more frequently they met. With regard to (ii) the score would depend on the frequency with which topics were raised and an assessment of the intensity of workers' contributions to discussions. Finally, points awarded under (iii) would depend upon factors such as the frequency with which workers introduced

topics for discussion and whether, in the event of disagreements, it was workers' views which prevailed. As with the Cable and Fitzroy study the transformation of scores into an index required subjective and sometimes arbitrary assessments on weighting. Tests, however, suggested that the index was reasonably insensitive to changes in the weights.

Turning now to the effects of participation, a regression of productivity, measured by the average annual change in output per worker since the passage of the enterprise into the social sector, on participation, employment and investment yielded a significant positive coefficient on participation. Espinosa and Zimbalist were also able to shed light on the possible sources of this relationship. First of all there appear to be advantages in terms of incentives and/or monitoring since absenteeism and the number of thefts or defective products were significantly negatively correlated with participation, whilst worker discipline was found to improve as participation increased.(11) These findings accord with Gunn's (1980) observation that plywood cooperatives in the Pacific Northwest devote fewer resources to supervision and control than capitalist plywood enterprises operating with identical technology. Secondly, there was also a significant positive association between participation and innovation. As noted in the theoretical discussion, this might reflect an increase in incentives or better channels of communication. The final result of interest was that the level of investment, which had been controlled for in the productivity equation, was also found to rise with participation.

6.4 CONCLUSIONS

We began this chapter by exploring the various sources of an efficiency differential between capitalist and labour-managed production which have been suggested in the theoretical literature. If the ranking of the two organisational forms was always agreed upon and always the same then there would be no problem in arriving at an overall prediction concerning relative efficiency. This proved not to be the case. In terms of atmosphere and bargaining costs the discussion points to an efficiency advantage for LMF's. On the other hand in the absence of a perfect rental market for capital LMFs may be less efficient with regard to investment decisions than CFs. On assignment it was argued that there may well be gains from delegating to a specialist. We rejected Williamson's claim that this necessarily makes labour-management a "fiction" but a participatory structure to monitor the manager will involve costs. These will include the provision of information to the membership and possibly delays in response whilst members are informed and consulted. These however must be balanced against the possible gains from an increased flow of ideas from the production workers and an absence of resistance to change due to mistrust. Finally, an examination of the incentive and monitoring properties of the two modes of production provided no clear conclusion as to relative performance.

Ideally, we could look to empirical analysis to resolve the controversies. A number of recent studies were examined in section 6.3 and the general picture which seemed to emerge was that "productivity" (usually measured by value-added) may be enhanced by worker participation and/or ownership, perhaps especially when they are combined. A problem with a number of the studies was that the results were sensitive

to the choice of specification and data grouping, although there was seldom any suggestion of a negative impact. However, even without this problem of robustness any attempt to draw conclusions about the relative efficiency of the two modes of production would be subject to a number of serious criticisms.

Firstly, there are well-known difficulties with the estimation of production functions generally. To begin with neither labour, capital, nor output are homogeneous. There will, for example, be variations in the age and skill level of workers. Moreover, the labour input comprises not only the number of workers but also the hours worked by each of them and the effort expended per hour. Almost invariably, however, the work reported above took simply the number of workers in each enterprise. The only exception was Cable and Fitzroy (1980) and even here all that was possible was to distinguish blue- and white-collar workers. Capital is often regarded as posing even more serious problems. The ideal measure is capital services per unit of time but in practice data on capital stock is used. Thus variations in the utilization of capital and in efficiency over the lifetime of a machine are neglected. The existence of different types of output means that value-added is used to proxy physical output. This may be unsatisfactory because it comprises product price as well as physical units and under imperfect competition both can cause value-added to vary. An additional consideration in the studies which concern us is that "participation" is also difficult to capture empirically. In regression analysis the error term is interpreted as representing the cumulative effect of all omitted variables. There is no econometric problem provided such variables do not influence decision-making within the firm. An example here would be unknown variations in input quality. However, many of

the omitted variables discussed above are part of the decision-maker's information set and hence are likely to influence the optimal choice of the observed inputs. The right-hand side variables will then not be independent of the error term and hence biased estimates may result. In this respect there may be more to be gained from studies such as that by Espinosa and Zimbalist which attempt to examine the mechanism through which "productivity" is affected.

Secondly, the production function is only one element determining the overall efficiency of an enterprise. Given the production function there remains the task of choosing the optimal quantities of inputs. Even in the absence of what Williamson (1975) terms "sub-goal pursuit" firms may differ in their ability to attain the input combinations given by the first-order conditions of neoclassical models. Differences in, for example, assignment capabilities may show up here as well as in the production function. The possibility of a divergence between the social optimum and the outcome when individuals act in their own self-interest would provide a further source of efficiency differences.

