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Monopoly Capitalism, Profits, Income Distribution and Unionism.

Martin J. Conyon.

Economics

September 1991.



A Thesis Submitted for the Degree of Doctor of Philosophy at the University of Warwick

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Acknowledgements.

During the time spent researching for this thesis I have benefited enormously from the advice, help, and encouragement from colleagues and friends in department of Economics at Warwick University and elsewhere. In particular, I would like to express my deep gratitude and tremendous debt to Keith Cowling whose graduate course entitled the Industrial Structure and the Macroeconomy provided the initial stimulus for the research presented here.

I should also like to express my deep thanks to Rebecca Endean at the Department of Employment for all her help and encouragement. Also thanks to Pete Mitchell at Warwick University for initially setting up the published union data from the New Earnings Survey used in this thesis.

Numerous other people have also supplied comments and suggestions on various parts of this work. I am grateful to seminar participants at Warwick, the London Business School, and the 1989 EARIE conference in Budapest for several useful comments. At Warwick a number of people must be thanked including Dennis Leech, Wiji Narandranathen, Ben Knight, and Paul Latreille. Away from Warwick a number of people have been very encouraging and helpful. Thanks are due to : Katherine Watson, Steve Machin, Gavin Reid, Paul Gregg, Christos Pitelis, Steve Dowrick, Paul Geroski, Steve Davies, Kevin Ennis, Bruce Lyons, Roger Sugden, Claudio Lucifora, and Andrew Henley. I am also grateful to John Van Reenan for setting up much of the data used in chapter 5.

Above all I would like to extend my thanks to the supervisors of this thesis Keith Cowling and Mark Stewart for all their help and support during my time at Warwick. Without their expert knowledge this thesis would be considerably diminished. Finally, I gratefully acknowledge financial assistance from the Economic and Social Research Council Award R00428824041.

Declaration.

This thesis represents research carried out since October 1988. It has not been presented, either in whole or in part, at any University for any degree. Aspects of chapter six of the thesis were undertaken as joint research between Dr. Steve Machin and myself. I would like to express my sincere thanks to him for allowing our work together to be used in this thesis. Chapter six of the thesis is different from our published papers, but draws heavily upon them. They are published in *Economics Letters* as Conyon and Machin(1991a) and the *Journal of Industrial Economics* as Conyon and Machin(1991b).

Abstract.

This thesis aims to extend our understanding of the contemporary stage of monopoly capitalism by considering the issue of profits, income distribution and trade unionism. By focusing on the effect of trade unions on key economic indicators we hope to demonstrate the key importance of both trade unions and market structure in shaping the industrial economic landscape. Using national accounts and census of production data we find that there is a secular tendency for the degree of monopoly to rise although we find little evidence to suggest a similar decline in the profit rate. It also emerges that unions cannot easily influence factor shares. We go on to make the case for a fundamental reappraisal of the role of labour within the firm. We then provide an assessment of the effect of unions within oligopoly. Using firm level data we illustrate that there is a significant degree of apparent collusion within oligopoly and that this is influenced by product market structure and trade unionism. We consider the effects of both structure and unionism in shaping industry profits. We find that for the mid-1980's unions depress mark-ups whilst increasing concentration impacts positively on the margin. We further show that the effect of concentration in successively related industry adds to the seller margin and does not reflect countervailing power. We also find evidence that union coverage in downstream industries adversely affects the seller margin in 1984-85. Finally, we consider the role of trade union power in shaping factor distribution in the manufacturing sector. We find that unions cannot easily influence the distribution of income but that seller concentration significantly depresses wage share. These results are of considerable interest and attest to the importance of considering both product and labour market interaction in shaping key economic variables.

CHAPTER ONE

Introduction.

"Monopoly appears to be deeply rooted in the nature of the capitalist system : free competition, as an abstraction, may be useful in the first stage of certain investigations but as a description of the normal stage of capitalist economy it is merely a myth."

M. Kalecki, *The Distribution of the National Income*, 1938

" under monopoly capitalism employers can and do pass on higher labour costs in the form of higher prices. They are, in other words, able to protect profit margins in the face of higher wages ... [so the] working class as a whole is [not] in a position to encroach on the surplus which, if realised, would benefit the capitalist class relative to the working class."

P. Baran and P. Sweezy, *Monopoly Capital*, 1967, 76-77.

The question of how trades unions affect various dimensions of economic performance and interact with employers in shaping the distribution of national income between capitalist and labour classes is central to a full understanding of the monopoly stage of capitalism. It is clear, see Henley(1990), that the orthodox Keynesian-neoclassical synthesis, as a general rule, finds the question of how the national income is divided between wages and profits as uninteresting.¹ In contrast this thesis, through a series of essays, explores some of the myriad aspects and ways in which trade union activity influences outcomes between employers and labour.

The methodological position that informs our analysis is that the historical evolution of the capitalist system passes through an era of competitive capitalism during the late nineteenth century and reaches an epoch of maturity after the second world war. Currently, advanced industrialised capitalist economies are dominated by large firms, which are strategically inter-linked, often transnational in

¹ The use of the concept of class as a *social collectivity* as distinct from a mere categorisation is most clearly present in Ricardo(1817 p. 5). The opening of his *Principles* puts the concept of both class and distribution at the centre of economic inquiry. Needless to say this insight has now been lost. The *Principles* begin : "the product of the earth - all that is derived from its surface by the united application of labour, machinery and capital, is divided among these classes of the community In different stages of society, the proportions of the whole produce of the earth which will be allotted to each of these, under the name of rent, profit and wages, will be essentially different To determine the laws which regulate this distribution is the principle problem in political economy."

nature, and have captured market positions that are relatively unassailable and free from outside encroachment by smaller rival capitals. In short vast tracts of production, as well as the wider socio-political environment, are coordinated and deeply influenced by firms operating within national or transnational oligopolies.

The rest of this introduction is devoted to an overview of the themes raised in subsequent chapters. The next Chapter explores the ramifications of the development of monopoly capitalism by exploring some of the key economic features of the British economy since 1960. We do this in two ways. In the first part of Chapter 2 we explore recent trends in factor shares, the rate of profit, wages and the degree of monopoly. In particular we focus on whether Kalecki's degree of monopoly theory is capable of explaining recent changes in the share of profits. In the second part of the analysis we provide a decomposition of the profit rate to examine certain aspects of crisis theory in the U.K.. Overall a number of important conclusions emerge. First, we find that the degree of monopoly has been increasing in the British economy since 1970. Taken together with the evidence presented in Cowling(1982), and more recently Henley(1990), this suggests an overall secular rise in the monopolisation of the U.K. economy since 1948. The evidence on the decomposition of the profit rate suggests that over the period 1960-1989 there has been little significant decline in the profit rate. This contrasts to the behaviour of profit share where we find a significant upward, albeit small, trend over the period.

Since, product and labour market outcomes do not occur in a vacuum we go on to consider the nature of the capitalist enterprise and the reasons for its existence in Chapter 3. We compare and contrast two polar views that account for the structure of the modern hierarchical enterprise : namely the contractual (or efficiency) view and the radical (neo Marxist) view. We unearth the salient features of each and argue that the latter position is more consistent with an understanding of modern enterprises. As such we examine some of the implications of the nature of the firm for the activity of dominant enterprises, and their implication for achieving economic democracy.

In Chapter 4 we extend the analysis from the intra-firm interaction between capital and labour to the role of unions in the arena of exchange. To this end we examine some of the salient themes of a theory of monopoly capitalism and comment on some of their main predictions. In particular, we argue that dominant firms and oligopolies are relatively stable and are safe from encroachment by rival capitals. Also we argue, using some of the recent evidence provided in the strategic game literature, that collusion is not the fragile thing that it is often thought to be. We also examine the class struggle between workers and capitalists and its implications for margins, the rate of profit and the distribution of income. In a world of giant firms, operating within oligopolistic markets, we argue that labour, through their trade unions, cannot easily raise production worker wage share. In particular, we make

the case that it will also be difficult for workers to affect price-cost margins, and the degree of monopoly, in a world where particular institutional bargaining structures exist between workers and firms. For example, where firms engage in wage fixing strategies or collusive leadership.

In Chapter 5 we examine empirically the nature and pattern of firm conjectural elasticities in a sample of 182 manufacturing enterprises between 1970 and 1986. Our objective is to explore whether some degree of apparent collusion is the norm within modern industrial society. Using the standard conjectural variations oligopoly model we test the Cournot hypothesis that firms make output decisions without reference to the reactions of rival producers. We push the analysis forward by exploring the relationship between the degree of apparent collusion and seller concentration. We argue that this enables us to distinguish between market power and efficiency explanations of a concentration margins relationship.

In the following Chapter 6 we examine the impact of union power on profitability in British manufacturing over the period 1983-1986. We open the Chapter with a review of the existing literature. We then seek to test whether the much cited negative union effect on profitability established in the U.S. is valid in the British context. In particular, we offer a new empirical insight into this literature by suggesting that there is a bias in the estimation of profit equations when the important union variable is ignored. Moreover, it is often said that the much quoted positive structure-performance relationship does not exist for the U.K. In the final part of the Chapter we examine the impact of unionism on profitability, as well as the conditions under which we can empirically observe a positive concentration effect.

In Chapter 7 we extend the dimension of the unionism and concentration effects to considering the role of downstream structure and labour activity on seller profit margins. We explore whether we might expect downstream structure to add to the seller margin or whether we expect some countervailing power effect to be observed. On the labour market side we consider whether we expect there to be a negative effect of unionism on the seller margin in successively related industries. Using data from the British Census of Production and the British input-output tables we examine these effects for the manufacturing sector in the mid-1980's.

In Chapter 8 our attention turns to the ability of trade unions, through collective bargaining power, to increase production worker wage share. The novelty of the analysis is that it uses a panel of industries in British Manufacturing over the period 1975-1986 to examine the relative empirical importance of seller concentration and union power in shaping wage share. But importantly, the use of a panel data set over such an extended time period allows us to focus directly upon a controversy that has arisen in the literature - namely is the effect of union power on wage share a transitory or permanent phenomena? Our new results, in contrast to recent U.S. and U.K. evidence, suggest that

trade unions do have difficulty in raising wage share.

Although the research undertaken in this thesis focuses on a number of issues they are inter-linked in a number of important ways. Although complex, the central theme and current that runs through the analysis is that product market outcomes are critically contingent on the strategic interaction between capital and labour. Thus, in the final Chapter 9 we offer some concluding remarks on the preceding Chapters and draw together some of the main contributions of the thesis.

Finally, it should be mentioned that we have made no attempt to give an exhaustive treatment of monopoly capitalism. However, I have attempted, as far as is possible within the time and space constraints, to unify the themes discussed in this thesis within a holistic structure. I hope that focusing on particular themes, examined through a series of inter connected essays, helps develop an understanding of those particular features of monopoly capitalism that I have highlighted. The important neglected areas that have not been covered in as much detail as I would like are : the internationalisation of production and neo-imperialism; stagnation and underconsumption theory; macroeconomic implications of oligopoly and monopoly capitalism; and the wider social consequences of a world dominated by monopoly capital. But importantly this thesis has really neglected to provide a systematic assessment of the interaction between state theory and the capitalist enterprise.

CHAPTER TWO

Profitability, income distribution and the degree of monopoly: recent U.K. experience.

2.1 Introduction.

In this chapter our principle focus of attention will be on the secular and cyclical behaviour of the rate of profit and factor income shares in the U.K. economy since 1960. Such an exercise is considered to be of critical importance because of the fundamental role played by these variables, particularly the profit rate, in influencing the future direction of the economy, expectations and investment decisions. The theoretical perspective that informs our empirical analysis is derived from the analysis of industrial economy provided by the monopoly capitalism paradigm.

This chapter is divided into two broad parts. In the first part our primary objective is to analyze data on key variables for the U.K. and assess whether theories of monopoly capitalism are consistent with the available evidence. Our analysis in this respect is an extension of Cowling(1981, 1982, chapter 7). Our second objective is to counter a recent criticism made by Auerbach and Skott(1988) that has alleged to show that the analysis by Cowling(1982) explaining the mid-1970's profit crises is not borne out by the available empirical evidence. We therefore attempt to show that the Auerbach and Skott(1988) position is based upon an erroneous conceptualisation of the monopoly capital paradigm which leads them to draw false inferences from the observed data.

The second part of the Chapter examines in closer detail British corporate sector profitability and the distribution of income between 1960 and 1989. Using the decompositional and growth accounting framework introduced by Weisskopf(1979). Our objective here is to examine the secular and cyclical behaviour of the profit rate and distribution for the Industrial and Commercial Company sector and evaluate the factors that account for changes in the profit rate.

The post war economic experience of the U.K. can be divided into a number of key periods. Although it is often arbitrary to impose such rigid dimensions upon the evolution of economic development a consensus has been reached which suggests that the period up to the mid 1960's was characterised by near full capacity working and high levels of employment. This period of sustained economic activity in the U.K. (often referred to as the "long boom" or "golden age") was periodically interrupted by relatively short lived recession as successive political administrations sought to ease impending crises imposed by a worsening external sector. Cowling(1982) argues that in large part this extended period of prosperity must be explained by unprecedented state involvement in the regulation of the economy, the world integration of the capitalist system, flows of funds from the U.S. and

Europe, and a real need to satisfy the material demands of citizens (via the introduction of new technologies) immediately after the second world war. A second period can be identified as beginning from the mid 1960's where British capitalism began to experience the effects of prolonged recession and stagnation, with 1973 marking the clear end to the post war boom. Since then the restoration of previous profitability levels has been a priority for British capital. This task however, was not achieved until the early 1980's. Since then the British economy has experienced a third wave with revitalised profitability and increases in capacity working. By the close of the 1980's the mounting evidence suggests that the contradictions that characterise monopoly capital have reappeared and the onset of recession is again afflicting British capitalism. Our task now is to examine the evidence and then to consider the proximate causes of crises in British capitalism.

2.2 Income distribution and the profit rate.

Table 2.1 details estimates of wage and profit share for the U.K. economy since 1960. Column 2 reports income from employment as a percentage of GDP which we have denoted wage share although we must stress that this measure does not distinguish between different types of labour eg. overhead and direct labour, which are considered important within the Kaleckian framework. From 1960 to 1973 income from employment as a share of GDP remained relatively stable at about 67%, which is consistent with the evidence provided by Cowling(1982). In the mid 1970's, there is a relative labour gain, with wage share exceeding 70% which appears when one compares it to column 3 to have come at the expense of profit share. From 1977 until 1981 labour's share returns to about 67% but since 1982 has come under significant pressure and in 1988 a record low of 63.5% is registered, some nine percentage points below its 1975 value. The experience of wage share contrasts to the movements in the share of profits, estimates of which are provided in columns 3 and 4. Column 3 defines profit share as gross trading profits of companies net of stock appreciation as a percentage of GDP, and during the 1960's, until the mid 1970's, records a relatively stable values around an average of 13%. After 1973 there is a sharp drop in profit share and an historic low of 7.6% is recorded for 1975. After recovering towards the end of the 1970's profit share also falls back again during the British recession of the early 1980's, but this series does not display the same shock to profit share that occurred in mid-1970's. Thereafter profit share recovers throughout the long upswing of the 1980's. There is evidence of a downturn in 1989 consistent with the onset and widening of the depression that is afflicting the British economy.

An initial comparison between columns 2 and 3 suggests that the gains made in wage share are coming at the expense of profit share and vice versa. We should, however, urge an element of caution on this interpretation especially when using this measure of profit share since the share of

profits in GDP is simply the product of company sector profits in company income and the share of company income in GDP. So, for example, if the share of the company sector income in actual GDP was declining in the mid 1970's this would account for the observed decline in profit share. A factor which might influence this would be a widening public sector crowding out private sector activity. And similarly, if a narrowing of the public sector occurred in the 1980's, through the vigorous pursuit of a denationalization programme for example this might similarly explain the observed increase in profit share at this time. These considerations, though, seems to be of little quantitative significance during the mid 1970's since the share of gross trading surplus' of public corporations and general government corporations and general government enterprises in GDP remained relatively constant at about 3%. We can therefore safely conclude that the growth in wage share during the mid 1970's came at the expense of profit share since the other residual components that go to make up GDP in the accounts displayed little quantitative movements during this critical period.¹

The pertinent question remains though whether the apparent decline illustrated in column 3 reflects changes in the composition and relative size of the company sector. As a further diagnostic, though, we present in column 4 the share of real profits in manufacturing income. This data, available only since 1970, displays a similar trend as for the economy wide profit share figures but to a more pronounced degree. Profit share records a low value of 6.24% in 1975 and thereafter recovers. The effect of the recession of the early 1980's has a much more dramatic effect on manufacturing profit share than on profit share of the economy as a whole. In 1981 manufacturing profit share reaches an historic low of 3.98% but thereafter recovers monotonically, and by 1988 has regained the position held in 1970 with a figure of 16.77%

In table 2.2 we compare the profit share experiences of a sample of OECD countries. This table reports the gross operating surplus' as a percentage of gross value added in manufacturing sectors. Importantly the feature that we have identified for the U.K. has also been experienced by other OECD countries to a greater or lesser degree. Germany, Sweden and the U.K. all experienced a decline in manufacturing profit share in excess of 30% between 1960 and 1980 and in the subsequent period a revival is observed between 1980 and 1987. For example, the penultimate column of table 2 indicates that Germany experienced a fall -34% point fall in profit share between 1960 and 1980, but this experience has since been turned around 15.5% as indicated by the final column. The only country

¹ Table 7 of the 1990 Blue Book identifies five categories which go to make up income GDP and expresses them as percentages. They are : income from employment; gross trading profits of companies; gross trading surplus of public corporations and general government enterprises; and rent income including an imputed charge for non-trading capital. In 1989 the two categories that attract the lions share of income are employment income (64.5%) and companies gross trading profits (15.2%) . The remaining categories make up 20.2% of GDP. It is noteworthy that whilst profit and wage share move in opposite directions the residual these categories together have contributed a stable share of between 19% and 21% to GDP since the mid-1960's. Hence, as we conclude in the text a profit share increase comes at the expense of earnings share.

that has not seen this trend is Japan. On the basis of the available evidence we conclude that during the mid-1970's British capitalism suffered a severe profit share squeeze, an experience repeated in other advanced capitalist economies. However, since 1980 this effect has been turned around and over the secular period 1960 to 1988 we find little evidence for a collapse in profit share despite the existence of periodic crises.

At the same time as profit share was rising real rates of return on capital employed were also on a sharp upward trend. In table 2.3 we present gross and net estimates of the real rate of return before interest and tax during the period 1960-1987. Gross estimates are given in odd numbered columns, and net figures in even columns. Columns (1) and (2) present estimates for all industrial and commercial companies (ICC), (3) and (4) for non-oil companies, and (5) and (6) for manufacturing firms. Immediately we confirm the same general trend in the profit rate, regardless of the particular profit rate formulation, as was observed for the share of profits. Focusing on column (2) the net rate of return for all industrial and commercial companies has a plateau in the mid 1960's, before a record low of 4% is observed in 1975. Thereafter, profit rates recover and in 1987 a record twenty six year high of 11.5% is achieved. The revival of profit rates in the whole of the ICC sector might be misleading, and hence biased, due to the effects of legitimate north sea oil rents gleaned by oil companies in the early 1980's. In column (4) net estimates for non-oil companies are presented. Again the same trend appears with a conspicuous 10.5% value observed in 1987 (this represents a twenty year high and over three percentage points higher than the previous peak in 1978). Since non-oil companies profit rates stand well in excess of the levels seen in the 1970's we can conclude that the revival in the fortunes of capital in the 1980's cannot be solely explained by factors attributed to north sea oil coming on stream.

The rise in the net rates of return for non-oil companies might be explicable in terms of substantial restructuring of British industry, and the "shaking-out", that occurred in the early 1980's (ie. a more efficient use of any given level of capital). In column (6) we explore the rate of profit in the manufacturing sector. The net rate of return reaches 8.5% in 1987. This exceeds the previous peak in 1978 by three percentage points and is the highest since 1969. So, as well as the average rate of profit rising in the ICC (oil and non-oil) sector, which comprises all corporate bodies other than banks, financial institutions, and public corporations, we also observe striking gains by capital in sub sectors of the economy during the 1980's. As a further diagnostic check, on whether record profitability is explicable in terms of restructuring, table 2.4 presents estimates of the performance of large companies since 1975. Whilst these enterprises are only a small proportion of the total population of companies they do account for three quarters of assets and income in the U.K. As is clear from the table, all three major sectors (capital, consumer, and other goods) all exhibit increases in return on capital employed

since 1980². In addition, examining all of the sub-sectors it appears that the only industry not to register an increase in 1987 over its 1982 profit rate is the electronics industry³. Taken as a whole profitability has risen in almost all industries. Whilst the restructuring of industry was undoubtedly important in the 1980's, the revival of the profit rate cannot be explained solely in terms of substitution from low to high profit industries, since all industries experienced record profitability.

2.3 Income Distribution, capacity utilisation and the degree of monopoly.

Having examined the evidence on the evolution of the profit rate and profit share in the U.K. we concluded that both magnitudes have been subject to periodic crises in the mid-1970's and a subsequent recovery in the mid-1980's. The important question that now needs to be addressed is what series of factors precipitated movements in these key variables? The monopoly capital paradigm points to a number of factors that account for the observed changes in profit share and the rate of profit. Our task in this section is to summarise the important themes and to present an anti-thesis to the recent article by Auerbach and Skott(1988) which claims to show that the monopoly capital model is incapable of explaining recent crises.

2.3.1 Monopoly capitalism, the profit rate and income distribution.

We briefly consider explanations for changes in the share of profits. First, there is the tendency for the ratio of profits plus overheads in value added or sales revenue to increase over time.⁴ This tendency for the degree of monopoly to rise over time, implying a higher ratio of profits plus overhead costs in national income, itself can be explained by a number of key factors. An important factor leading to higher levels of monopoly is the existence of periodic merger waves. To the extent that these are horizontal in character they will automatically increase the Herfindahl index by twice the product of each capitalist enterprise's original market share implying a tendency for the ratio of profits plus overheads in sales revenue to rise. Another factor which is important in raising the degree of monopoly is the proportion of advertising spending per unit of output, or value added, spent by the enterprise. To the extent that this lowers the product elasticity of demand, then there is a tendency for the degree of monopoly to rise. And lastly is the degree of apparent collusion between capitalist

² Except for a slight transitory fall in the other goods sector and the oil and gas sector.

³ Interestingly, some industries performance is quite striking. eg. Agencies: up from 18% in 1982 to 48.1% in 1987, and health and household products up from 24.5% in 1982 to 32% in 1987.

⁴ The tendency for the surplus to rise under monopoly capitalism has been developed at length by, inter alia, Baran and Sweezy(1966). The discussion here is based on Cowling(1982) and in Chapter 4 we consider in more detail the nature of monopoly capitalism.

enterprises within oligopolistic industries. To the extent that collusion can be nurtured and facilitated by increasing concentration then this implies a tendency towards the joint profit maximisation monopoly solution. Our main theoretical position must therefore be that there are good reasons to expect the degree of monopoly to rise over time.

However, the tendency towards a higher degree of monopoly may not result in a higher share of reported profits, *per se*, for important reasons. The first concerns the pivotal role played by capacity utilisation within the monopoly capital paradigm. The emergence of a greater and widening degree of monopoly within the economy, largely as a consequence of horizontal merger activity, automatically implies the existence of excess capacity [see, for example, Cowling 1982, p.44]. That is, of course, unless the profits generated within the newly monopolised sector of the economy were actually spent on capitalist consumption goods, investment goods, or spent on securing further monopoly position etc. So if monopolisation implies an increase in the mark-up of price on direct unit costs, then as long as the rate of utilisation is maintained then actual profits will rise. But the fact that increases monopolisation admits the very real possibility that unplanned excess capacity will emerge means that the rate of profit can fall even in the face of an increasing degree of monopoly.

In addition we can identify two other important tendencies which allow a falling rate of profit to be observed for an increasing degree of monopoly. The first relates to the secular growth of managerialism which has two key effects which are important to us here. As more profits are generated by the capitalist enterprise, so ever increasing resources are diverted into maintaining and securing the increasingly complex organisational structures and cumulating hierarchies that are being brought into existence. On the other hand, managerialism implies that there is a tendency for the wage bill of administrative and technical salariat to increase over time. In either case the net effect is the same : for any given degree of capacity utilisation, increased managerialism will have a tendency to imply a lower reported share of profits.

Another central theme which tends to depress the growth rate of profit share, for a constant degree of monopoly, will be the tendency for overhead costs to increase over time because of the imperative imposed upon a capitalist class to dominate the labour process in the pursuit of monopoly profits and accumulation. Such an imperative is similar to the Marxian notion of the rising organic composition of capital, where variable capital is displaced by constant capital, under the conditions of competitive capitalism. Under the monopoly capital schema it is, of course, obvious that rising overhead costs require a rising degree of monopoly if the rate of profit is to be maintained. But that is not the end of the matter since not only do rising overhead costs require a rising degree of monopoly but it is also the case that a rising degree of monopoly itself requires that overheads rise. Such endogeneity is explicable because increased monopolisation requires an increasing salariat to

secure cumulating multi-divisional hierarchies and also to maintain an optimal degree of planned capacity to discourage encroachment by rival capitalists. So the monopoly capital process we have described predicts that there is pressure upon both the degree of monopoly and overhead costs to rise over time but also that a rise in one magnitude places pressure on the other to rise in a cumulative process upwards.

2.3.2 A stylised model of monopoly pricing and factor shares.

These arguments may be succinctly summarised by setting out a simple stylised model which embodies the salient features of the monopoly capital paradigm. Hence we can illustrate the relationship between the profit rate, income shares, the degree of monopoly and capacity utilisation. In addition, the exposition is useful because it allows us to highlight what we consider to be some of the main failings of the recent paper by Auerbach and Skott(1988).

Consider a simple Kaleckian monopoly pricing equation given by $P=\theta c$, where P is product price θ is a mark-up factor, and c is marginal cost which is assumed to be coincident with average costs. For simplicity, it is assumed that variable costs consist entirely of direct labour costs and also that over the immediate production period the technical capital output ratio is a given constant. Let $k (=K/Y^*)$ denote the technically given capital output ratio, where K is constant price capital, Y^* is potential output. If φ is the rate of capacity utilisation, and F represents overhead costs, which we can assume are set in constant proportion, λ , to the current value of the capitalist enterprise's capital stock, $F=\lambda PK$, then the rate of profit is simply given as :

$$\rho = \frac{\pi}{K} = \frac{PY - cY - F}{PK} = \left(\frac{\theta - 1}{\theta} \right) \frac{\varphi}{k} - \lambda \quad (2.1)$$

where π is the volume of profits. So equation (2.1) illustrates (a) that for a constant degree of capacity utilisation, then a rising degree of monopoly, *ceteris paribus*, leads to a higher profit rate. (b) an increasing proportion of overhead costs can offset an increase in the degree of monopoly for a constant degree of utilisation. (c) the implication of (a) and (b) is that to maintain the rate of profit in the face of rising overhead costs, and for a constant degree of capacity utilisation, the degree of monopoly must also rise. We can use equation (2.1) to derive a relationship between the share of profits $\sigma_x=(\pi/Y)$, capacity utilisation and the degree of monopoly, as :

$$\sigma_x = \frac{\pi}{Y} = \left(\frac{\theta - 1}{\theta} \right) - \frac{\lambda k}{\varphi} \quad (2.2)$$

which says that (a) for a constant degree of monopoly and overhead costs then the emergence of excess capacity will result in a decline in profit share (b) increases in overhead costs, *ceteris paribus*,

will lead to a lower reported share of reported profits and (c) an increase in the degree of monopoly will lead to an increase in the share of profits if the degree of capacity utilisation is maintained, *ceteris paribus*. Equation (2.2) corresponds to equation (12) derived in Auerbach and Skott(1988). To examine changes in the share of profits, rather than the level, we totally differentiate equation (2.2) which yields :

$$d(\sigma_{\pi}) = d\left(\frac{\pi}{Y}\right) = \frac{1}{\theta^2} d\theta + \frac{(\lambda k)}{\varphi^2} d\varphi - \frac{1}{\varphi} d(\lambda k) \quad (2.3)$$

It is at this point that the difference between the analysis being pursued here and Auerbach and Skott(1988) arises. Within their mathematical treatment they show that an equation similar to (2.3) can be written but excluding the final term on the right hand side.⁵ The difference arises because they treat the term λk as a constant. However, since overhead costs are a function of capacity, $F=\lambda PK$, we have $\lambda=F/PK$ and $k=K/Y'$, which implies that $\lambda k=F/PY'$ in equation (2.2). It is clear that if the fixed coefficient production function assumption is dropped then k becomes variable, but more importantly variations in overheads relative to capacity would imply that λ becomes variable. This is the very point argued in Cowling(1982), and emphasised in section 2.3.1, that the tendency towards increased monopolisation requires an increasing proportion of overheads relative to capacity. We argued that there is a tendency for this variable to increase over time for technological control purposes or due to greater managerialism. The fact that λk is potentially variable is acknowledged by Auerbach and Skott(1988) verbally, but is not treated as such in their derivation of changes in profit share.

Using their formulation of equation (2.3), which does not admit that overheads relative to capacity can vary, and using data presented in Cowling(1982), they show that the change in manufacturing profit share between two cycles 1956-60 and 1970-73 was about 9% (ie a fall in average profit share values from 22% to 13%). Over the same period capacity utilisation fell from 94% to 91% (a decline of 3% points) and the mark-up factor from the degree of monopoly rose from 2.4 to 2.9. Substituting these values into their equation (which excludes the final RHS term in equation 3) implies a value of four for λK . As they comment "In other words a consistent monopoly capital explanation of Cowling's own data would require that overhead costs exceed total value added by a factor of four." Given the implausibility of such a value for this ratio Auerbach and Skott(1988) go on to argue that if λk assumed a reasonable value of 0.25 "then the monopoly capital story would lead

⁵ Using our notation Auerbach and Skott's final equation with which they explore the data is given as :

$$d(\sigma_{\pi}) = d\left(\frac{\pi}{Y}\right) = \frac{1}{\theta^2} d\theta + \frac{(\lambda k)}{\varphi^2} d\varphi$$

To get this equation they treat the term λK as a constant.

one to expect an *increase* in the share of profits of six percentage points." On this basis they conclude that "increasing monopolisation and falling utilisation rates cannot explain the empirical evidence."

However, if λ_k is potentially variable as we have argued then even the substantive point made by Auerbach and Skott(1988) is no longer valid. Assume that the ratio of overheads to value added is approximately 30%, a figure acceptable to Auerbach and Skott(1988). In this case a consistent monopoly capital explanation of the data provided by Cowling(1982) would require that the change in overheads to value added was approximately 8%. The main point to be made is that if the ratio of overhead costs to value added is treated as fixed then to solve for the observed change in manufacturing profit share requires an unrealistically high value. However, treating it as a variable requires only that the ratio changes by approximately 8% to explain the change in profit share. Thus contrary to assertion made by Auerbach and Skott(1988) increased monopolisation and falling rates of utilisation are quite consistent with the data.

Auerbach and Skott(1988) then present new evidence for changes in manufacturing profit share using their model which we have shown does not admit the possibility of an increasing proportion of overhead costs. In addition to this problem, the construction of their profit share measure is also prone to bias. Using published estimates of manufacturing gross trading profits derived from the CSO, they construct a profit share series, and argue that to explain the changes in their profit share estimates overhead costs would have to exceed value added by 40%. But the definition of gross trading profits for manufacturing published in the accounts also includes income from self employment which they do not attempt to adjust for in the construction of their measure of profit share. In addition, their series contains no adjustment for stock appreciation or capital consumption. In consequence, the evidence that they present for changes in manufacturing profit share, because of the actual construction of their profit share estimate and because overhead costs are not treated as variable, must be regarded as rather weak.

But there is a further important point. Whilst discounting the monopoly capital argument of increasing monopolisation as part of the explanation of the mid-1970's profitability crises they offer no positive explanation for the phenomena themselves except for asserting that "we suggest that increasing competition, in particular foreign competition, must play an essential part in any explanation of falling profitability in the U.K." Their argument is wholly negative since they offer no positive or direct empirical evidence in support argument. Also they overlook one important element in the data, that would appear to contradict their conclusion, namely that the empirical evidence shows a widening, not narrowing, degree of monopoly. We are now in a position to explore the recent evidence on this issue.

2.4 Recent U.K. evidence.

Table 2.5 presents data on key variables, pertinent to our analysis of changes in profit share, for the period 1970-1988. In column 2 we reproduce our estimate of real profit share in the manufacturing sector.

2.4.1 the degree of monopoly.

Columns 3 and 4 provide two alternative measures of the average degree of monopoly which we have computed for the manufacturing sector. Following Cowling(1982) the degree of monopoly is defined as the ratio of sales revenue minus operative wage and material costs to sales revenue. Whilst this definition is apparently straight forward the actual construction of the degree of monopoly is not without issue. We can identify two potential problems that arise in calculating the degree of monopoly.

First, the average degree of monopoly, μ , can actually change either because of changes in the industrial composition of manufacturing output or alternatively because of the relative increase in the monopolisation of particular industries. Auerbach and Skott(1988) argue that for this reason it is not an accurate estimate of the growth in monopoly in an industrial economy. However, the main point that should not be lost sight of is that regardless of the source of the change in the degree of monopoly, although this is an important question, the fact remains that the degree of monopoly can in fact be shown to have risen.