Thirdly, there is the possibility that participation per se contributes to utility.[12] None of the studies referred to above attempted to incorporate "atmosphere" into their analysis but Blumberg, from a survey of an extensive and varied empirical literature, concludes "There is hardly a study in the entire literature which fails to demonstrate that satisfaction in work is enhanced or that other generally acknowledged beneficial consequences accrue from a genuine increase in workers' decision-making power" (1968 p.123).

Finally, as noted earlier, each of the empirical studies in section 6.3 considers enterprises within a fairly narrow segment of the range between pure capitalist and pure labour-managed production.

As always, great care is required if predictions are to be made beyond the boundaries of the data set.

A number of authors side-step all of these problems by simply arguing that the relative sizes of the CF and LMF sectors in economies where both types of organisation are permitted demonstrates the superior efficiency of the former. This "Darwinian" argument is the subject of the following chapter.

NOTES TO CHAPTER 6

1. See Sen (1966) and Chinn (1979) for a discussion of individual labour supply in cooperatives.

2. Monitoring by team members will only take place up to the point where the marginal gains equal the marginal costs.

3. In a tightly-knit group of workers, altruism may also play a role. See Sen (1966).

4. Investment issues are, however, explicitly ignored. Williamson simply points out that Vanek and others have identified problems for collective ownership in this respect. These problems are examined below.

5. See Espinosa and Zimbalist (1978) p.149 for further discussion.

6. This generates U-shaped average cost curves for the CF.

7. It is often argued that an important ingredient in the success of the Mondragon cooperatives is the existence of their own bank, the Caja Laboral.

8. In the French study Defourney, Estrin and Jones (1985) found that a failure to take account of simultaneity leads to an underestimate of the significance of participation and an overestimate of the significance of distributed profits.

9. Cable (1985a, 1985b) is currently working on the problem of how best to measure participation.

10. See Espinosa and Zimbalist (1978) pp. 51-55.

11. The firm with average participation tended to have about the same rate of absenteeism as in the pre-socialisation period, so low participation firms experience a deterioration whereas for high participation firms there was an improvement.

12. See Levin (1982) for a brief discussion.

CHAPTER 7

EFFICIENCY, DISTRIBUTION, AND THE DETERMINATION OF ORGANISATIONAL FORM

7.1 INTRODUCTION

A major issue in the literature on the internal organisation of the firm is whether organisational form is dictated by efficiency or distributional criteria. Thus whilst Coase (1937), Alchian and Demsetz (1972) and Williamson (1975, 1980) have differing views on the nature of the firm, all agree that it is relative efficiency which determines the choice among organisational forms. In contrast, Marglin (1974) argues that the rise of the factory was due not to any efficiency advantages but because it benefitted one group (capitalists) at the expense of another (workers). Similarly, Cowling (1982) suggests that the distinction between U-form and M-form corporate structures is essentially one of distribution rather than efficiency.

This chapter addresses the issue in the context of the choice between capitalist and labour-managed modes of production within a capitalist economy.

New forms of organisation may emerge in two ways: through the entry of new capacity, or the conversion of an established firm from one type of internal organisation to another. With regard to the former it is useful, following Scherer (1980), to distinguish between small-scale and large-scale entry. In the absence of scale economies

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or if minimum efficient scale is negligibly small in relation to the size of the market, potential entrants can enter with an output level which has no effect on market price. As a result there is no strategic interaction between the incumbent (if any) and potential entrant. This allows us in Section 7.2 to focus attention on the roles of efficiency and distribution in determining the incentive to set up each of the two modes of production. Section 7.3 then examines large-scale entry and suggests that incumbent firms may have advantages over potential entrants such that the latter may be deterred even if they are more efficient. In the remainder of the chapter the notion of first-mover advantages is developed. Section 7.5 argues that problems concerning information and small-numbers exchange may prevent the conversion of an existing firm from an inefficient to an efficient form of organisation. Each of these two types of first-mover advantage relates to an incumbent firm of either type. A further possibility, explored in the following section is that particular types of enterprise may secure an advantage through the development of an accommodating institutional structure and technology. A short conclusion completes the chapter.

7.2. SMALL-SCALE ENTRY

A necessary condition for the formation of a new firm is that, ignoring the possibility of mistakes, at least one of the individuals would become better off, with nobody suffering a decline in welfare. However, not only must this opportunity for gain exist, it must be perceived.(1) Kirzner (1973) refers to this "discovery of something for nothing at all" (p.48) as pure entrepreneurship. The pure entrepreneur is a decision-maker whose entire role arises out of an alertness to hitherto unnoticed opportunities. No other resources are necessary because all inputs may be hired. Other authors, however, assume that this alertness is combined with the ability to organise production. Gravelle and Rees (1981, p.151) for example refer to the central figure with whom all contracts are negotiated in Alchian and Demsetz's "classical" CF as the entrepreneur. Presumably organisational ability is necessary in order to decide what contracts are required. Similarly, Marglin (1982) in developing his analysis of the origins of hierarchy argues that "The capitalist's 'hold' [over individual producers] was in large part the organising ability he brought to production" (p.2). We shall assume that "entrepreneurship" comprises both talents. One justification for this is that in many cases a knowledge of how production will be organised is required in order to evaluate whether there is an opportunity for gain. Secondly, it will be argued below that in the absence of organisational ability it is difficult to appropriate any rewards from pure entrepreneurship. A further assumption we shall make to begin with is that entrepreneurs are individuals.

Consider then an entrepreneur who has discovered an opportunity and is contemplating whether production should be organised along capitalist or labour-managed lines. Let us suppose initially that both modes are equally efficient. Marglin (1974) was concerned with a very similar situation. The putting-out system, with its minute division of labour, was, he suggests, technically no more efficient than alternative ways of organising production. Rather, it served to provide profit for the capitalist putter-outer at the expense of the individual producers. If this was the case then "Why didn't some enterprising and talented fellow organize producers to eliminate the capitalist putter-outer?" The answer, Marglin argues, is that "....there was no profit in such a line of endeavor. If the organizer became a producer himself, he would have to settle for a producer's wage" (p.39).(2)

This line of reasoning can be applied to our problem as follows. Assume for simplicity that the only input required is labour. Two types of task must be undertaken whatever form the enterprise takes: production work and organisation. For simplicity, we assume that for both activities the market determined wage is w. Profit in a CF would be given by

$$\pi = R - wN - F \qquad (7.1)$$

where N comprises one organiser and N-1 production workers.(4) The entrepreneur has the option of running the firm personally (w is the opportunity cost) or hiring a manager. We shall argue below that, in the context of our simple CF model, the former course will be adopted.

In a LMF the entrepreneur, along with the other members, would receive

$$y = \frac{R - F}{N} \qquad (7.2)$$

Combining (7.1) and (7.2) we obtain

$$y = w + {}^{\pi}/_{N} \qquad (7.3)$$

This suggests, then, that if the two modes of production are equally efficient, capitalist organisation will be chosen because it enables the entrepreneur to capture all of the surplus (π), rather than having to share it. What would be the effect of a difference in efficiency between the two types of firm? Obviously if the CF is more efficient it continues to be preferred. If it is less efficient then the outcome could go either way since the lower efficiency must be weighed against the above distributional advantage of capitalist production to the entrepreneur. Capitalist production may therefore continue to be preferred even if it is less efficient. Clearly, however, a sufficiently large efficiency differential will lead to the establishment of a LMF rather than CF - a share of a big pie can be better than all of a small one.

The analysis thus far is, however, incomplete since it fails to examine two possible means through which, in theory, the entrepreneur could do better from a LMF than has been suggested above. The first

possibility is that the entrepreneur may be able to sell the opportunity that has been discovered to the membership, and the second is that (s)he may be able to negotiate an income differential over the other members.

Marglin seems to recognise this point because the passage quoted above continues: "His co-workers might have subscribed a dinner or gold watch in his honor, but it is doubtful that their gratitude would have led them to do much more." The crucial issue which Marglin fails to examine is precisely how much they would do. Given that there is assumed to be no efficiency difference between the two methods of production, the workers could pay a sum which exactly equalled the foregone profit, without themselves being worse off than they were before. The question we must consider therefore is whether a fee or income differential could make the entrepreneur indifferent between labour-managed and capitalist production, assuming once again for the moment that the modes are euqally efficient. That is, can the entrepreneur extract π from labour-managed production?

Let us begin the analysis by assuming away the possibility of labour-managed production altogether, and suppose that the alternative facing the entrepreneur is simply whether to organise (capitalist) production personally or to sell the opportunity to another CF. The outcome is clear when it is realised that all that a pure entrepreneur has to sell is knowledge. Arrow (1962) then informs us that "In the absence of special legal protection, the owner cannot, however, simply sell information on the open market. Any one purchaser can destroy the

monopoly since he can reproduce the information at little or no cost..... With suitable legal measures, information may become an appropriable commodity. Then the monopoly power can indeed be exerted. However, no amount of legal protection can make a thoroughly appropriable commodity of something so intangible as information" (p.170). Thus except in special cases, such as where patents can be obtained, the entrepreneur faces the problem of incomplete property rights, or, more specifically, imperfect excludability. The consequence is that ".... the only effective monopoly would be the use of the information by the original possessor" (Arrow, 1962, p.170).

We interpret this as meaning that the entrepreneur must be the organiser of production, for only then can knowledge be monopolised. The distinction between the organiser and the remaining labour inputs is that the former has knowledge of the enterprise as a whole whereas the latter know only about their constituent part.(5) Thus the entrepreneur can appropriate returns to pure entrepreneurship through personally organising production, but could not do so by attempting to hire the organisational talent itself.