Second, changes in the average degree of monopoly for manufacturing are going to be affected by the degree of vertical integration or disintegration occurring in the sector. This is particularly pertinent here because the British *Census* data, from which our data is derived, is calculated from establishment or plant level responses. So increases in vertical integration over time at the plant or establishment level will cause an upward bias in the calculation of the average degree of monopoly.⁶ This substantive point was made by Cowling(1982) and reiterated by Auerbach and Skott(1988), the latter using it as a criticism of the data which purports to show an increase in monopolisation. As an empirical matter it is difficult to assess the extent and nature of the bias induced by vertical integration at the establishment level, although the work by Cowling seems to suggest that the problem may not be too serious. However it is clear that an unbiased series can be constructed if one deducts intra-

⁶ To see this define two establishments A and B, which are vertically related before integration takes place, and let R be sales revenue, W be wage costs and M be material costs. Establishment A's degree of monopoly is simply $\mu_A = (R_A - M_A^1 - M_A^2 - W_A)/R_A$, and establishment B, $\mu_B = (R_B - M_B^2 - W_B)/R_B$, and $R_B = M_A^1$. Then the estimated aggregate degree of monopoly is given as $(R_A - M_A^1 - M_A^2 - W_A + R_B - M_B^2 - W_B)/(R_B + R_A)$ which can be written as $(R_A - W - M^2)/(R_B + R_A)$. Clearly, post integration this then becomes: $(R_A - W - M^2)/R_A$; which illustrates the increase in the degree of monopoly.

industry, inter-establishment transactions from the denominator of the degree of monopoly.⁷ But due to the near impossibility of this task, caused by data unavailability, a corrected μ can be constructed which nets all material costs out of the denominator of the degree of monopoly.

For these reasons we present two estimates for the average degree of monopoly : μ_1 defined as the ratio net output minus operative wage bill to gross output and μ_2 defined as the ratio of net output minus operative wage bill to net output. The results detailed in column 3 and 4 of table 2.5 confirm our expectations showing a clear upward trend in the degree of monopoly as predicted by, *inter alia*, Baran and Sweezy(1966) and Cowling(1982). We can further establish whether there is a secular movement in the degree of monopoly by a simple linear regression of the natural logarithm of each estimate of the degree of monopoly on a time trend. As indicated in table 2.5.1 below this exercise yielded significant estimates which suggests that the degree of monopoly has increased on average by 1.183% per annum for μ_1 and by 0.7835% on average per annum for the alternative measure μ_2 . Our expectations, then, are clearly confirmed with both estimates leading us to conclude that the recent history of the U.K. economy between 1970 and 1988 is towards increased monopolisation. These results, taken in conjunction with the evidence in Cowling(1982), suggest a secular increase in the degree of monopoly since 1948. Examining columns 3 and 4 in more detail we notice that the degree of monopoly increases until 1973 and falls back slightly in 1974 with a subsequent plateau period between 1974 and 1977. In part the fall in μ can be explained by the activities of the Price Commission during this period restricting the growth in μ . From 1979, with the return to office of a conservative administration committed to non-interventionist pro-market strategies, the growth in μ has gone unchecked. Both estimates of the degree of monopoly have exhibited rapid growth during the 1980's and reached their highest values in 1988 ($\mu_1=0.3308$ and $\mu_2=0.7569$).

Table 2.5.1 : Simple linear regression of the degree of monopoly on a time trend for U.K. manufacturing 1970-1988	
$\ln \mu_2 = -43.9204 + 0.7835 \text{ time}$ <p style="text-align: center;">(0.6656) (0.0584)</p>	$\ln \mu_1 = -135.975 + 1.183 \text{ time}$ <p style="text-align: center;">(1.722) (0.1510)</p>
R^2 0.9087 F 180.117 μ_2 : (net output - operative wage bill) / net output. Standard errors in parenthesis.	R^2 0.7702 F 61.3393 μ_1 : (net output - operative wage bill) / gross output. Standard errors in parenthesis.

⁷ In this case the degree of monopoly would be $\mu=(R_A - M^2 - W)/(R_B + R_A - M_A^1)$, but since $M_A^1=R_B$, μ is simply $(R_A - M^2 - W)/(R_A)$ which is the same before or after integration.

2.4.2 proximate causes of the changes in the degree of monopoly.

It is an important question to consider what factors might have resulted in changes in the degree of monopoly in British manufacturing. Besides outside factors, such as the actions of the Price Commission, Cournot oligopoly theory suggests that changes in the degree of monopoly will be related to changes in the Hirschman-Herfindahl index. An important determinant of concentration is, of course, the degree of horizontal merger activity⁸. For example, if two firms operating within a particular product market, one with a market share of 15% and the other with 20%, merge then this would raise the value of the Herfindahl index by six percentage points. We would expect this to affect positively the degree of monopoly. Indeed, the Office of Fair Trading report that the lions share of merger activity in 1989 was indeed horizontal in character. In 1989 60% of mergers were horizontal, 3% vertical and 37% classified as diversifying. Cowling(1982) argues that the merger wave of the late 1960's, which built up to a high point in 1968, is consistent with the increases in the degree of monopoly that occurred in the early 1970's.

Another important factor accounting for the growth in the degree of monopoly, and identified by Baran and Sweezy(1966) and Kalecki(1971), is the importance of the sales effort and advertising spending undertaken by firms. The thrust of the argument is that it can be easily shown that the price elasticity of demand is an important factor which varies inversely with the degree of monopoly then to the extent that advertising expenditure generates inertia in the price elasticity of demand, or in fact lowers it, then we would expect the degree of monopoly to be higher.⁹ Column 5 of table 2.5 details the ratio of advertising spending, exclusive of direct mailing, expressed as a percentage of gross domestic product at factor cost. The secular behaviour over the period reveals an upward trend rising from 1.25% of GDP in 1970 to 1.73% in 1988.¹⁰ Performing a similar exercise as was done for the degree of monopoly estimates we can note that the effect of regressing the natural logarithm of the advertising to GDP ratio on time, over the sample period, produced an average annual increase in advertising spending of 1.12%. But as is clear from the table this conceals the obvious cyclicity of variable. During the profits crises of the mid-1970's advertising as a percentage of GDP fell from 1.33% in 1973 to 1.00% in 1975. Similarly in the boom years of the mid-1980's we see this variable

⁸ A review of both the empirical and theoretical literature is to be found in Curry and George(1983), and more recently Sawyer(1985) and Davies et. al.(1988).

⁹ Indeed this is quite consistent with the Dorfman-Steiner(1954) tradition which demonstrates that the optimal advertising to sales ratio is related to the both the advertising and price elasticities of demand. Indeed, extending the framework to multi-firm markets it is easily demonstrated theoretically that the advertising intensity of the capitalist firm depends on the reactions of other firms. The evidence suggests that oligopolistic environments are likely to advertise more intensively than more competitive markets. For example, see Cable(1975), Sutton(1974)

¹⁰ Indeed that Advertising Association Yearbook shows that advertising spending as a percentage of GDP was only 0.76% in 1948 and that the last date for which data was available, ie. 1989, was in fact a peak of 1.75%.

rising.

To evaluate the importance of advertising spending as a percentage of GDP and merger activity in determining the degree of monopoly we perform a simple linear regression and detail the results in the table below. We do not, however, claim that this specification is a definitive empirical formulation of the degree of monopoly. Unfortunately we cannot obtain advertising intensity or merger activity figures solely for the manufacturing sector and so have to make do with advertising spending as a percentage of GDP and the number acquisitions per year as proxy variables. However, the picture that emerges is that the time trend and advertising spending are positively associated with the degree of monopoly over the sample period, but there is little support here for the number of acquisitions increasing μ . Although we would expect the number of horizontal mergers to positively affect the growth in μ the proxy that we have used does not work well. One explanation for this is that the number of mergers recorded with the Office of Fair Trading is systematically biased downwards.

The degree of monopoly, advertising spending and merger activity, 1970-1988.

$$\ln \mu_1 = -121.3011 + 0.8081 \text{ time} + 0.3063 \ln(\text{ADV}) - 0.0364 \ln(\text{MERGER})$$

(12.1199) (0.2153) (0.0500) (0.0260)

$R^2 = 0.9368$, $F=90.9368$

LM Serial Correlation test : $\chi^2(1)=0.1599$

Ramsey RESET test : $\chi^2(1)=0.0886$

Normality Test : $\chi^2(1)=0.8500$

Heteroscedasticity : $\chi^2(1)=0.0193$

$$\ln \mu_2 = -46.4472 + 0.5646 \text{ time} + 0.1018 \ln(\text{ADV}) + 0.00394 \ln(\text{MERGER})$$

(6.9685) (0.1238) (0.0288) (0.0149)

$R^2=0.944$, $F=103.0069$

LM Serial Correlation test : $\chi^2(1)=0.2129$

Ramsey RESET test : $\chi^2(1)=0.3517$

Normality Test : $\chi^2(1)=5.1243$

Heteroscedasticity : $\chi^2(1)=0.0175$

Notes : μ_1 , μ_2 are estimates of the degree of monopoly, *ADV* is advertising spending as a percentage of GDP (Source Advertising Association Yearbook); *MERGER* is the number of acquisitions per year (derived from the Office of Fair Trading annual reports); time is a time trend. Standard errors in parenthesis.

2.4.3 Capacity utilisation, overhead costs and wages.

As explained in section 2.3 capacity utilisation plays a central role in explaining observed changes in profit share. If greater monopolisation results in a higher mark-up on marginal costs, which we have confirmed in section 2.4.1, then only if capacity utilisation is maintained at the pre-monopolisation rates will actual profits rise. However, a greater degree of monopoly brought about by horizontal merger will imply the existence of excess capacity unless the profits generated by the higher degree of monopoly are spent. Thus, the very real possibility that increasing monopolisation will result in the emergence of unplanned excess capacity is then capable of explaining a falling rate and share of profit.

In column 6 of table 2.5 we present an estimate of capacity utilisation derived from the Confederation of British Industry's Industrial Trends Survey. The actual construction of this variable is described in Driver(1986) in his appendix, p. 352. The data reveals that during the profits crises of the mid-1970's capacity utilisation was indeed falling below it's early 1970's levels, a phenomena that is consistent with the evidence in Cowling(1982). In the early 1980's capacity utilisation begins to rise, at the same time as the sustained profits revival. Taken together this evidence suggests that the growth in the degree of monopoly throughout this period is only turned into rises in actual profit share and profitability depending upon the degree of capacity working.

However, this cannot be the whole of explanation since we have neglected to account for changes in overhead and wage costs during this period. A factor that will tend to depress the growth in profit share is the tendency for overhead costs to assume greater importance over time¹¹. Overhead costs can rise for technological or control purposes. Monopolisation, and the adoption of ever increasing hierarchies (for example, the introduction of multi-divisional form organisational structure), requires larger proportions of overhead labour relative to direct labour ie. more technical, administrative, and clerical staff to maintain and service this greater hierarchy. To sustain the rate of profit rising overheads will necessitate an increasing degree of monopoly. This tendency will be reinforced by the need of enterprises to commit strategic (or planned) levels of spare capacity to secure markets from potential hostile attacks from other capitalists. Thus, a rising degree of monopoly itself will imply a rising proportion of overhead to direct labour. In column 8 of table 2.5 we confirm the tendency for the ratio of salary to wage bill to rise over time¹². Whilst this series is biased downwards, because it fails to measure the costs of non-pecuniary benefits received by

¹¹ This tendency is similar to the imperative for the organic composition of capital to rise in Marxian crises theory. The substitution of constant for variable capital can come about as a counter strategy to working class militancy in the work-place. A rising proportion of overhead to direct labour is seen as variant of this tendency.

¹² This result reinforces the evidence presented in Cowling(1982) over the period 1948-1977.

middle-management and above, it does highlight the potential difficulties encountered in maintaining the rate of profit. The relentless rise of this ratio in the 1980's, at the same time as the profits revival, suggests that the move back to capacity working is, *inter alia*, an important source of the recovery. In addition, in the final column we give an estimate of the ratio of overhead costs to value added which we would expect to rise over time. This series was constructed by recognising that value added was equal to the sum of profits, direct wages, and overheads. Since we have estimates of profits, wages and value added for manufacturing as a whole we could estimate the ratio of overhead costs to value added. As expected there is a clear secular tendency for this ratio to increase over time.

In column 7 of table 2.5 we give estimates of the ratio of the materials to wage bill, which enters into the determination of the share of profits. The importance of this ratio is that as long as the ratio of the wage bill to materials bill does not increase as fast as the change in the degree of monopoly then an increase in the degree of monopoly will imply a lower wage and higher profit share. The obvious absence of any clear trend in this ratio is evidence of its relative unimportance in explaining the decline and subsequent revival in the rate, and share, of profits over the sample period.

Before providing a decompositional analysis of the British corporate sector profit rate we are in a position to offer some interim conclusions. First, we have illustrated that the profit rate and profit share in the British economy has been subject to periodic crises and that there was a sustained recovery during the 1980's, although the evidence points a recent downturn in the share of profits. Over the secular period, 1960-1988, we found that profit share has remained relatively stable. The evidence that we pieced together has demonstrated a tendency for the degree of monopoly to rise since 1970, and this coincided with a falling rate of capacity utilisation and a tendency for overhead costs to rise. The outcome during the 1970's was for the share and rate of profit to fall. With increases in the rate of capacity working in the mid-1980's resulted in increases in manufacturing profit share.

2.5 British Corporate Sector Profitability and the Functional Distribution of Income, 1963-1989 : Introduction.

A popular research agenda among many industrial and macro economists has sought to account for the secular and cyclical behaviour of the rate of profit.¹³ This exercise is viewed as critical by many economists because the actual profit rate plays a key role in the formation of profit expectations which in turn influence current investment decisions and determine the future direction of economic

¹³ See, *inter alia*, Weisskopf(1979), Henley(1987, 1989) and Hargreaves Heap(1980). More recently the issue has been examined for the U.S. by Henley(1987) and for the U.K. by Funke(1986) and Henley(1989)

growth and the extent of spare capacity within the industrial economy.¹⁴ The severe profits squeeze, which afflicted many advanced capital industrial OECD economies during the 1970's, spawned a burgeoning literature that tried to isolate the theoretical and empirical validity of the falling rate of profit. This paper further examines this issue, using the decompositional and growth accounting framework introduced by Weisskopf(1979) which accounts for profitability changes induced by shifts in factor distribution, capacity utilisation and factor productivity, by considering the behaviour of the aggregate rate of profit in the British industrial and commercial company corporate sector between 1963 and 1989. The analysis diverges from the approach adopted in previous empirical investigations in the U.K. in a number of important ways, some of which affect the estimated impact of capacity utilisation and factor productivity on the aggregate corporate profit rate.

Firstly, and of significant empirical importance, is that there is an important role potential output to influence the aggregate profit rate. Theoretically, this follows from the decomposition of the profit rate into its component parts : profit share, capacity utilisation and the capacity capital ratio. It also emerges from the empirical observation that capital productivity is an important influence on both the secular and cyclical rate of profit.¹⁵ Hence we investigate whether the empirical formulation of the potential output measure is of importance in contributing to the profit rate performance in the British corporate sector.

Second, we utilise annual time series data between 1963 and 1989 for the Industrial and Commercial Company sector to examine the behaviour and decomposition of the rate of profit. The extended nature of our time series means that we can consider both the secular and cyclical behaviour of the rate of profit during the important profits revival of the mid-1980's.

To briefly anticipate the main findings, we find that there is little empirical support for a secular decline in the rate of profit in the full period between 1963 and 1989. However, experimenting with important sub periods we demonstrate that there are important sub-periods for which such a decline can, not unsurprisingly, be detected. Over the sample period we find that there is a small, but significant, distributional shift away from labour, but this has not been transposed into a secular rise in the profit rate because of an adverse movement in capital productivity. The intra-cycle analysis

¹⁴ Kalecki(1971, chapter 10) illustrates that an increase in profits during any given time interval "renders attractive certain projects which were previously considered unprofitable and thus permits an extension of the boundaries of investment plans". Empirical evidence in support of this hypothesis is presented in Fazzari and Mott(1988). In addition, Chenery(1952) develops a model combining investment in spare capacity with profitability.

¹⁵ This has been established for the non-financial business sector in the U.S. by Weisskopf(1979) and Henley(1987). Results for the U.K. presented by Henley(1989) find that capital productivity contributes to a -2.11% secular decline in the profit rate between 1963 and 1981 in the British corporate sector. However, the analysis presented here differs significantly from Henley(1989) in the choice of the potential output measure. Funke(1986) also finds a secular decline in capital productivity in the U.K. manufacturing sector between 1951 and 1981, a decline which has accelerated since 1969.

confirms that there is a premature profit rate peak that precedes the subsequent peak in real output, and that this stems from shifts in the functional distribution. In addition, we find an important role for both real and relative price factors in the further decomposition of profit share and capital productivity. Inadequate growth in labour productivity to match the growth in the real capital labour ratio explains the decline in capital productivity over the sample period. Furthermore, we find that the failure of real labour productivity growth to match real wage growth has impacted negatively on the rate of profit, but adverse price effects have meant that true profit share has tended to rise.