Consider now the additional possibility of labour-managed production. The opportunity cannot be sold to a LMF for a fee, just as it could not be sold to a CF. What about the possibility of capturing - by performing the organisational role within a LMF? Here we come across the defining characteristic of labour-managed production - all members have a right to participate and hence a right to information. Thus labour-managed production, unlike capitalist production, does not enable the entrepreneur to retain the monopoly on knowledge. In

summary, then, whereas previously the problem of incomplete property rights over knowledge was seen simply as leading to its use in production by the individual who initially has it rather than an attempt to sell it, we have shown that it also implies capitalist rather than labour-managed production.(6) Relaxing the assumption of equal efficiency we conclude that superior efficiency would be a necessary but not sufficient condition for a LMF to be established.

In the absence of entry barriers the profit available from capitalist organisation in a particular market will diminish over time, and hence so will the distributional advantage to the entrepreneur of capitalist over labour-managed production. Superior efficiency would then be sufficient for the emergence of LMFs in long-run equilibrium. The assumption that there are no entry barriers is a crucial one. Our analysis here suggests that for distributional reasons, capitalist production may emerge first, when the prospective entrepreneurial profits are large. In the following sections we argue that first-movers may have an advantage over subsequent potential entrants.

Up to now we have viewed the entrepreneur as an individual. An alternative possibility is that Alchian and Demsetz's (1972) notion of a "team" may also be applicable to entrepreneurial activity. Thus we may have a group who jointly discover an opportunity and are jointly capable of organising production. Suppose the size of the team is sufficient to perform all of the tasks in the enterprise. The group can then form a LMF and appropriate the gains from pure entrepreneurship. The other option would be to appoint a single manager and elect to work as employees within a capitalist organisation. However, as we have already noted the monopoly over knowledge would

immediately be lost. Thus superior efficiency is now sufficient but not necessary for a LMF to be established. Vanek (1970 p. 285) suggests that entry by groups of individuals is most likely in sectors where the work involves high levels of professional skill because it is such workers who are most likely to possess the additional organisational faculties required.

If the size of the required labour force exceeds the number in the original team, then they have the option of admitting new members to the LMF or taking on hired labour. In the latter case we move away from pure labour-managed or capitalist production. The incentive for the entrepreneurial team to take on hired workers is the same as that for the individual entrepreneur. We should note here the possibility, discussed by Ben-Ner (1984) and Miyazaki (1984) that a pure LMF might eventually degenerate into a CF as departing members are gradually replaced by cheaper hired workers. However, as we remarked in the previous chapter, there is no guarantee that a smooth continuum exists between the two polar modes. Thus even if the pure LMF and pure CF happened to be equally efficient, there is no reason to suppose that the same is true of intermediate forms.

A final consideration concerns unemployment and the role of trades unions. In periods of unemployment unions may serve to secure a differential between the minimum wage that the unemployed would be prepared to accept and the actual wages received in CFs. If, however, LMFs can be established

without a union presence, then they may be able to generate employment where it would not be profitable for a CF to operate.

7.3. LARGE-SCALE ENTRY

Large-scale product market entry refers to a situation in which the existence of scale economies necessitates entry at a scale such that the entrant must take account of the fact that its output would, other things being equal, depress market price. Recent work has shown that under such conditions there may be an advantage to being first in the market. This result is of fundamental importance since, as we shall see, it means that the initial conditions matter in the determination of organisational form.

The advantage to first-movers is that they may be able to make commitments such that potential entrants perceive that they cannot do as well in the post-entry equilibrium as the incumbent achieves pre-entry. The earliest and most well-known of this class of models assumes that the potential entrant expects the incumbent's output to remain fixed (and that the incumbent knows this to be the case). This particular assumption, the "Sylos Postulate", turns out to be generally unsatisfactory but given its familiarity it is useful to illustrate the essence of the argument. Dixit (1979) considers the optimal strategy of an incumbent CF faced with an equally efficient CF potential entrant. He demonstrates that in certain curcumstances the incumbent would choose to accommodate the entrant into the market, but in others it is optimal to set an output level which deters entry. In the latter case, which is of particular interest to us, the incumbent continues to earn positive profits pre-entry even although the entrant perceives zero post-entry profits. Furthermore, such entry deterrence may still be feasible and optimal if the incumbent is less efficient than

the potential entrant. The crucial point is that given the assumptions of the model a firm has an advantage simply by virtue of being first. If the other firm had been first the equilibrium would be different. Thus, as Dixit points out: "This suggests that we should pay more attention to historical or even purely accidental factors when economies of scale are important, since they can effect industrial structure in a significant way" (1979, p.23). The same holds true if the potential entrant is a LMF rather than a CF because, as shown by Miyamoto (1980), the same output which deters a CF would deter a LMF of equal efficiency.