These results provide an interesting juxtaposition to the recent paper by Henley(1989) who finds, for the Industrial and Commercial Company sector between 1963 and 1981, a secular decline in the rate of profit of approximately five percentage points per annum. The differences are explicable in terms of the profits revival of the mid 1980's, and our extended time series data, together with our preferred measure of potential output.

The section proceeds as follows. In section 2.6 we present a resume of the salient theoretical considerations drawn from Weisskopf's(1979) decompositional and growth accounting framework which provides the basis for our empirical analysis. In section 2.7 the data set is explained, and in section 2.8 presents the results from the profit rate decomposition. Finally, section 2.9 offers some overall concluding remarks.

2.6 The decomposition of the rate of profit.

The theoretical decomposition of the rate of profit, $\rho = (\pi/K)$, begins by recognising that the profit rate is identical to the product of the share of profits, σ_x , the rate of capacity utilisation, φ , and the capacity capital ratio, ζ , such that the following expression can be written :

$$\rho = \frac{\pi}{Y} \cdot \frac{Y}{Z} \cdot \frac{Z}{K} = \sigma_x \cdot \varphi \cdot \zeta \quad (2.4)$$

where π is the volume of profits, K measures the capital stock, Y is a measure of actual output, Z is an estimate of potential output and K measures the capital stock. The terms, σ_x , φ and ζ are profit share, capacity utilisation and capital productivity respectively.¹⁶ This basic identity, however, is incapable of examining the pure or exogenous changes in the functional distribution, σ_x , on the rate of profit, ρ . Conceptually, the share of profits in income is equal to one minus the share of labour. However, particular types of labour, namely overhead labour which comprises mainly of administrative

¹⁶ Weisskopf(1979) shows how changes in each of these sub-components of ρ can be associated with changes in three variants of Marxian crises theory. A rising strength of labour (RSL variant) impacts negatively on profit share, σ_x , and ρ by raising wage share; A failure to realise the value of the commodity produced (RF variant) implies a fall in capacity utilisation, φ ; and a rise in the organic composition of capital (ROC variant) implies a fall in capital productivity, ζ .

technical and clerical workers, are employed in relation to the capacity of the enterprise. Other types of labour, namely direct labour which comprises mainly production workers, are used in proportion to actual output produced. If capacity utilisation falls below the optimum operating rate for the enterprise, then direct labour can be readily curtailed in proportion to the output supplied, but overhead labour, on the other hand, is not so easily altered. Any observed fall in actual profit share, therefore, cannot be automatically attributed to a change in the balance of power between capital and labour, since actual profit share is linked, via the employment of overhead labour, to capacity utilisation. This is a fundamental point that suggests because overhead labour is positively related to the capacity of the enterprise, actual profit share and capacity utilisation are endogenous. To net out the capacity effect on factor shares, Weisskopf(1979) introduces the notion of truly required labour share, σ_w^* . This measures the share of income accruing to labour *as if* overhead labour was employed in proportion to *actual* output rather than capacity [see Henley(1989) p.172]. Truly required labour share is then :

$$\sigma_w^* = \frac{w_d L_d + w_o L_o^*}{Y} \quad (2.5)$$

where w_d and w_o are money wage rates of direct and overhead labour respectively, and L_d and L_o are hours worked by direct and truly required labour hours respectively. The relationship between truly required and actual labour hours for overhead labour controlling for capacity effects is $L_o^* = (\hat{\varphi}/\hat{\varphi})L_o$, where $\hat{\varphi}$ is the optimal level of capacity utilisation. Equation (2.5) can be further decomposed to yield an estimate of truly required labour share as¹⁷ :

$$\sigma_w^* = \frac{P_w}{P_y} \cdot \frac{\bar{w}^*}{\bar{y}^*} \quad (2.6)$$

where P_w is the price of wage goods, P_y is the price of output goods, \bar{w}^* is the truly required wage rate, and \bar{y}^* is truly required labour productivity. From equation 2.6 it is clear that truly required wage share can rise because either (a) truly required real wages rise faster than truly required labour productivity (labour strength is on the *offensive*, to use Weisskopf's terminology), (b) because the price of wage goods rises faster than output prices (labour strength is on the *defensive*), or due to some combination of both mechanisms.

Turning attention to the capacity capital ratio this can be decomposed in like fashion to the truly required wage share to yield the following expression :

¹⁷ This is seen by dividing the numerator and the denominator by of equation 2.5 by truly required labour hours $L^* (=L_d+L_o^*)$, which then gives an expression for truly required wage, w^* , and truly required labour productivity, y^* . Using the appropriate price and good deflators these can be expressed in real terms (\bar{w}^* , \bar{y}^*).

$$\zeta = \frac{P_y}{P_k} \cdot \frac{\dot{\bar{y}}}{\dot{j}} \quad (2.7)$$

where P_k is the price of capital goods and \dot{j} is the truly required capital labour ratio. In the same way as before ζ can fall either because (a) the truly required capital labour ratio grows faster than truly required labour productivity, (b) because the price of capital goods, P_k , rises faster than the price of output goods, P_y , or some combination of the two.

Transforming equation (2.4) into a growth accounting equation, and incorporating the decompositions of (2.5) through (2.7) yields the following expression for the exponential growth rate of profitability :

$$\dot{\rho} = \frac{\dot{\pi}}{K} = \dot{\sigma}_x + \dot{\varphi} + \zeta \quad (2.8)$$

where $\dot{\sigma}_x$ is truly required profit share, $\dot{\varphi}$ is adjusted capacity utilisation, and ζ is capital productivity. The dot operator signifies an exponential growth rate. In addition, it can be shown that $\dot{\sigma}_x = -\Phi \dot{\sigma}_w = -\Phi ((\dot{\bar{w}} - \dot{\bar{y}}) + (\dot{P}_w - \dot{P}_y))$; where Φ is a function coefficient, $\Phi = (\dot{\sigma}_x / \dot{\sigma}_w)$ to express the growth rate of labour share in terms of the growth rate of the share of profits. Similarly truly required adjusted capacity utilisation is given as : $\dot{\varphi} = \Phi \dot{\varepsilon} + \varphi$; where the term $\varepsilon_w (= \dot{\sigma}_w / \sigma_w)$ defines the relationship between truly required and actual wage share. Finally capital productivity is given by $\dot{\zeta} = (\dot{\bar{y}} - \dot{j}) + (\dot{P}_w - \dot{P}_k)$.

Taken together the growth rate of profitability is identical to the sum of the contributions of truly required profit share, adjusted capacity utilisation, and capacity capital ratio, ζ . Furthermore, the decomposition of adjusted profit share allows us to examine the impact of the terms of trade effect (via $(\dot{P}_w - \dot{P}_y)$) and real effects of truly required wage and productivity growth $(\dot{\bar{w}} - \dot{\bar{y}})$ on profit share and the profit rate. Similarly, we can isolate the effects of truly required labour productivity growth and the capital labour ratio on capital productivity and profitability growth. Equation 2.8, therefore, together with its extended decompositions forms the basis of our empirical analysis.

2.7 Data description.

The data that we utilise in this analysis is derived mainly from the U.K. national accounts and supplemented with data from the CBI industrial trends survey, Employment Gazette, and the Census of Production. Our theoretical framework dictates that we must have consistent time series for the volume of profits, net capital stock capacity utilisation and potential output. Such data is not available for the British economy as a whole or any constituent sector. Hence we focus on the Industrial and

Commercial Company sector for which data can be assembled with a fair degree of accuracy.¹⁸ We use time series data, which contrasts to Henley's(1989) analysis for two reasons. First, a number of critical variables necessary for the analysis are not available quarterly (eg. net capital stock). Second, by generating a quarterly series by linearly interpolating from annual data points, one runs the risk of artificially imposing a trend or turning point in the series that is not necessarily there. This is fundamental if one is trying to date precisely phases within cycles, or business cycles themselves.¹⁹

We define the volume of profits in the industrial and commercial sector as net pre-tax corporate income which includes rent and other non-trading income but excludes capital consumption and stock appreciation. As a pre-tax measure of gross corporate income, we divide it by the net capital stock to estimate profitability. The measure accords closely to what Nordhaus(1974) identifies as 'genuine rate of return on non-financial capital'.²⁰ Annual profit share is given as the volume of profits in the corporate sector divided by total income, where income is measured as profits plus income from employment in the corporate sector.

A distinguishing feature of this analysis is the choice of the potential output measure, and hence the estimate of capacity utilisation and the capital productivity variable. Previous research by Henley(1989) defines capacity utilisation as the ratio of actual gross domestic product to potential GDP, where potential GDP is obtained from the Layard and Nickell(1986) series on potential output. This estimate, though, and its critical role in obtaining measure of capacity utilisation and capital productivity, and hence the influence on profitability, may be considered as deficient for our purposes in a number of important ways. First, the series is gleaned by estimating a linearly homogenous Cobb-Douglas production function allowing for labour augmenting technological progress. Hence the estimate of potential output will be sensitive to the length of the time series under investigation. Second, our theoretical analysis has highlighted the importance of the quasi-fixity of overhead labour which is not accounted for in his estimate of potential output. Furthermore, Cobb-Douglas technology, by assuming a constant marginal rate of transformation between factor inputs, is inconsistent with the theoretical structure outlined here. This, by contrast, emphasises that overhead labour cannot be adjusted to actual output changes. Third, the estimating model for his potential output series is capable

¹⁸ According to the U.K. national accounts the industrial and commercial company sector accounts for approximately 50% of the U.K. gross domestic product (48.6% in 1987). In addition the ICC sector contributes a relatively stable share to overall GDP. The average for the period 1977-1987 was 46.4% of GDP, with a standard error of 1.14. Approximately one half of the remainder of GDP was accounted for by income from unincorporated businesses and self employment income. The rest consisted of output generated by central government, local authorities and financial institutions.

¹⁹ Of course, we recognise that the use of annual data makes it difficult to precisely date phases and cycles as well, but we are trying to avoid the problem highlighted above.

²⁰ The construction of the data set is detailed in the appendix to the paper.

of only capturing short run deviations from a potential trend and not longer term potential output (see Cowling(1982)). Lastly, our model requires an estimate of capacity utilisation for the corporate sector whereas Henley's estimate is an economy wide estimate. To try and circumvent these problems we estimate potential output from CBI data which reports the percentage number of firms working below capacity.

2.8 The empirical decomposition of the corporate profit rate.

The key variable in the analysis, ρ , can be constructed from the accounts data from 1962 onwards and hence our analysis begins from the start of the next business cycle thereafter. Figure 2.1 plots the behaviour of the rate of profit along with our measure of real income for the Industrial and Commercial Corporate Sector between 1963 and 1989. Table 2.6 provides similar information together with the identification of the five complete cycles and the phase dating. The data show, as expected, the profit squeeze of the mid 1970's, together with the sharp turn around in the fortunes of capital with the sustained profits revival of the early 1980's which culminated in a peak of 15.24% in 1985. A downturn in profitability is observed in 1986, which recovers briefly, before seemingly turning down.

In table 2.7 we present estimates of the simple decomposition of the profit rate into its component effects unadjusted for capacity effects. The results for the intra-cycle phase averages corroborate the findings of Henley(1989), and Funke(1986), illustrating that the lions share of the changes in the profit rate are accounted for by changes in the functional distribution of income through the profit share term. Capacity utilisation and capital productivity, though, assume a greater quantitative significance than those reported by Henley. From cycle to cycle, we observe as expected, profitability falling until the final cycle where a sustained profits revival reversed the squeeze that occurred in the 1970's. In terms of the secular decline it culminates in a small, but insignificant, overall decline in the annual average profit rate over the full period. This contrasts to Henley's(1989) estimate of approximately 5% average decline per annum between 1963 and 1981. Examining the factors that contribute to the profit rate we note that there is a small, by significant, upward trend in profit share which is more than outweighed by a secular decline in capital productivity of -1.38% points on average per annum. The capacity utilisation effect, whilst reenforcing the distribution effect, is insignificant. The sustained profits revival of the 1980's in the industrial and commercial company sector, therefore, means that in our sample period we can no longer corroborate the Marxian falling rate of hypothesis. Although capital has gained at the expense of labour in the distribution arena, this has failed to translate into an upward trend in the profit rate due to worsening capital productivity. By way of contrast the results for the sub period 1963-1981 do reproduce the main thrust of Henley's(1989) earlier findings for the U.K.. There is a significant fall in the profit rate of -3.62%

points per annum. This is accounted for by a decline in profit share of -1.45%, and an almost equal effect of the decline in capital productivity by 1.4%. The capacity utilisation effect, although reinforcing and significant is clearly the least important factor accounting for the growth in the profit rate. Taken together this emphasises the importance of extending the data period under investigation.

In table 2.8 we report the results for the decomposition of the profit rate once we have adjusted for the non-optimal employment labour, recalling that table 2.7 simply records movements in the actual components of the profit rate. Qualitatively, the results from table 2.8 reflect those in table 2.7. As we might expect, though, capacity utilisation now has a slightly larger impact on the secular movement in the profit rate but still doesn't quite achieve statistical significance.²¹ Again the secular growth profitability is explained by a positive significant profit share growth, but this is not translated into a significant profit rate growth because of the adverse movement in capital productivity. For the sub period all sub-components are important in explaining the decline in aggregate profitability, and a noteworthy feature is that both distributional factors and capital productivity assume equal importance in this decline. Capacity utilisation on the other hand has a smaller quantitative impact, a result which is quite consistent with Henley(1989). Taken together the results for the secular decline suggest that the capital productivity measure has a greater impact than previous studies have suggested.

Turning to the within cycle phase averages we confirm that distributional shifts are the most important factor in explaining profitability changes, but that this should be set against important effects coming through the capital productivity effect. In the critical phase B of the cycle adjusted capacity utilisation has a quantitatively small effect on profitability growth, whereas the changes in the capacity capital ratio reinforce the distribution effect. The between cycle results indicate that adjusted capacity utilisation, associated with the expansionary phase of the early 1970's, improves as expected. During the profits revival in cycle 4-5 the previous downward trend in profitability is turned around, and is explained by changes in all three sub-components, the shift in the functional distribution being most pronounced.

Table 2.9 presents evidence on the further breakdown of capital productivity into truly required labour productivity and truly required capital labour ratio, together with relative price changes of capital and output goods. Dealing first with the full period results, the decline in capital productivity is accounted for by a failure in the growth of truly required labour productivity to match the growth rate in the capital labour ratio. The contribution of the relative price effect is quantitatively less important, but nevertheless has a significant negative counteracting effect overall. This conclusion is similarly borne out between cycles, where labour productivity growth is less than the growth in real

²¹ On the basis of a two tailed test the reported t ratio is significant at 0.129, would pass a one tail test (1.31).

capital labour ratio. In each of the phase averages truly required labour productivity lags behind the that of the capital labour ratio, with a small contributory factor coming from the price effect. In the important phase B this differential growth is much more pronounced.

Table 2.10 considers the further decomposition of adjusted profit share into truly required real wage growth, truly required labour productivity effects and relative price changes between wage and output goods. Each variable is multiplied by the function co-efficient, Φ , so that the results presented give the average percentage growth contribution of the change in the variable to the change in the corporate profit rate. Column 1 gives the adjusted profit share contribution to the profit rate, column 2 the contribution of truly required real wage share, which since it is multiplied by Φ , can be thought of as a constant price profit share. columns 3 and 4 a respectively the contribution of truly required real wage and productivity effects (which sum to column 2), and column 5 is the contribution of relative price of wage and output goods. The full period results isolate the extent to which the contribution of truly required real wage and productivity effects contribute to changes in the rate of profit, measured by the combined effect of $-\Phi(\dot{w}, \dot{y})$, and relative price movements captured by $-\Phi(\dot{P}_w - \dot{P}_y)$. The evidence suggests that over the full period labours offensive strength contributed a small but significant decline in the corporate rate of profit since the real wage failed to keep pace with changes in real productivity. However, this small gain in true real wage share is offset by adverse price movements since the growth in the price of wage goods does not match the growth in the output good price, hence wiping out the gains made in truly required wage share. This contrasts to Henley's(1989) results where he finds that the real true real wage share effect dominates a small adverse relative price effect. In the final cycle to cycle period truly required profit share, and actual profit share, recovers, and is accounted for by a rise in productivity more than offsetting the true real wage effect. Truly required profit share would have fallen but for the adverse price effect which contributes positively to the profit rate. From the intra-cycle results in the critical phase B, the important distributional shift is accounted primarily by adverse price movements. Real factors actually impact positively on the profit rate, but the fall in true profit share comes about because the price of wage goods rises faster than the price of output goods. Taken together these results suggest, in contrast to Henley(1989), that both real and relative price factors are important in contributing to the secular and cyclical behaviour of the corporate rate of profit. Labour productivity has failed to keep pace with true real wage growth, but in addition table 2.9 suggests that labour productivity growth has lagged behind the growth in the true real capital labour ratio. The former has resulted in rising true real wage share, but has not been realised because of the adverse changes in the relative price changes resulting in a rise in true profit share. The latter rise in the capital labour ratio has resulted in a decline in capital productivity.