Given that the wage rate is assumed fixed, the organisational input is ignored for both firms, and there are no differences in job satisfaction in his model, this is easily seen since combining $\pi = R - wN - F$ and $y = \frac{R - F}{N}$ reveals that $\pi \gtreqless 0$ as $y \gtreqless w$.[7] The problem with the Sylos postulate is that if entry were to occur the established firm would find it best to reduce output. Knowing this, the potential entrant would not regard the threat to maintain the pre-entry level as credible. However, a number of models have been proposed in which the incumbent makes a commitment which is binding. The commitment may take a number of forms, including brand selection, capacity, innovation and advertising. They operate in the same way as would a commitment, if it was possible, to a given level of output. Thus the major implication, as Salop (1979) points out in his short review, is that an incumbent may be able to deter an entrant which is of equal or even superior efficiency.[8] Although the models always examine potential entry by a CF, it is clear from our argument above regarding

the Sylos postulate that a LMF would be deterred in the same manner. We have therefore the important possibility that CFs may be able to deter entry by LMFs even if the latter are more efficient.

This analysis relates to entry into the product market. In the case of labour-market monopsony power we suggested in Chapter 3 that LMFs might be less easily deterred by an incumbent CF than would CF potential entrants.

7.4 CONVERSION

If workers wish to buy an existing CF the purchase price must take account of any future stream of profits that the capitalist is giving up. Conversions will not therefore occur if labour-management is less efficient than capitalist production; but if it is more efficient there would appear to be the possibility of a mutually advantageous trade. However, it is well known in general that, under certain conditions, potentially advantageous exchanges may not take place (Gravelle & Rees 1980, pp. 504-7). Two such conditions are pertinent to our analysis: imperfect information concerning the good to be traded, and "small numbers".

Certain kinds of information about the firm may be obtained relatively costlessly by workers contemplating the establishment of a LMF. Into this category would fall, for example, the prices and quantities of existing inputs and outputs and the length of time which contracts have to run. On the other hand, information such as the possibility of new competitors on the horizon, forthcoming supply difficulties and the stock of goodwill enjoyed by the firm is much more difficult to obtain. The costs of acquiring such information could exceed the gains from trade. Turning now to the second problem, it is unlikely that negotiations over the sale of firms would involve large numbers of identical potential buyers and sellers. This is because, first of all, for any particular CF the existing workforce are likely to have superior information regarding the sorts of issues mentioned above to that of outsiders. Imperfect information and

"small numbers" are therefore not necessarily independent. Secondly, the existing workforce already have the appropriate production skills. Thirdly, and perhaps most importantly, an outside group of workers would be faced with the problem of removing the incumbent workforce. The situation facing the capitalist seller and LMF buyer is therefore one where there is a multiplicity of terms which could make one or both parties better off but, because of "small numbers", there is no exogenous market price at which they must trade. The result may be a period of lengthy and costly bargaining and there is the possibility that they may not be able to agree at all. An important point of note is that if there is no agreement on the sale it does not mean that the two parties do not trade at all. They would still be faced with the employment contract to negotiate and this typically involves bargaining. Recognition of this may make the capitalist reluctant to provide information which the workforce requires in order to evaluate the possibility of purchase because, in the event of a failure to agree terms, that information would weaken his or her bargaining position concerning the employment contract. The possibility of a continuing employment relation will therefore add to the difficulties of negotiating a sale.

Our examination of large-scale entry and of the sale of firms suggests that there may be advantages to being first. The first-mover advantage may be sufficient to outweigh some degree of inefficiency relative to a potential entrant or prospective purchaser. These types of advantage are not advantages of one particular organisational form over another, but advantages to the incumbent firm whatever it is.

Thus for example a LMF may be able to deter entry by a more efficient CF and similarly a relatively inefficient CF will not necessarily be taken over by more efficient owners.[9] However, our interest is with an initial situation in which all existing firms are CFs and hence for us the implication is that capitalist production might not be replaced by labour-managed production, even if the latter were more efficient. We now turn to another type of first-mover advantage which, in contrast, is specific to an enterprise type.

7.5 TECHNOLOGY AND SUPPORTIVE INSTITUTIONS

The productive efficiency and overall performance of an individual firm is a function not only of its internal organisation but also of a variety of external factors such as the nature of technology, the education received by workers and capital market conditions. Enterprise types will differ in the particular configuration of these external factors that most suits them. Furthermore, technology and the characteristics of supportive institutions may evolve to respond to the needs of the existing forms of enterprise. This could be thought of as a form of external economy which is enterprise-type specific. There is therefore the possibility that in a capitalist economy the external environment has evolved to suit the needs of capitalist rather than labour-managed, or any other form of, production. Although generally requiring further development, a number of authors have suggested first-mover advantages of this kind.

An argument which is presented in considerable detail is the critique of the US educational system by Bowles and Gintis (1976). The system is viewed as supporting capitalist rather than labour-managed production, not through its content but rather by its form. The "social relations of the educational encounter ... correspond closely to the social relations of dominance, subordination and motivation in the economic sphere" (p. 265). In other words, the fact that schools function in a strictly hierarchical manner serves to prepare individuals for the role of employee in a CF rather than a participant in a LMF. They suggest two mechanisms through which the requirements of capitalists have shaped education in the US. First, the uncoordinated

pursuit of self interest by large numbers of individuals and small groups tends to lead to a more or less automatic orientation of educational perspectives to the requirements of capitalist production. Particularly in periods of high unemployment, their concern is with employability. Secondly, when, periodically, major educational debates take place, the capitalist class exerts direct influence both through political channels and via their control over financial resources for educational research. Putterman (1982) makes a similar point with respect to individual development on leaving education and entering work. In CFs there is a sharp division of labour between managerial and production tasks and only a small proportion of employees are involved in the former. Since management skills are largely developed on-the-job the result is that in a capitalist economy they are concentrated among a small section of the population. Labour-managed firms which require decision-making capabilities to be more widely dispersed than do CFs are therefore at a disadvantage.