2.9 Implications and Conclusions.

The evidence put forward in this Chapter has revealed a number of features of the U.K. economy since 1960. We have updated the evidence presented in Cowling(1981,1982) and provided a decompositional analysis of the rate of profit in The ICC sector.

We have illustrated that the profit rate and profit share in the British economy has been subject to periodic crises and that there was a sustained recovery during the 1980's, although the evidence points a recent downturn in the share of profits. Over the secular period, 1960-1988, we found that profit share has remained relatively stable. The evidence that we pieced together has demonstrated a tendency for the degree of monopoly to rise since 1970, and this coincided with a falling rate of capacity utilisation and a tendency for overhead costs to rise. The outcome during the 1970's was for the share and rate of profit to fall. With increases in the rate of capacity working in the mid-1980s resulted in increases in manufacturing profit share.

The decomposition of the rate of profit for the British corporate sector between 1963 and 1989 has revealed a number of interesting and important conclusions about the behaviour of the profit rate. Over the full period, 1963-1989, the net profit rate has declined a little over half a percentage point per annum on average, but since the resulting time coefficient failed to be significant we cannot conclude that there has been a secular decline, consistent with the Marxian falling rate of profit hypothesis, during this time. However, for the sub period 1963-1981, ie. the period immediately before the sustained profits revival of the 1980's, there was a tendency for the rate of profit to decline by on average almost 4% per annum. This result provides an interesting juxtaposition to the analysis by Henley(1989). Using quarterly data, he also found a decline of approximately 5% points per annum between 1963 and 1981, but the extended time period on which the analysis here is based reveals that his conclusions concerning the behaviour of the secular profit rate are no longer robust. This is hardly surprising and can be accounted for by the sustained profit revival of the 1980's. It appears that all three components of the profit rate, namely factor distribution, capacity utilisation and capital productivity, contribute to the movement in the growth rate of profitability. The capacity utilisation measure though is the weakest contributor. Importantly, we found that there is a distributional shift away from workers over the full period of a little over half a percentage point per annum over the full period. However, this is not translated into an increase in the profit rate because of adverse movements in capital productivity which declines by -1.3% per annum. The decomposition of profit share (adjusted for utilisation) and capital productivity reveals an important role for labour productivity in explaining the behaviour of the profit rate. In the case of capital productivity labour productivity fails to grow as fast as the changes in the real capital labour ratio. In the case of profit share labours offensive strength contributed to a small but significant decline in the corporate profit rate as the real

wage failed to keep pace with changes in labour productivity. However, this small gain is offset by adverse price movements since the growth in the price of wage goods does not match the growth in output goods price. So, in contrast to Henley(1989) who finds a secular shift away from profit income, the analysis presented here suggests that by extending the time period under investigation, the converse is true and we find a small but significant shift to profit income.

Within each business cycle we observe a similar pattern to that established by Weisskopf for the United States, and Henley(1989) for the U.K., namely a premature peak in the profit rate accompanied by subsequent upward pressure on the truly required real wage share. This notion of a rising real wage share, which can also be legitimately viewed as a falling real profit margin, can within each business cycle be associated with a rising strength of labour at the critical upswing phase of the cycle. However, over the full period, where we cannot establish a secular shift away from profit share, the evidence suggests against a rising strength of labour hypothesis.

Table 2.1 : U.K. factor income distribution 1960-1989.

Year	Wage Share	Profit Share ^a	Profit Share ^b
1960	66.00	15.80	-
1961	67.40	14.30	-
1962	67.90	13.60	-
1963	67.20	14.10	-
1964	67.20	14.50	-
1965	67.40	13.90	-
1966	68.40	12.70	-
1967	68.10	12.70	-
1968	67.70	12.40	-
1969	67.40	12.50	-
1970	68.90	11.50	16.07
1971	67.60	12.40	14.59
1972	67.30	12.30	16.90
1973	66.90	12.00	16.92
1974	70.50	8.30	9.87
1975	72.50	7.60	6.24
1976	70.60	8.10	7.31
1977	67.30	12.30	13.51
1978	66.90	12.80	13.89
1979	67.60	12.70	10.23
1980	68.90	11.30	6.33
1981	68.80	10.20	3.98
1982	66.80	11.80	8.28
1983	65.10	13.90	9.40
1984	64.70	14.60	11.34
1985	63.70	16.50	13.27
1986	64.70	14.20	14.72
1987	64.00	15.40	14.38
1988	63.50	16.00	16.77
1989	64.50	15.20	-

Notes :

Wage Share : Income from employment as a percentage of gross domestic product, income based. Source : Economic Trends, table 7, 1991, Central Statistical Office.

Profit Share^a : Gross trading profits of companies after providing for stock appreciation as a percentage of gross domestic product (income based)²². Source : Economic Trends, table 7, 1991, Central Statistical Office.

Profit Share^b : Real profits (ie net of stock appreciation and capital consumption at current replacement cost) in the manufacturing sector divided by net income in the manufacturing sector (ie. net of stock appreciation and capital consumption at replacement cost). Source : Unpublished data obtained directly from the CSO.

²² The measure of gross trading profits of companies reported here excludes the gross trading surpluses of public corporations and general government enterprises. This shows up in a category called "other gross trading profits" in the accounts data.

Table 2.2 : Gross Operating surplus as a percentage of gross value added in manufacturing sectors across OECD countries.

	1960	1974	1978	1980	1983	1985	1987	% Δ 1960- 1980	%Δ 1980- 1987
Japan	55.1	47.1	43.7	43.7	41.3	42.3	42.1	-20.7	-3.8
Germany	39.1	30.3	28.8	25.6	29.0	30.3	30.3	-34.5	15.5
France	na.	na.	28.8	24.9	25.6	27.6	na.	-13.5	9.7
United Kingdom	29.5	19.9	24.4	18.9	23.8	27.5	31.5	-35.9	40.0
Italy	na.	40.4	38.9	42.4	40.9	43.7	44.7	4.9	5.15
Canada	33.4	34.0	30.9	31.8	30.4	34.6	34.1 ^a	-4.8	6.75
Sweden	33.9	30.5	15.2	22.3	29.3	30.3	31.0	-34.2	28.1
United States	25.2	22.0	26.5	22.2	24.9	25.6	27.1	-9.5	15.9

Notes :

1. Data is derived from the Historical Statistics of the Organisation for Economic Co-operation and Development, 1960-1988, section 7, Economic Outlook.
2. %Δ is simply the percentage change of the variable over the given time period.
3. na : the statistic is not available for this year.
4. a : This figure is for 1986, the actual figure for 1987 was not published.

Table 2.3 : Rates of return before interest and tax at current replacement cost.

Year	$(\pi/K)_1$	$(\pi/K)_2$	$(\pi/K)_3$	$(\pi/K)_4$	$(\pi/K)_5$	$(\pi/K)_6$
1960	11.4	13.1	11.4	13.1	12.0	14.5
1961	10.3	11.3	10.3	11.3	10.4	12.0
1962	9.6	10.3	9.6	10.3	9.6	10.8
1963	10.3	11.4	10.3	11.4	10.1	11.5
1964	10.8	12.0	10.8	12.0	10.3	11.8
1965	10.4	11.4	10.4	11.4	9.8	11.0
1966	9.5	10.0	9.6	10.1	8.9	9.5
1967	9.6	10.1	9.7	10.2	9.0	9.6
1968	9.7	10.2	9.8	10.3	8.8	9.3
1969	9.7	10.1	9.7	10.2	9.0	9.6
1970	8.9	8.9	8.9	8.9	7.9	8.0
1971	9.1	9.1	9.1	9.1	7.2	6.8
1972	9.3	9.5	9.3	9.5	8.0	8.1
1973	8.8	8.9	8.8	9.0	7.7	7.9
1974	6.3	5.2	6.3	5.4	5.2	4.0
1975	5.6	4.0	5.7	4.3	4.3	2.6
1976	5.9	4.4	5.8	4.4	4.6	2.9
1977	8.1	7.5	7.4	6.8	6.4	5.7
1978	8.4	7.9	7.7	7.1	6.5	5.9
1979	8.1	7.4	6.6	5.7	5.3	4.2
1980	7.4	6.4	5.5	3.9	4.7	3.1
1981	7.3	6.2	4.9	3.0	4.0	2.0
1982	8.1	7.5	5.5	3.8	5.0	3.6
1983	9.2	9.1	6.1	4.8	5.3	4.1
1984	10.2	10.7	6.7	5.6	5.7	4.8
1985	10.6	11.4	7.8	7.2	6.4	6.1
1986	9.7	10.0	8.8	8.9	7.1	7.2
1987		11.5		10.5		8.5
1988						
1989						

Notes.

π/K are different measures of the profit rate. Odd numbered columns are measured gross whilst even columns are net rates of return. Gross profits (π) (odd columns) are defined as gross operating surplus on U.K. operations ie. gross trading profits less stock appreciation plus rent received. Net profits (even columns) are simply gross profits less capital consumption at current replacement cost. Capital employed (K) is gross capital stock (odd columns) or net capital stock (even columns) of fixed assets (excluding land) at current replacement cost, plus book value of stocks in the U.K. Source, British Business, April 1988.

$\pi/K_1, \pi/K_2$: All industrial and Commercial Companies.

$\pi/K_3, \pi/K_4$: non-oil industrial and commercial companies.

$\pi/K_5, \pi/K_6$: Manufacturing Companies.

Table 2.4 : Rates of return in a sample of sectors in the U.K. economy : 1975 1987.

	1975	1977	1979	1981	1983	1985	1987
Capital goods group	15.8	17.7	15.8	12.6	14.3	15.9	18.9
Electrical	16.4	17.2	16.7	18.0	18.2	19.0	19.8
Electronics	21.3	26.0	26.1	24.0	23.8	20.4	19.5
Mechanical engineering	17.1	18.0	14.7	12.0	12.7	14.1	16.2
Motors	9.1	13.7	8.6	4.1	9.2	11.4	15.8
Consumer goods group	15.5	17.9	16.9	15.3	16.6	17.7	19.9
Health and Household	25.4	27.2	21.4	23.8	25.0	29.6	32.1
Other groups	15.2	16.3	16.0	13.8	15.4	17.0	20.4
Agencies	14.1	28.1	23.1	18.2	26.3	34.2	48.1
Chemicals	15.6	16.6	14.8	10.7	13.7	16.9	22.9
All industrial groups	15.5	17.6	16.5	14.1	15.6	17.2	20.0
Oil and gas	29.4	29.4	34.4	20.1	18.9	22.6	16.3
Industrials and oils	18.0	19.6	20.0	15.5	16.5	18.4	19.3

Notes.

The table is reproduced from : *"Performance of large companies"*, Bank of England Quarterly Bulletin, 28, 1988, p. 548.

Table 2.5 : U.K. data 1970-1988.

(1) Year	(2) π/Y	(3) μ_1	(4) μ_2	(5) ADV	(6) CU= φ	(7) (M/W)	(8) (S/W)	(9) F/Y
1970	16.07	0.2677	0.6584	1.25	70.496	4.35	0.4714	0.4141
1971	14.59	0.2693	0.6570	1.17	67.227	4.20	0.4887	0.4339
1972	16.90	0.2830	0.6677	1.26	67.855	4.09	0.4857	0.4342
1973	16.92	0.2812	0.6696	1.33	72.555	4.18	0.4632	0.4922
1974	9.87	0.2706	0.6809	1.18	65.927	4.75	0.4802	0.5709
1975	6.24	0.2612	0.6571	1.00	61.896	4.42	0.4925	0.5603
1976	7.31	0.2653	0.6756	1.04	60.705	4.42	0.5104	0.5749
1977	13.51	0.2651	0.6488	1.15	63.947	4.42	0.4418	0.4880
1978	13.89	0.2742	0.6899	1.22	65.084	4.71	0.5105	0.5245
1979	10.23	0.2857	0.6921	1.24	67.221	4.46	0.5291	0.5517
1980	6.33	0.2840	0.6797	1.27	63.723	4.11	0.5574	0.5642
1981	3.98	0.2976	0.6973	1.28	61.736	4.22	0.5998	0.5985
1982	8.28	0.3025	0.7103	1.31	63.397	4.42	0.6172	0.5735
1983	9.40	0.3102	0.7264	1.37	66.327	4.69	0.6287	0.5869
1984	11.34	0.3060	0.7307	1.45	70.202	4.95	0.6286	0.5741
1985	13.27	0.3054	0.7333	1.46	74.317	4.99	0.6392	0.5598
1986	14.72	0.3175	0.7366	1.58	73.166	4.72	0.6449	0.5485
1987	14.38	0.3279	0.7503	1.63	76.674	4.89	0.6704	0.5729
1988	16.77	0.3308	0.7569	1.73	81.281	4.89	0.6822	0.5619

Notes.

1. ADV : Advertising spending, excluding direct mail, as a percentage of gross domestic product at factor cost. Source : Advertising Statistics Yearbook, 1990, 8th edition, published by the Advertising Association.
2. π/Y : Profit share in manufacturing sector. Real profits, π , (ie net of stock appreciation and capital consumption at current replacement cost) in the manufacturing sector divided by net income, Y , in the manufacturing sector (ie. net of stock appreciation and capital consumption at replacement cost). Source : Unpublished data obtained directly from the CSO.
3. μ_1 : average degree of monopoly in the manufacturing sector, defined as net output minus operative wage bill to gross output. Source : *Business Monitor Census of Production Summary Tables, various issues 1970-1988.*
4. μ_2 : average degree of monopoly in the manufacturing sector, defined as net output minus operative wage bill to net output. Source : as for μ_1 .
5. S/W the ratio of salary bill (ie administrative, technical and clerical) to wage bill (operatives) in manufacturing. Source : as for μ_1 .
6. M/W the ratio of materials bill to wage bill (operatives) in manufacturing. Source : as for μ_1 .
7. CU : capacity utilisation calculated from the CBI industrial trends survey using the transformation suggested in Driver(1986).
8. F/Y : the ratio of overhead costs to value added in manufacturing.

Figure 2.1. Real Income and the Rate of Profit in the British Industrial and Commercial Sector, 1963-1989.

Notes :

1. Real income (denoted crosses in figure 1) defined as net income in the Industrial and Commercial Company sector divided by retail price index (1985=100)

2. Real Profit Rate (denoted boxes in figure 1) as detailed in data appendix.

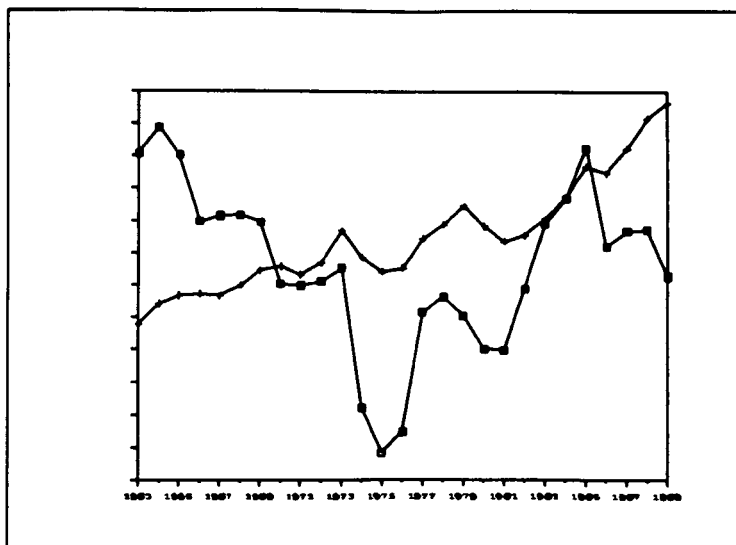


Table 2.6 : The rate of profit and real income in the British corporate sector.		
Year	Real Income in 1985 prices	(π/K) Percent
1963	97833.6	15.058
1964	103970.7	15.871
1966	107009.5	12.972
1967	106517.0	13.142
1968	109661.9	13.163
1970	115521.3	11.000
1971	112914.5	10.957
1973	126444.5	11.488
1975	113686.5	5.842
1978	128537.0	10.605
1979	134337.4	10.020
1981	123335.2	8.947
1985	146736.0	15.236
1986	144672.4	12.179
1988	161533.5	12.712

Table 2.7 : Rates of growth of basic contribution variables : full period, between cycles, and phase averages.

Phase Averages	$(\pi/K)=\rho$	$(\pi/Y)=\sigma_x$	$(Y/Z)=\varphi$	$(Z/Y)=\zeta$
Phase A	21.214	17.712	7.942	-4.40
Phase B	-13.994	-7.902	0.762	-6.853
Phase C	-22.342	-15.236	-5.639	-1.467
Between Cycles				
Cycle 1-2	-14.693	-8.614	-1.486	-4.592
Cycle 2-3	-11.979	-1.846	1.625	-11.758
Cycle 3-4	-24.669	-9.381	-12.976	-2.309
Cycle 4-5	19.576	15.641	1.892	2.043
Full period 1963-1989	-0.509 (1.087)	0.679 (2.025)	0.202 (1.04)	-1.389 (10.491)
sub-period 1963-1981	-3.617 (5.942)	-1.453 (2.834)	-0.764 (5.868)	-1.400 (11.171)

Table 2.8 : Rates of growth of adjusted contribution variables : full period, between cycles, and phase averages.

Phase Averages	$(\pi/K)=\rho$	(σ'_x)	φ'	(φ)
Phase A	21.214	18.908	6.746	-4.40
Phase B	-13.994	-7.687	0.547	-6.853
Phase C	-22.342	-16.169	-4.706	-1.467
Between Cycles				
Cycle 1-2	-14.693	-9.036	-1.065	-4.592
Cycle 2-3	-11.979	-1.445	1.223	-11.758
Cycle 3-4	-24.669	-12.412	-9.948	-2.309
Cycle 4-5	19.576	14.420	3.113	2.043
Full period 1963-1989	-0.509 (1.087)	0.648 (1.836)	0.233 (1.515)	-1.389 (10.491)
sub-period 1963-1981	-3.617 (5.942)	-1.621 (3.206)	-0.595 (5.346)	-1.400 (11.171)

Notes :

1. The growth rate for each variable within each phase is computed as $1/n \cdot \Sigma(\log(x(t_2)) - \log(x(t_1)))$, where x refers to the value of a variable at each year.
2. Full and sub period results are obtained by estimating an ordinary least squares regression of $\log(x)$ on a constant and a yearly time trend, an multiplying the resulting slope coefficient by 100. T ratios reported in parenthesis are based on White(1980) adjusted standard errors.

Table 2.9 : Rates of growth of adjusted contribution of capacity capital ratio : full period, between cycles, and phase averages.				
Phase Averages	ζ	\dot{y}^*	\dot{j}^*	$(p_y - p_c)$
Phase A	-4.440	4.041	7.950	-0.527
Phase B	-6.853	3.819	10.673	0.001
Phase C	-1.467	4.165	6.619	0.987
Between Cycles				
Cycle 1-2	-4.592	15.554	22.062	1.916
Cycle 2-3	-11.758	11.114	18.270	-4.602
Cycle 3-4	-2.309	13.648	14.992	0.965
Cycle 4-5	2.043	15.617	17.401	3.827
Full period 1963-1989	-1.389 (10.491)	2.535 (22.076)	3.873 (31.179)	-0.052 (1.100)
sub-period 1963-1981	-1.400 (11.171)	2.867 (26.116)	4.029 (16.994)	-0.238 (2.726)

Table 2.10 : Rates of growth of adjusted contribution of profit share : full period, between cycles, and phase averages.					
	$\dot{\sigma}_x$	$-\Phi_{\sigma w}$	$-\Phi \dot{w}^*$	$\Phi \dot{y}^*$	$\Phi(p_w - p_y)$
Phase A	18.908	-2.917	-25.460	25.543	21.825
Phase B	-7.687	2.287	17.194	-14.906	-9.975
Phase C	-16.169	2.623	27.134	-24.511	-18.792
Between Cycle					
Cycle 1-2	-9.036	0.200	24.999	-24.799	-9.236
Cycle 2-3	-1.445	3.898	14.535	-10.637	-5.343
Cycle 3-4	-12.412	0.482	23.535	-23.052	-12.894
Cycle 4-5	14.420	-7.566	-19.417	11.851	21.986
Full Period 1963-1989	0.648 (1.836)	-0.161 (1.778)	0.662 (1.077)	-0.823 (1.515)	0.808 (1.897)
Sub-period 1963-1981	-1.621 (3.207)	4.463 (5.020)	0.316 (2.648)	-4.147 (5.344)	-1.937 (3.132)

Notes.

As described in tables 2.7 and 2.8.

CHAPTER THREE

The nature of the capitalist enterprise : contractual versus radical explanations.

3.1 Introduction.

In the previous Chapter we pieced together evidence on the evolution of the rate of profit, and the share of profits, in the British economy. We argued that movements in these key variables could be explained by a combination of factors within the product and labour market (Eg. increased monopolisation, capacity utilisation, and the changing nature of overhead costs). However, the decisions that result in us observing movements in the profit rate do not take place in a vacuum : they are the outcome of the interaction between capital and labour within the capitalist enterprise. The individual firms success in achieving a given profit rate is conditioned not only by the market environment that it operates in, but also by the combination of capital and labour within the firm¹. This raises the question of the nature of the firm, and why particular organisational structures are preferred by capitalist enterprises.

The objectives and importance of this Chapter arise from the need to understand the hierarchical nature of the firm. As Sawyer(1988) illustrates, one of the shortcomings of some monopoly theories of capitalism is that they neglect to investigate the internal structure of firms and instead treat the firm as a "black-box". But this feature of monopoly theories should "be seen as simplifications, useful for certain parts of the analysis but not to be seen as crucial ingredients" [Sawyer(1988)]. My objective then is to investigate the nature of the firm as an important issue necessary for a fuller understanding of the monopoly stage of capitalism.

One of the most fundamental, yet relatively unexplored, questions of industrial political economy concerns the existence, and continued predominance of the hierarchical firm in organising the production process. It is generally assumed in mainstream economics that the internal organisational structure of the capitalist enterprise, stemming from the original research of Coase(1937), is ostensibly efficient. In comparison a parallel research agenda, radical in foundation and tracing its roots to Marx, argues that the introduction and continued development of the hierarchical structure of the enterprise has more to do with the social power relations of production rather than with an issue of efficient resource allocation.

¹ See for instance the discussion in Cullenberg(1988) who maintains that the aggregate movement in the rate of profit can only be evaluated by reference to individually constituted capitalist enterprises. Hence, he argues that an economy wide trend in the profit rate cannot be observed.

In this Chapter it is proposed to restate the fundamental questions about the essential nature of the firm and present a critique of this received orthodoxy. The analysis will endeavour to highlight the failings of the internalisation, or efficiency, view of the firm. Importantly, we shall argue that internal organisational structure is not parametric, as assumed in the efficiency or transaction costs explanations, but a strategic choice variable ultimately under the control of a dominant (capitalist) group. During the exposition the issue of how proprietorship is treated within the existing literature will be highlighted. Whilst the issue of the hierarchical adoption of production relations has been reasonably well developed in the literature, drawing on the economics of information, how this relates to proprietorship has in large part been ignored. In the latter part of this essay we draw together these points to illustrate that proprietorship has consequences for the position of labour as a productive factor input within the firm. The exposition will also concentrate on the issue of centralisation of capital and the growth of the firm. A central conclusion of this analysis is that the growth of the giant firms has differential welfare implications for the different actors within the firm. Also the essence of the firm not only has important welfare consequences for those actually involved in the production process but also has implications extending to the wider context of the firm within the nation state. This in turn will focus matters on the importance of proprietorship and control in explaining the observed nature and activities of the firm. If this is taken into account then the economic ownership of the firm is seen to have consequences beyond the usual remit of positive economics extending to the arena of political economy.

3.2. Firms and Economic Theory.

Until comparatively recently the economic nature of the firm and its relationship to conventional economic theory was an underdeveloped area of inquiry². It is now considered by institutional economists and internal organisational theorists³ but within mainstream economic theory it is still treated in a relatively cursory fashion. My aim in this section is to provide a rationale for reconsidering the importance of firms. Naturally, why firms exist and how they behave is an important question if we are to understand the consequences of firm behaviour for the evolution of the macroeconomy and the interaction of capital and labour. The contention adopted here is that if firms exist solely as a response to the costs of using the market mechanism (ie. they are efficient) then the implication is that the evolution of the giant corporation does not present any fundamental conflicts

² The seminal paper in this area is Coase(1937) who establishes the market non-market distinction. Thereafter the literature is relatively silent until the 1970's. See the review in Putterman(1986).

³ For example, see Williamson(1980,1985) for an institutionalist view of the firm as a nexus of idiosyncratic exchange, and Williamson(1970) for the efficiency properties of multi-divisional (M-form) internal organisation.

between capital and labour. More importantly, when one unearths the essence of the firm, how does the existence of different types of labour, whether differentiated by gender, race, organised or skilled, alter, or affect, the behaviour of the firm? That is the nature of the firm raises an issue of identification since not only will firm activity and organisation affect the responses and actions of labour but this in turn will alter the behaviour of firms.

The existence of the firm has been addressed in a variety of ways in the internal organisation literature. Frequently concepts such as the firm as an authority, have been used in misleading, and differing ways. However, these varieties of meanings, each with their own nuances, can be divided into two separate research paradigms capable of shedding light on what firms are ostensibly about. The first is the efficiency explanation and the second a Marxist conceptualisation. Whilst this simple dichotomy might appear at first sight somewhat crude, or over simplistic, the following exposition shows that such a divorce is, in fact, quite legitimate. Whilst there are many variants within each paradigm, which we do not dispute, they each have their common strands which in effect, means that we can identify them as either efficiency or radical.⁴

The efficiency explanations, also known as transactions costs and internalisation approaches, share a common factor that the firm should be able to efficiently produce, and sell, more of a given output, or combination of outputs, than the sum of the constituent parts. In the parlance of the recent new Industrial Organisation framework [see Jaquemin(1987)], the firm must satisfy a sub-additivity criteria⁵ It is this guiding principle that resource allocation can be achieved more effectively within the ambit of the firm than outside it that is the common theme in efficiency explanations of the firm. Moreover, if the boundaries of the firm are defined by this decision rule or procedure, it is clear that the limits of firm behaviour are dictated by optimisation rules within the firm. Hence, a consequence of this approach is that the tools of marginalist analysis are suitable in explaining the firm. Marxist, or radical, explanations of the firm, which at an elementary level share with the efficiency explanation a plethora of variants within the actual research paradigm, have a common factor based on the exploitation of one group or class by another. The source of this domination is located in the wider structure, and super structure, of political economy : in particular the social relations of exchange that

⁴ However, it is not claimed that splitting our view of the firm into two camps is definitive in any way, only that it provides an interesting way of viewing the problems of explaining hierarchy and so forth. There might even be some elements of both positions in some theories of the firm, but this does not preclude us from stressing which aspect is more important.

⁵ If we characterise two operations undertaken by the firm as (O_1, O_2) a necessary requirement, but not sufficient, for internalisation is the sub-additivity rule : $C=C(O_1, O_2) < C(O_1) + C(O_2)$. where $C(\cdot)$ is a general convex cost function. For sufficiency, the costs of negotiating a contract for separate enterprises to perform the separate operations must be suitably large. Teece(1980) describes those conditions under which this criteria will lead to sufficiency.

individuals are forced to operate within.⁶

The behaviour of the firm, as distinct from explaining existence, and the actions of its constituent actors, can be thought of in terms of how, once the existence of the firm is established, the actors within the firm are constrained. Within the efficiency explanation of the firm this is usually couched in terms of the limits to managerial discretion, the meshing of the stockholders and managers interests and so forth.⁷ Within the Marxist literature the focus of the firm is much wider. One can argue that a main concern is the position of labour within the firm, and how the introduction of certain working practices, technological developments, alienate these individuals from their work. Indeed, Marxists see the role of the firm, as the controller of the production process, as central in explaining crisis within capitalism.

Both the efficiency explanation and the Marxist school rationalise the firm, in the first instance, as a static concept. Indeed economic theory perceives the firm as a static concept. That is the nature of the firm remains basically stationary. It does consider, say, the dynamics of oligopoly but this is really a phenomena of the market rather than an issue of the firm. Both accounts are essentially at fault in this respect. The behaviour and nature of a firm is a dynamic concept which is malleable through time. Indeed, it is the growth of firms, itself, that accounts for the importance of reassessing the essence of the firm at this time.

In times past liberal economists accepted the notion that the quintessential feature of the firm was its benign nature. Those times, the late nineteenth and early twentieth, century, were characterised by relatively "small" firms operating within relatively "big" nation states, so in the final assessment it didn't really matter whether economists were right or wrong about the fundamental nature of the firm. In 1909 the share of the largest one hundred firms in net output was 16%.; by 1987 approximately 1300 companies account for three quarters of assets and income in the U.K..⁸ In earlier times the nation state could exercise its legitimate authority to curtail the activities of firms judged to be acting contrary to the public, or sectional, interests. Fifty-three years since the publication of Coase's(1937) seminal paper outlining an efficient and benign nature of the firm it is at least questionable whether the same conclusion can automatically be drawn. Some countries are now relatively small and some companies relatively big. The advent, emergence and development of the

⁶ Clearly, within a dialectic methodological framework individuals cannot operate independently of others. It is not possible to define any item without implicit reference to the things around it.

⁷ The appropriate tools of analysis then becomes the generalised principal-agent framework which we discuss below. An excellent review of this theory, and recent literature, is to be found in Rees(1985).

⁸ This figure is derived from Datastream International company accounts information. A recent survey is documented in the Bank of England Quarterly Review, 28, 1988.

conglomerate, and transnational corporation, makes it imperative that we understand the exact nature and operation of the firm. The evolution of the monopoly stage of capitalism over the last fifty years have altered the power structure between firms and nation states, such that what was automatically an asymmetric advantage in favour of the nation state, which could exercise ultimate sanctions against firms if required, or so directed, might not necessarily hold true at the close of the century. What is clear is that this is a matter for analysis. We need to identify who are the gainers and who are the losers in the evolution of the firm and the socio-political structure. Moving beyond the dynamics of firm evolution, and the interrelationship of the firm with the state, it is customary to define two groups involved in the production process: capital and labour⁹. The firm then, as controller of the production process, has consequences for the distribution of the surplus. Following Kalecki(1971) the determinants of the functional distribution are bound up with an analysis of the firm within oligopolistic industries and not marginal productivity theories. The distributional relevance of studying the evolution of the firm stems from this. Any given organisational structure or nature of the firm will be associated with particular actions of representative agents. For example, large multi-divisional firms can exercise power in relation to nation states and workers. These activities in turn will have some bearing on the determination of the functional distribution. The importance of the distribution of income and its relation to the theory of the firm then becomes central to a Kaleckian monopoly capital model.

The growing literature concerned with the internal organisation of the firm has three common strands. These elements exist independently of the school or tradition that is analysing the problem at hand. The first element posits the question: Why Firms? This seemingly curious question, given the prevalence of not only of the firm as characterised in economic theory as a unitary form but the conglomerate and transnational corporation, is concerned with explaining the existence of firms. Typically the analysis is couched within an exchange economy, and is concerned with the issue of whether the resulting organisational form is efficient. The second strand considers why hierarchy has emerged as the dominant structure, as opposed to other conceivable forms say along cooperative or socialist lines. Again the concern is whether such hierarchy is efficient or not. Finally, the literature has focused on the rental aspect of internal organisation. Why does capital hire labour and not the other way around? This question, stemming from the preoccupation of economics to treat economic actors as essentially symmetric, is epitomised by the oft quoted remark by Samuelson(1957,1971): "Remember that in a perfectly competitive market, it doesn't matter who hires whom; so have labour hire capital." However we note that the aspect of rental implies that we are required also to consider proprietorship.

⁹ Though, as we pointed out in the previous Chapter there is considerable differences in the types of labour, in particular whether it is of an overhead (administrative and technical) or direct (manual) type.

3.3. The firm as a symmetric contractual arrangement.

Having examined the rationale for reconsidering the nature of the firm, and stated the questions we seek to explore, we are now in a position to explain the received orthodoxy. The aim is to review the existing efficiency explanation of the firm and argue that they all have in common an understanding of the firm as a set of symmetric relationships between capital and labour. To aid our discussion we subdivide our argument into Walrasian and Contractual explanations of the firm¹⁰.

3.3.1 Walrasian Explanations.

The Walrasian understanding of the firm is most closely associated with the theory of the firm presented in neoclassical economics. The nature of the pure exchange economy is that agents have given endowments, and exchange commodities to achieve preferred consumption patterns. Augmenting the model by allowing for production, which has an assumed given technological foundation, allows inputs to be turned into other goods and services, namely outputs. In a pure exchange economy any individual agent can turn a given exogenous endowment into a preferred bundle, but this is not valid for the group (economy) as a whole. The sum of consumption bundles cannot exceed the sum of initial endowments. The quintessential purpose of production permits transformation of endowed bundles of goods into other types of goods for the economy as a whole. Within this Walrasian schema, theories of the firm stem from the need to incorporate production into a well developed theory of resource allocation. The consequent theories of the firm that were developed are not theories of the firm at all, but ostensibly theories of markets in which firms were important actors. Imperfect competition, oligopoly and monopoly are theories of markets, specifying price and output configurations, and having nothing to do with the nature of the firm that was operating within the assumed profit maximand. In this sense the Walrasian analysis posits the firm as a "black box", as coined by Jensen and Meckling(1976), operating so as to meet the relevant marginal conditions of efficient resource location with respect to inputs and outputs so as to maximise net worth. Alternatively, Malchup(1967) has termed this type of firm a "mono-brain". Under fairly stringent market configurations, namely perfect competition, the profit maximising firm is Pareto efficient.