Levin (1982) argues that, in capitalist economies, the financial institutions tend to favour CFs over LMFs. One reason for this is that they prefer some measure of control over firms that they lend to and with CFs this can often be achieved by joining the corporate board. Further difficulties of LMFs might lie in the legal system. For example Ellerman (1984) points out that existing statutes in U.S.A. are typically poorly suited to the unique legal requirements of LMFs. Finally we may note the possibility, suggested briefly in Bowles and Gintis (1976) that technological change has followed a course appropriate to the requirements of capitalist organisation.(10)

If this is true then productive efficiency is itself endogenous. Clearly these are issues which deserve further theoretical and empirical attention.[11]

7.6 CONCLUSION

This chapter has examined the factors which determine whether LMFs will emerge in a capitalist economy. Our analysis suggests that distributional as well as efficiency considerations are relevant.

This is the case first of all because of incomplete property rights over knowledge. An individual entrepreneur may be able to preserve a monopoly over information by personally organising production within a CF, but would not be able to do so in a LMF due to the fact that members have statutory rights to information. Superior efficiency is therefore a necessary but not a sufficient condition for labour-managed production to be chosen. The situation may, however, be reversed if entrepreneurship is located within a group rather than an individual. This possibility of inefficiency is well known when the alternatives facing the holder of information are to sell it or use it personally. Arrow points out that "...the only effective monopoly would be the use of the information by the original possessor. This, however, will not only be socially inefficient, but also may not be of much use to the owner of the information either, since he may not be able to exploit it as effectively as others" (1962 p.170). We have argued that not only must it be used personally but there are implications for the type of organisation within which it is used.

Secondly our examination of large-scale entry and conversions suggests that once a firm becomes established it may be able to deter entry by a more efficient potential entrant and would not necessarily be reorganised if a more efficient organisational form became available.

Finally, first-mover advantages may accrue also to particular types of organisation. Whatever the reasons behind the emergence of capitalist production in the first place, be they efficiency or distributional, the fact is that the established mode of production is now almost entirely capitalist. These are now the starting conditions and, we have argued, this puts LMFs at a disadvantage.(12)

NOTES TO CHAPTER 7

1. Vanek (1970 p.282) recognises this in his examination of entry in labour-managed economies.

2. Similarly Ben-Ner (1985 p.4) suggests that an entrepreneur will have no incentives to share the profits generated by the new organisation with others and therefore would establish a CF rather than LF.

3. In practice differentials do frequently exist in LMFs. See for example Thomas and Logan (1982) on the Mondragon group.

4. The organisational input is assumed not to vary with the level of output.

5. Marglin (1974) argues that this is an important consideration lying behind the degree of specialisation within capitalist enterprises.

6. Similarly, Marglin (1974, 1982) argued that even within a capitalist mode of organisation it has implications for how production is organised.

7. As we saw earlier, entry deterrence is not always optimal. A LMF that is accommodated into the market need not necessarily be as efficient as the CF because of the possible distributional gains. This is the same point as was made in relation to small-scale entry.

8. An additional model not mentioned by Salop is Dixit (1980).

9. Numerous studies have shown that CFs may exhibit some degree of inefficiency or non-profit-maximising behaviour without necessarily being taken over by new (capitalist) owners. See, for example, Scherer (1980 , p.37-38).

10. Marglin makes the same point in his analysis of the rise of the factory system: "...the bias of technological change towards improvements consistent with factory organization sooner or later took its toll of alternatives..." (1974 p.52)

11. It is interesting to note that the Mondragon group of LMFs have their own educational and financial institutions. See Thomas and Logan (1982).

12. In "Markets and Hierarchies", Williamson explicitly states that the starting conditions are irrelevant to the final outcome: "I assume, for expositional convenience, that 'in the beginning there were markets.'... however, were the initial conditions to have been reversed, so that 'in the beginning there was central planning'... the same eventual configuration of transactions as between firm and market should be observed" (1975 pp. 20-21). (A footnote adds the rider that "...transactions for which neither firm nor market had an advantage would be assigned to the market under the first set of initial conditions and to the firm for the second").

CHAPTER 8

CONCLUSIONS

This thesis has examined a number of aspects of LMF behaviour and performance which have particular or sole relevance to those enterprises operating in capitalist economies. It comprises, firstly, a variety of explicit comparisons between labour-managed and capitalist firms and, secondly, explorations of interactions between the two types of enterprise. These interactions may take place directly in markets or indirectly through institutions and technology.

We began by pointing out that existing comparisons had failed to consider labour market imperfections and that this was surprising as we might expect the treatment of the labour input to be a possible source of differences between the two types of firm. This suggestion was confirmed by the monopsony analysis of chapter 2. We saw that, under conditions in which the CF earns positive profits, income per member in the LMF will exceed the wage rate received in the CF. This is not surprising since it is well-known that the same result obtains if the firms operate in a perfectly competitive labour market but have monopoly power in the product market. However, whereas in the latter case the CF employs more workers and produces a higher output level than the LMF, we demonstrated that with monopsony power it is possible that employment and output may be higher in the LMF. The remainder of the chapter was concerned with short-run employment adjustment in the LMF. Domar (1966) pointed out that if a LMF is prevented from reaching the peak of its income-per-member schedule by an upward-sloping labour supply curve then, in contrast to the

standard Illyrian case, membership would be expanded following a price rise or fall in fixed costs. Obviously the "perverse" response still occurs if the labour supply constraint is not binding. A recent development has been to introduce into the standard model a requirement either that any departing members are entitled to compensation or that a vote is taken on the optimum membership size in the knowledge that any ensuing redundancies would be selected randomly. Our aim was to extend analysis of those schemes to the situation where monopsony power was present. If the initial position was an Illyrian equilibrium then, just as in the standard case without monopsony power, employment remained rigid following a price rise or fixed cost fall. On the other hand, Brewer and Browning (1982) have shown that under alternative initial conditions a LMF may contract membership even when compensation has to be paid. Monopsony was of more interest here. Firstly, it became necessary to distinguish between schemes where compensation could be varied across individuals and where there was just a single rate. The likelihood and extent of a membership reduction was lower in the latter. Secondly, there was now no reason to expect the voting procedure to yield the same outcome as a compensation scheme (of either form).

The following chapter extended the analysis to oligopsony and labour market entry. A simple duopsony model revealed that for LMFs there is no systematic relationship between market structure on the one hand and workers' incomes and employment on the other. Furthermore, income differentials might exist between LMFs with identical technologies. Both of these features were shown to contrast with a market consisting of CFs. Investigation of a mixed duopsony comprising one LMF and one CF again revealed the absence of a systematic relationship and the

possibility that workers may receive different amounts in the two firms. Finally, there was a brief analysis of entry based upon the Sylos Postulate. This simple treatment suggested that a strategy used by an incumbent CF to successfully deter entry by another CF may not necessarily prevent entry by a LMF. The underlying rationale is that an increase in the wage rate following entry represents a cost to a CF entrant but not to a LMF.

In chapter 4, which was joint work with Peter Law, the focus of attention switched to the product market. The aim was to explore some aspects of the interaction between profit maximising CFs and Illyrian LMFs using a simple duopoly model. First of all we described a "mixed" Cournot equilibrium comprising one firm of each type and derived the responses of the firms to cost and demand changes. This revealed that a slope-preserving increase in demand induces an expansion of employment and output by the CF and a contraction by the LMF. The "perverse" LMF response therefore persists as does the expansionary effect of a rise in fixed costs. This latter adjustment affects the CF in turn, causing it to cut employment and output. Thus in a mixed duopoly changes in fixed costs may lead to employment and output responses by the CF, whereas of course a pair of CF duopolists would not respond to fixed cost changes. Similarly, a rise in the wage rate facing the CF in our model causes it to reduce employment and output and the consequent increase in price induces the LMF to contract. The second part of the chapter considered Stackelberg leadership and followership. It is well-known that, under fairly general conditions, profit-maximising duopolists prefer to lead rather than to follow, but if both attempt to lead then Stackelberg disequilibrium results. In contrast, we demonstrated with a simple example that a pair of LMFs

may prefer followership. Again disequilibrium would result. This suggests the interesting possibility that in a mixed duopoly the optimal strategy may be for the CF to lead and the LMF to follow. This turned out to be the case in our example and so the mixed duopoly yielded a determinate Stackelberg equilibrium where one composed of homogeneous firm types would not.

A feature common to all three of the above chapters is that the behaviour of the LMF reflects perfectly the desire of the members to maximise their incomes. If, however, perhaps as a result of the concentration of managerial skills which characterises capitalist economies, the LMF decides to appoint a specialist manager then the possible implications of managerial discretion need to be explored. This was undertaken in chapter 5 using a simple model, one version of which incorporated a compensation scheme. Our analysis suggested, first of all, that managerial discretion may have important consequences for short-run behaviour and secondly, that it is not only the preferences of managers but also the nature of the constraints which they face which crucially determine the outcome. One result of particular interest was that the managerial LMF may increase output and membership following a price rise.