There are many aspects of the Walrasian general equilibrium model and the veil that it throws over the true nature of the firm that could be discussed but a few are worth highlighting. First it is possible to demonstrate that within the distribution of welfare each pareto optimum allocation of

¹⁰ Bowles(1985) makes a three way distinction between different theories of the firm categorising the models as Walrasian, neo-Hobbesian and Marxist. The classification scheme adopted here seeks to make the contrast between orthodox efficiency and non-orthodox radical views of the firm more apparent. Stating this contrast allows us to put into sharp relief the central themes that between the orthodox and radical paradigm. For alternative conceptions of the firm see Putterman(1988) or Drago(1987).

resources can be associated with a competitive market and initial wealth position. That is the optimality of the resource allocation is not independent of some initial starting functional distribution. Moreover, this Walrasian veil is silent on the organisational structure that the firm is supposed to adopt. One aspect of this silence is the actual concept of the firm employed. The firm is merely a device by which factor inputs are (silently) organised in the transformation of factor inputs into output vectors. The firm is only a decision making unit and not viewed as a coalition of interests for example between managers, customers, workers and stockholders. The distinction between the firm as viewed as a mere decision making unit as opposed to a collection or assembly of differential interests will be of importance when discussing the issue of proprietorship in the subsequent discussion.

As production is introduced into the model it is done so in a symmetric manner among equal traders with equal importance within a price taking environment. In consequence there is an assumed fundamental symmetry of those involved in the production process. Indeed we can talk of inputs being combined rather than organised, because there is no hint of any organisational structure that may underpin this model. Any notion of power or control is eschewed in this framework.

The silent nature of the internal organisational structure of the Walrasian structure also extends to the issue of proprietorship. Given that we are considering a symmetric combination of inputs to produce some output, or output vector, it is not clear that property rights are well defined for all factors in this model. Clearly labour owns its ability to work and can hence supply services within this symmetric structure for some Walrasian determined supply price. The ownership of raw materials, intermediate goods, and capital is less clear and this might have implications for the organisation of production relations (namely whether such relations are hierarchical or democratic)¹¹. Within the Walrasian firm it is not immediately obvious who owns, for example, the capital assets used in production. Capital may be owned by a capitalist owner manager involved currently in the organisation of production or alternatively rented to an association of labour from an external source. So we can either posit a rentier class supplying equipment at some (symmetrically) agreed income stream or alternatively that the factor inputs are owned by an agent who employs it in production.

If we posit that material factor inputs are owned by a capitalist class then, as will become apparent in the following section, it is a requisite of the model that the firm is a good itself capable of a realisable value within some market. Because capital, or other objectifiable factor inputs, cannot hire themselves, as it were, to other parties they must be owned by some external agent. Within capitalism ownership of these factors confers the right of disposal. However, it has been argued by some authors [see, for example, Putterman(1988)] that these factor inputs, including labour services,

¹¹ Clearly, a machine does not own itself. It is in the production process because some agent has rented it or has proprietorship of it.

are potentially more valuable when they are combined together as a unit called a firm. This is not to deny that these factors are not useful separately and in their own right. However, as a whole the firm has characteristics that can be potentially viewed as more than the sum of its constituent parts. The firm itself then becomes the unit of sale within this schema. In the act of sale, the transference of proprietorship, what is actually being sold is the firm as a decision making entity in the production process. At a basic level one can argue that the Walrasian conception of the firm [as a decision making entity turning factor inputs into outputs] is consistent with the classical unitary form firm. This may be the case because the Walrasian firm, like the unitary form firm, is depicted as a decision making unit which has a non-complex organisational structure. At a minimum it is a decision making entity which, under capitalism, has the right of proprietorship transferral. Because of the nature of this proprietorship other aspects of the firm are neglected, for example any rights that labour as an association might have. Hence any discussion of the firm should also provide some systematic treatment of how proprietorship impacts on the nature firm and the agents within it.

In some ways we might be reading too much into the Walrasian analysis. Indeed, all we are really presented with is the idea of factor inputs somehow being transformed into outputs. However, this section has tried to highlight that whilst explicitly silent on a number of key issues they are implicitly nested within the Walrasian framework. These ideas, fundamental symmetry, efficiency, and proprietorship rights, are the cornerstone of more systematic analyses of the contractual approach to which we now turn.

3.3.2. Contractual explanations.

The explanation of the nature of the firm characterised as contractual includes the work of Coase(1937), Alchian and Demsetz(1972) and Williamson(1985). Alternatively these approaches have been expressed as efficiency, internalisation or transactions costs approach. Bowles(1985) has attempted to draw a parallel between accounts of the firm within a model of resource allocation and the exercise of legitimate government within the ambit of the nation state. Differing from the explanation forwarded by Bowles(1985), who classified these as Hobbesian, there is a close analogy between the contractual school and the system of legitimate government forwarded by Locke. The difference between the Walrasian and Contractual explanations is quite straightforward. The latter directly addresses issues of why firms exist as they do in their current structure and what are the relevant boundaries to the firm's operations. The former, however, has no pretensions of even addressing these issues.

It is important to draw the parallel between the theory of the firm and the system of government developed by Locke. In the treatise Locke(1690) argued that legitimate government is to

be found only in contract. The transition from what political theorists call the State of Nature into Civil Society involves the legitimate *de jure* transfer, renunciation and creation of a system of rights within a social contract. The notion of the social contract is that human beings abdicate individual natural rights that exist in the state of nature in favour of the security and benefits of longevity enjoyed in civil society. Importantly the compact is not historically identifiable, but is implicit in the structure of society. It is apparent that a compact exists whenever there exists political obligation. The form of consent that is required to move from a state of nature to civil society is tacit rather than explicit. This explanation for legitimate government has close analogies to the theory of the firm as espoused by those who argue that the nature of the corporation is in fact efficient. To illustrate this consider some historical features of the development of the theory of the firm.

Coase(1937) argued that the "the main reason why it is profitable to establish a firm would be that there is a cost of using the price mechanism." Costs that are conjectured to be of importance are the inability to discern correct price ratios in the market place, the problems of formulating and implementing long (and short) term contracts, and general uncertainty. The explicit parameterisation of these costs is left implicit within the bulk of the analysis.

One of the themes that springs from Coase's analysis, and is also a feature in the work of later writers on the efficiency explanation of the firm, is that because the costs of organising production through the price mechanism economic agents prefer to give up their right to decide on patterns of production and let the entrepreneur within the firm take the initiative. It predicts that agents recognise the prohibitive costs of trying to organise production atomistically among themselves, and allow a benign overseer to fulfil this function. The benefits from organising production through the entrepreneur to avoid the price mechanism is analogous to citizens giving up their rights in Locke's state of nature to enter into civil society.

The analogue can be pushed further. Surely, for those who argue the efficiency of the internalisation approach, hierarchical firms must be beneficial, or otherwise alternative forms of production relationship would be instigated. This is a powerful argument. As with Locke and his contract between the citizen and state there is an implicit beneficial contract between labour and the entrepreneur. If there was no benefit the hierarchical organisation would disappear. This limit, or boundary, to the firm was recognised by Coase(1937): "The entrepreneur has to carry out his function at less cost,, because it is always possible to revert to the open market if he fails to do this." The bottom line to which this explanation gravitates is that firms exist, *ergo sum*, they must necessarily be efficient. Without the logical argument of the counterfactual, which simply states that the non-existence of capitalist firms would be inefficient therefore their existence must be optimal, the explanation would become void. It is this issue of the counterfactual about which the efficiency

explanation pivots. In many ways it must, especially over the longer term, justify the status quo since inefficient production organisation would disappear. Such a notion sees the firm as entirely passive and its existence due to necessity. The nature of the firm becomes no more than a derived demand for the firm.

3.3.3. The symmetry thesis within contractual explanations of the firm.

There are a number of salient features within this early efficiency explanation of the firm that may be considered as deficient. Fundamentally, is the assumed symmetry between all actors in the economic system. This symmetry thesis is critical to all explanations of the firm that attempt to demonstrate the optimum outcome of organisational hierarchy.

From the Walrasian explanation, and Coasian, through to modern notions of efficient hierarchical structure is the concept that agents are never coerced. Observed market outcomes are the result of the free play of market forces between equal players. No power relationship exists. Within the Walrasian view of the firm as the transformation of inputs into outputs this is explicit. To aggregate to the economy wide level it is made axiomatic that agents are identical so that legitimate aggregation can in fact take place. In the core there can be no blocking coalitions. It follows that agents are both powerless and symmetric in the Walrasian schema.

Whilst not explicit in the Coasian explanation of the firm the symmetry thesis is implicit. This is the case since Coase argued that the entrepreneur¹² who failed to effectively internalise the costs of using the price mechanism would suffer the fate that production would revert to the market.

It is important to stress that symmetry between agents within the economic system generally, and the firm specifically, is an axiom rather than a proof capable of refutation or exploration. In many ways this is not surprising. At the root of liberal economy is the basic working assumption that all power is diffused, partial and dispersed.

From the notion of agent symmetry springs the sole emphasis on the market and non-market distinction in describing what transactions actually take place. It follows quite logically since either production is within the firm, because it is efficient, or within the market because firm organisation is inefficient. Since, fundamental power asymmetries between factors are assumed to be unimportant then one does not need to consider such factors in explaining the hierarchical structure of firms. Hence, we are forced down the road of exploring other (non-power) factors which lead to firms and therefore the importance, for the efficiency school, of the market or non-market nature of the firm.

¹² This seems an appropriate place to point out a minor issue in that the analysis of Coase provides no explanation of the importance of the entrepreneur and the legitimacy of his position within the firm. This is not trivial if the analysis of Marglin(1984) is anywhere near correct.

Coase(1937), therefore, establishes categorically the market non-market distinction based on a symmetry of factors.

A major weakness within the argument provided by Coase(1937) is the failure to identify the sources of the costs in organising production through the price system. This is partially rectified by Alchian and Demsetz(1972) who focus on the economics of information in explaining the firm that has become characteristic of the efficiency paradigm. An explanation of the firm is offered that is based on a theory of contract explicitly rather than implicitly as with Coase(1937). The authors dismiss the notion that a firm has anything to do with asymmetric power relations: "It is common to see the firm characterised by the power to settle issues by disciplinary action..... This is delusion." Alchian and Demsetz(1972) further argue that there exist a system of contracts between the firm and the employee, but that the firm is no more than this series of contracts. The key features of the firm are team production, which causes the firm to exist where this existence is no more than a nexus of contractual obligations, and the notion of information deficiencies.

Alchian and Demsetz(1972) demonstrate the efficiency of the hierarchical firm by reference to team production and information costs. Team production requires that certain problems be resolved in particular the metering issue. Metering simply implies that an agents actions can be both monitored and controlled but within the Alchian and Demsetz(1972) model it has a special meaning : the output function cannot be written as an additively separable function of factor inputs.

By definition, then, team production involves the joint use of inputs in the creation of some output. Alchian and Demsetz(1972) argue that production technology is non-separable which implies that one cannot perfectly observe and identify the contribution of each factors marginal productivity to overall productivity. This, of course, is not to imply that it is impossible to attain higher levels of productivity, only that the marginal contribution of any factor is imperfectly observed. Within such an environment the possibility of shirking is rife.

Metering, as a solution to shirking when production technology is non-separable, involves two logically separate concepts: measurement and control of the production process. For the hierarchical firm to be efficient, production must be measured and controlled accurately so that the appropriate reward structure be enacted. The feature of metering however is that it is costly, when there exists a moral hazard problem, and hence resources need to be directed to this activity. The nature of the moral hazard problem springs directly from the nature of team production. Because production technology is assumed to be additively non-separable (and also it is a given within their analysis) each member involved does not bear the full cost of shirking. Hence there is an incentive to free ride on the efforts of other team members.

What does additive separability imply about production technology? By definition an n

Meckling(1976) illustrate a similar model where the problem of agency costs are minimised in the context of managerial incentive to usurp part of the value created by the enterprise.

There are two principle features of the Alchian and Demsetz(1972) analysis that are problematic and make their analysis inadequate as an explanation of the theory of the firm. The first focuses on the perceived symmetry of those in the production process. Unlike the Coasian model of the firm where the contract between employed and employer is implicit, Alchian and Demsetz(1972) argue explicitly that a nexus of symmetric contracts govern the employment relation. It is of course valid that full or complete contracts covering every aspect of the work process cannot be defined but that is not the point of the analysis. There is assumed fundamental symmetry in the hiring and firing relationship/process that means that either party cannot be persistently or continually discriminated against. As such the model is of harmony where the reconciliation of the moral hazard problem results in workers recognising the logic of allowing capitalists to organise production so that all may be made better off. This is a feature of hierarchy wherever the moral hazard problem is supposed to originate. This notion of symmetric contracts is similar to that envisaged by Jensen and Meckling(1976). Whether or not the notion of symmetry is valid is not the point in question. What is relevant however is under what circumstances can symmetry be taken as a valid description of reality. Thus these analyses treat as axiomatic the notion that symmetry prevails rather than treating it as something to be unearthed via appropriate analysis.

A further issue which is consistent with the analysis of Alchian and Demsetz(1972), but not entirely drawn out in their paper, concerns the incentive to become an owner versus being a mere rentier. Because it is both difficult and costly to imperfectly observe the marginal contribution of each factor to total output it might, under certain situations, be preferable to own the factor input. For example consider the determinants of whether a machine is to be hired or owned. If the machine is hired to labour then additional monitoring costs can be incurred. If the machine is owned, and the owner-manager observes how labour and capital interact in the process of production, he or she can imperfectly observe the use and misuse applied to the equipment as production actually occurs. A contract limiting its misuse might then be easily enacted. If the machine was rented then the rentier has no knowledge of the depreciation of the equipment until after the rental period. The hike in rental supply price of the equipment would reflect the differential cost of monitoring during production and that of ascertaining misuse of equipment after rental. The increased cost of monitoring capital equipment outside the ambit of the firm, contingent on capitalist preferences, would explain why

capitalists become bosses.¹⁴

In addition to the problems of the assumed symmetry in production relations the notion that moral hazard in team production explains why the firm exists is also at fault. The structure of the moral hazard problem requires that one individual (a principal) is trying to elicit a well defined response or function from another individual (the agent) where the action to be performed is imperfectly observed by the principal. The action to be undertaken enters the principal's objective function (the residual claim to the enterprise) positively, and into the agents objective function negatively. For optimality of the principals preference function an appropriate reward structure is necessary so that the agent may perform the action of her own volition. In the parlance of the literature these are the individual rationality and incentive compatibility constraints¹⁵.

This is a particular feature of the modern firm but it does not explain why the firm emerges in the form that it does, namely a hierarchical one. Information costs alone cannot explain hierarchical production because alternative forms of contracts can be formulated to solve the problem shirking other than enabling the principal (monitor) to have residual claimant status. These contracts are myriad and we suggest a few. A firm may exist in many guises : profit sharing firms, labour managed firms, socialist firms, mutual and non profit firms, partnerships, conglomerates and so on. For example consider a firm organised along participatory or socialist lines where all employees share in the residual and key decisions concerning product design, capital investment etc. are undertaken by the workers. In this case there is no central monitor or individual residual claimant to the surplus. Instead, all members of the firm share equally in self-monitoring. In this situation, because all share in the surplus and control over the key decisions of the firm are real, increased democracy implies greater output and economic performance. Cowling and Sugden(1987) present evidence for this type of effect.

However, Alchian and Demsetz(1972) introduce an auxiliary assumption in order to reaffirm the efficacy of the classical capitalist enterprise. They argue that general sharing in the residual results in losses from enhanced shirking by the monitor that exceed the gains from reduced shirking by "residual-sharing employees". However, their faith in this auxiliary axiom is difficult to maintain. On a theoretical level it is possible for one, or a group of workers, within the participatory firm to monitor performance and report to the group as a whole. The incentive not to shirk is that the monitoring function is critical to the efficacy of the firm (hence potential status effects will prevent monitor shirking) and that the individual receives equal shares in the surplus. On an empirical level

¹⁴ A similar argument (see later) is employed in Eswaran and Kotwal(1989). The point here though is that we have not explained why some individuals are in a particularly wealthy position to have the choice of rental or ownership in the first place. We have, for all intents, artificially subsumed the issue of the functional distribution of income.

¹⁵ See the appendix to this Chapter where the problem is illustrated for the case of stock holder and manager.

Hodgson(1984) concludes that increased participation rather than detracting from productivity in fact adds to it.

Thus we have demonstrated in this section that the arguments upon which the efficacy of capitalist enterprise is based are open to question. Information costs alone cannot explain the existence of the firm and for a fuller explanation we will have to cast our net wider. In addition, our suggestion here is that participation will aid rather than hinder economic performance.

3.3.4. Proprietorship and the capitalist enterprise.

Having cast an element of doubt on whether moral hazard in teams is sufficient in explaining the emergence and nature of firms we turn now to a closely associated issue of proprietorship or ownership and the capitalist enterprise. Previously we argued that establishing the residual claimant status for the monitor, as in the model by Alchian and Demsetz(1972), was an insufficient reason for establishing hierarchy in capitalist enterprises because other types of contract could be established that could also solve the moral hazard problem associated with team production.