The thesis then moved on to the fundamental question of why firms exist, or rather why certain types of firms exist. In particular, we examined the factors determining whether LMFs would emerge under capitalism. In chapter 6 the efficiency of labour-managed and capitalist production was investigated. This required us to focus attention on the production process, the nature of contracting and the level of utility derived from work. The chapter began with a discussion of

the theoretical literature and sought to make a number of contributions.

First, existing discussions frequently fail to establish at the outset precisely what is meant by the "efficiency" of an enterprise. We therefore put forward a definition. A second characteristic of the literature is the diversity of approaches. To facilitate a comprehensive evaluation we suggested a number of broad categories to which the various arguments could be allocated, and showed how each related to overall enterprise efficiency. Thirdly, specific criticisms were directed at Williamson's (1980) analysis of relative contracting costs. Finally, it was argued that whereas the notion of "atmosphere" played an important role in Williamson's (1975) examination of the relative efficiency of firms and markets, its treatment in his subsequent evaluation of different modes of internal organisation was unsatisfactory. We argued that "atmosphere" should be accorded equal status with other contributors to overall efficiency and that, on theoretical grounds, we would expect non-trivial differences between capitalist and labour-managed production.

The investigation of theoretical arguments failed to yield a clear prediction on the relative efficiency of the two modes of production. We then turned to the empirical literature. The general picture which seemed to emerge was a suggestion that "productivity" (usually measured by value-added) may be enhanced by worker participation and/or ownership, perhaps especially when they are combined. A problem with many of the studies was that the results were sensitive to the choice of specification and data grouping, although there was seldom any suggestion of a negative impact. However, even without this problem of robustness we argued that any attempt to draw conclusions

about the relative efficiency of capitalist and labour-managed organisational forms is subject to a number of serious criticisms.

Firstly, as in all empirical work on production functions there are difficulties associated with the measurement of enterprise output and the inputs of labour and capital. The measurement of participation then presents an additional problem. Since labour, capital and the degree of participation are endogenous to the firm there is a possibility that their coefficients may be biased. Secondly, the production function captures only one element of enterprise efficiency. A further task facing the firm is to choose the optimum levels of the various inputs. The latter objective is frequently termed "economic efficiency" and is distinct from "technical efficiency" which is captured by the production function. Thus various of the theoretical arguments may correctly identify differences in enterprise efficiency but need not necessarily be picked up by an augmented production function. Thirdly, little attention was paid to the possibility that participation per se (or "atmosphere") contributes directly to utility and hence efficiency. Finally, we noted the danger of attempting to assess capitalist and labour-managed production on the basis of evidence from studies each of which was confined to firms along only a small section of the range between the pure capitalist and pure labour-managed enterprise.

Finally, in chapter 7, we considered whether the choice among the organisational forms depended only upon their relative efficiency or whether distributional considerations were also important. Our analysis suggested the latter to be the case. The role for distribution arose first of all because of the entrepreneur's concern to maintain a monopoly over knowledge and secondly because, once established, individual enterprises and also types of enterprise may secure first-mover advantages.

A number of the issues examined in the thesis would appear to merit further attention. First, there is the interaction between LMFs and CFs in product markets. In chapter 4 we looked at a Cournot duopoly and Stackelberg leadership-followership. An alternative structure to consider is one involving a dominant firm and competitive fringe. Saving (1970) analysed such a situation where all firms sought to maximise profits. At the present juncture in capitalist economies the most interesting mixed case would comprise a dominant CF facing a LMF fringe. Returning to the Cournot model, an interesting extension might be to replace an Illyrian LMF with some form of managerial model, perhaps that suggested in chapter 5. This would relate to recent work by Vickers (1984) in which it was demonstrated that a firm controlled by a management whose utility derived from sales as well as profit may actually earn higher profits than a pure profit-maximising firm. A third aspect of product market interaction worthy of investigation is collusion. The literature on CF oligopoly has suggested various factors, for example, cost and demand heterogeneity, which might hinder collusion. Similarly it might be interesting to consider the possible implications of heterogeneous organisational forms.

The analysis of market interactions between the two types of firm may also need to take account of entry and exit. Chapter 3 briefly considered labour market entry deterrence based upon the Sylos postulate. As was pointed out, recent work on entry has criticised this model because the threat to maintain the pre-entry output level lacks credibility. Attention has shifted to the role of sunk costs in generating credible threats. In chapter 7 we discussed in general terms the advantage which the ability to make such commitments may confer upon incumbents. The development of formal models involving the two

types of firm is an important area for future research. As already noted, the various arguments concerning the role of institutions in the determination of organisational form require further development. It is relevant to note here the recent emergence of a literature, under the heading "The New Institutional Economics", which attempts to encompass the analysis of the role of institutions within the neo-classical paradigm.[1] Finally, an empirical investigation of the determinants and consequences of entry and exit which distinguished labour-managed and capitalist firms would constitute an important contribution to the debates contained in chapters 6 and 7.

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NOTES TO CHAPTER 8

1. See for example the Symposium in the Journal of Institutional and Theoretical Economics (Zeitschrift fur die gesamte Staatswissenschaft), March 1984.

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