In this section we shall concentrate on some of the implications of the nature of ownership and the capitalist enterprise. In particular how the potential saleability of the firm affects the position of labour within the enterprise and also how this affects the obtainability of democracy within the firm.

The implicit conceptualisation of the firm developed in the previous sections is of the enterprise as a decision making entity where the notion of the firm and ownership were synonymous. ie the firm meant that there was an owner who had the right to make decisions over the key decisions within the firm. In the analysis by Coase(1937), where the firm was idealised as a mini command economy, the entrepreneur has a number of rights. These included the right to own and dispose of the enterprise and its capital assets, to make investment decisions both in tangible and intangible capital assets; to establish and maintain contracts with consumers and suppliers; and to hire and fire labour. In the analysis by Alchian and Demsetz(1972) this view of the firm is modified slightly to take account of the firm as a team unit, but the main features of the Coasian conceptualisation remain intact : ie the right of the owner to control the key decisions of the firm with respect to capital investment, and the hiring and firing of labour.

An alternative conception of the firm is as a coalition of different interests, an association or polity. According to this view the firm is an organisation where the internal governance of its structure must somehow be distributed amongst its constituent members. If the firm is viewed in this way, as a polity, then the important question is how power over key variables is distributed amongst workers, managers and stockholders. This dimension, or conception, of the firm is much wider than that outlined by the efficiency school discussed above since it asks questions about job security, satisfaction

and the right of workers to organise their own working environment. As such it is in line with theories of codetermination and participatory production advocated, *inter alia*, by Aoki(1984), McCain(1980) and Cable(1988). The issues at stake here are not control over the production process *per se* but what contribution to the production process is made by constituent members acting as equal partners.

The argument advanced here is that a potential conflict between these two conceptions of the firm arises when the enterprise is saleable. That is the rights of workers within the firm to be able to participate in the key decisions of the firm are affected by the very fact that the enterprise is itself saleable. But much more than this it is an essential and immutable fact that at the monopoly stage of capitalism the capitalist enterprise is saleable if it is to operate efficiently and generate a high profit income for capitalists. Thus, proprietorship under capitalism has implications for the issue of participatory production.

The fact that saleability is essential to the efficient operation of the capitalist enterprise can be demonstrated by appealing to a variant of an argument by Selten(1978). The argument centres around the fact that, in the absence of saleability, the owner of the capitalist enterprise will have only a finite and limited association with the firm. In consequence, the capitalist owner of the firm will not have an incentive to make investment decisions that are efficient. The reason for this is that when the contractual rights of control over tangible and intangible capital assets are both saleable and ownable the incentive to maintain capital equipment are unaffected by the fact that the current capitalist owner may have finite association with the firm. This follows because the positive value of any additional investment in the enterprise will be fully reflected in the equity sale price of the firm. In consequence, the real wealth effects that ensue are borne by the current owner even those these effects may occur after the current incumbent capitalist has sold the firm. If the capitalist enterprise was barred from being sold, or the capitalists decisions are limited to his or her finite association with the firm, the incentive to undertake investment become sub-optimal. As the final period of association between the capitalist and the enterprise approaches he (or she) become insufficiently well motivated to undertake, or maintain, investment in capital equipment resources.

This points to the fact that a well developed second-hand market in firms (equity) is a necessity for efficiency within the capitalist enterprise. However, this is inconsistent with a view of the firm as a polity and for the issue of workers democracy. Consider two separate enterprises that are alike in all respect except that in one the decisions about key investment decisions are devolved to workers. The likely value of this worker controlled firm in the equity market will be below the value of the firm with no worker control for one reason : full worker control over key decisions in the firm wrests from capitalists the ability to dictate the future direction of the firm and the profit stream that it will generate. Hence, we have unearthed the possibility of potential resistance to worker control, and

the potential necessity of the subordination of wage labour within the enterprise by capital. Indeed, this argument can be seen as a generalisation of the position adopted by Cowling and Sugden(1987). They argued that the existence of participation within the workplace is of crucial significance for democracy in its broadest sense, but it is precisely at this point that the contradiction between democracy and the capitalist enterprise emerges. Equal participation of all in the enterprise would undermine the essence of the capitalist enterprise. This is the point we have attempted to illustrate here : the saleability of the firm (a necessity for the capitalist enterprise to generate a profit stream) is in conflict with worker participation.

The arguments of this section can be summarised follows : Sections 3.3.1 to 3.3.4 highlighted the transactions costs approach in explaining the essence of the firm. We illustrated that proponents of hierarchical production assumed a fundamental symmetry between capital and labour. The most convincing argument forwarded for hierarchy was that information costs necessitated a residual claimant to monitor shirking. To ensure the monitor does not shirk he or she requires the residual surplus. We found this explanation unconvincing because alternative contractual arrangements can also solve the moral hazard problem which do not necessarily result in hierarchy. Finally, we highlighted the importance of Proprietorship and the capitalist enterprise. We showed that when the capitalist firm is saleable a conflict arises between the rights of the owner and the rights of labour within the firm.

3.4. The firm as an asymmetric relationship between capital and labour.

We turn now to alternative explanations of the firm based upon the asymmetric relationship that exists between capital and labour. What distinguishes these explanations from previous views is the underlying essence of the firm. We illustrate that the capitalist firm defined in terms of a market non-market relationship is misplaced and we present an alternative explanation of the capitalist firm based on the subordination of wage labour. This in turn has consequences for the issue of democracy within the work place, and for the impact of the centralisation of economic power for democracy.

3.4.1. Marxist and radical explanations.

This section deals with explanations of the nature of the firm that have been characterised as Marxist, neo-Marxist or Radical. The most noted exponent of this mode of thought, as a direct attack on the efficiency claims of the transactions approach, is Marglin(1974). However, many other authors have dealt, directly or indirectly, with this issue.¹⁶ The analysis developed by Marglin(1974) reveals his methodological position to be informed not only by economic theory but also by the historical and social evolution of capitalist development. Marglin's position is to unearth the origins of capitalist

¹⁶ For a review of the radical explanations see the relevant chapters in Putterman(1986)) and Drago(1987).

hierarchy rather than to explain the theory of capitalist hierarchy. Whilst these cannot be obviously divorced in an easy manner it is clear that what Marglin(1974) seeks to explain is whether efficiency precedes social control or the other way about. Indeed at the outset of his essay he poses the question: does technology shape social and economic organisation or does social and economic organisation shape technology? The main thrust of his argument is that historically at least the adoption of hierarchy is not predicated on notions of efficiency but for reasons of social control. Further, it is stated that neither of the two developments in depriving workers of the control over their own product was undertaken for reasons of efficiency. These two developments were the introduction of the minute division of labour and the development of the centralised organisation. As Marglin states : "Rather than providing more output for the same inputs, these innovations in work organisation were introduced so that the capitalist got himself a larger share of the "social pie" at the expense of the worker, and it is only the subsequent growth in the size of the pie that has obscured the class interest which was at the root of these innovations." Immediately, we can note three points. First, unlike the efficiency explanations, he provides an explicit treatment of asymmetries in terms of sectional class interest. Second, the primary function of the adoption of specific hierarchical forms is social rather than technical. This is not to deny the importance of efficiency considerations, in fact quite the opposite. It suggests that when asking about whether one particular organisational structure is efficient or not, the auxiliary question : for whom or which group is it efficient should also be posed. For example, the adoption of hierarchical production can indeed be efficient for capitalist producers but this is not necessarily true for workers. Third the issue of the functional distribution of income, the division of the pie, is tied up with an analysis of the behaviour of asymmetric agents within the firm.

The propositions developed by Marglin(1974) can be divided into three distinct areas. First, the capitalist division of labour was, instead of reasons of superior technological efficiency, introduced so as to generate an unassailable position and role for the entrepreneur. In order to guarantee this role it was necessary to introduce the pyramidal hierarchical structure so that workers could be divorced from their particular product market. Second, the origin and success of the factory lay not in technological superiority, but in the substitution of the capitalist for the workers control of the nature of the production process, and the output decision. The choice that Marglin(1974) envisages is: "The change in the workman's choice from how much to work and produce, based on his relative preferences for leisure and goods, to one of whether or not to work at all, which of course is hardly much of a choice." The third, and importantly, the social function of hierarchical control of the production process is to enable accumulation for the capitalist. He argues that on average the individual does not make deliberate attempts at saving since the pressures to spend are too great. In consequence the appearance of saving is a lag to adjustments in income. It is of essence that the

corporation, as the medium of accumulation, assigns a proportion of the proceeds from the sale of the firms output to the process of accumulation and the enlargement of the means of production. Clearly, in the absence of hierarchy society would be forced into alternative forms of accumulation perhaps based on democratic or egalitarian methods. Marglin then establishes the credibility of these central hypotheses in the remainder of his essay by drawing on concepts such as divide and rule. (ie. a strategy adopted by capital to separate workers from their product and hence earn a reward that otherwise would not exist.)

Marglin's analysis provides an interesting juxtaposition to the efficiency views outlined previously. Asymmetry is established between two groups, capitalist and worker, and defended by the notion that capitalists are in a position to initiate and maintain a strategy of divide and rule. Second, hierarchy is explained not by reference to deficiencies in information sets as in the neoclassical explanation of the firm, but by an historical process in which capitalists, because they have power, can dominate other groups. Also the incentive to own capital equipment is not the same as under the contractual explanation. We argued that the reason for capital ownership, rather than rental, was due to differential costs in monitoring the use of the equipment. In the radical explanation of the firm it is because of the capitalists desire to accumulate which is made possible through the exercise of a divide and rule strategy.

3.4.2. Power and the asymmetry between capital and labour.

Section 3.3 emphasised the role of fundamental symmetry in the production process assumed in neo-classical economics. Attention now turns to an analysis of the firm based on an asymmetry within the production process. The asymmetry we consider is not the trivial conception found neo-classical economics.¹⁷ The asymmetries we are considering are the fundamental asymmetries between labour and the owners of the means of production. Unlike the asymmetry in neo-classical economics this is not resolvable, and attempts at its resolution are ultimately futile, unless based on a reworked concept of the labour process.

We focus here on the interrelationship between ownership and those other agents within the firm. We articulate the view that efficiency requires that the firm be a good to be bought and sold. But this is a narrow definition of the firm and ignores the wider polity or corpus of the firm. This has implications for others involved within the amalgam of the firm in particular labour.

Orthodox neo-classical economics begins its analysis in the arena of exchange. For example, witness the burdensome use of Edgeworth boxes, contract curves, the core and other paraphernalia

¹⁷ For example, neo-classical economics has a literature on asymmetric information, as well as the differing types of asymmetry that occur in oligopoly problems.

where agents interact in an assumed symmetric way. Some authors (Eg. Layard and Walters(1987)) go further and equate neo-classical theory with capitalism.¹⁸ However, this is maltreatment of the issues involved in theories of capitalism. For example, neoclassical economics gives no insight into historical processes (ie. it as an ahistoric or ergodic discipline). Furthermore, it is essentially timeless, in the sense of Shackle(1967,1972). It is a system of "levers and pulleys" designed to apply at any epoch in history, or for any country, or any group of individuals. Most important is the assumption that exchange is voluntary. Any notion of fundamental economic power is eschewed in the neoclassical methodology.

In contrast, our point of departure for analysing the monopoly stage capitalism is to focus on the production process. Sawyer(1988) states that the monopoly capital literature has generally recognised that the organisation of the production process..... is an important aspect of monopoly capitalism, but then considers it no further." Indeed, this failure to provide a systematic investigation into the labour process has been one source of criticism of monopoly theories of capitalism¹⁹. (Eg. Fine and Murfin (1984)) and Auerbach and Skott(1988)²⁰.

Previously, we illustrated that the hierarchical organisation of the production process arose from information costs associated with using the market mechanism (the Coasian view) and also due to problems of malfeasance (the Alchian and Demsetz view). However, we have cast doubt on these as the sole explanation for the hierarchical capitalist enterprise.. In contrast, our focus in defining the essence of the firm explores an alternative framework that moves away from the obsession of the market non-market distinction, as well as deficient information sets, to exploring the very nature of the production and exchange relationship. Our investigation owes much to the insights of Marglin(1974,1984) and his analysis of the British putting out system and the role of the capitalist as a usurper of workers rights to organise their own working lives. As we have commented, his analysis focuses upon what is happening at the point of production, and the nature of control within the workplace, rather than the superficiality of the market non-market exchange process. Marglin's analysis points to the fact that what is important in unearthing the essence of the firm is to explore what is actually happening within the firm as they arise. In contrast to the Coasian, or Alchian and

¹⁸ For example, Layard and Walters(1987) pp.19-27 provide an evaluation of capitalism, market failure and alternatives economic systems.

¹⁹ Despite the suggestive title of the text by Braverman(1974), *Labor and Monopoly Capital*, it is not clear from the corpus of the text why the analysis therein rests upon the centralisation and concentration of capitalist society. Indeed, much of the analysis is consistent with a competitive stage of capitalist development.

²⁰ These criticisms though are at variance with the arguments by Sweezy(1981). Indeed, he argues that labour theories of value and exploitation of labour in the sphere of production are entirely consistent with monopoly capital theory. The fact that it is an undeveloped area of monopoly capital enquiry can be explained by the fact that monopoly theorists have traditionally considered the implications of oligopoly pricing for the evolution of the macroeconomy.

Demsetz(1972), views the appropriate question is not market or non-market exchange but why this particular type of exchange rather than another. But, in addition, it is important to analyse why production is organised hierarchically. Our analysis requires a fundamental reevaluation of the behaviour of firms. To facilitate this we must start by considering the activity of firms within an oligopolistic environment, as opposed to the competitive market environment that is implicit in the internalisation approach of Coase et. al.

3.5. The essence of the capitalist enterprise.

In section 3.3.2 we offered two different views of how we might understand the nature of the firm. To recapitulate, one view emphasised the firm as an autonomous *decision making unit*, where the right of disposal of the enterprise, to make contracts with suppliers and customers, to invest in capital and to hire and fire labour, was conferred to the owner-manager of the firm. An alternative, wider dimension, viewed the firm as an association, or polity, of different interests including those of workers, managers and stockholders. Here the appropriate question focuses upon how key decisions are distributed among workers, managers and so on. The key point is that the firm, in an oligopolistic world, is viewed as a decision making unit of some kind. This is of crucial importance because it focuses directly upon the production process as it happens rather than whether production is organised within the ambit of the firm or not. Both views of the firm, as an autonomous decision making unit or a wider association of interests, have decision making as a key activity; but they differ in the behaviour of the internal organisation of the firm. In the case of the firm as association or polity there is considerable attention paid to issues of participatory production, job satisfaction and security, and worker control over the intensity and pattern of working routines. In the case of the autonomous decision making firm the wider dimensions of participatory production are discarded in favour of a "right to manage" strategy by the capitalist owner or his agent. In general, these two views can be seen as part of a wider research paradigm considering the question of what exactly is it that firms actually do.²¹ What is important here is to ascertain the behavioral implications necessary for capitalist control of the enterprise.

For the capitalist enterprise operating within an oligopolistic world ultimate control of the firm is akin to our first view of the firm as an autonomous decision making unit. Participatory production, if it has real meaning, wrests from the owner manager the right to determine the direction of the enterprise. To avoid this situation explains in part the hostility of capital towards devolved decision making. Indeed Zeitlin's(1974) view of the firm implies the ability to determine broad corporate

²¹ For example see the seminal behavioral theories of Simon(1959), Cyert and March(1963) and more recently Williamson(1985).

variable production function is additively separable if the derivative of the marginal function with respect to some other variable in the primitive function is zero. For example if the derivative of the marginal product of labour with respect to capital is non-zero this implies additive non-separability. Young's theorem imposes a symmetry on the calculus of the problem so the differential of the marginal product of capital with respect to labour would also have the same non-zero solution. This seems a necessarily restrictive assumption in Alchian and Demsetz's(1972) analysis since a monotonic transformation of the economists most favourite production function, the Cobb Douglas, does satisfy additive separability. That is if one takes natural logarithms of the function then Cobb-Douglas technology is additively separable. Whatever function Alchian and Demsetz(1972) have in mind it cannot, therefore, be a Cobb-Douglas (transformed) function. The point to be made from this is that the usual neo-classical technology assumption is being eschewed in the model in order that the concept of team production can be incorporated. This is a point not drawn out in the author's paper.

Within the shirking, free rider or malfeasance models the hierarchical firm emerges because of the necessity of solving the moral hazard problem¹³. What is the main source of the moral hazard issue for Alchian and Demsetz(1972)? Consider the following illustrative comment from Alchian and Demsetz: "Clues to each inputs productivity can be secured by observing the behaviour of individual inputs. When lifting cargo into the truck...how many cigarette breaks does he take, does the item being lifted tilt down his side." It seems clear that the authors view the moral hazard problem that occurs between manual labour and manager a potentially more serious question than that of ensuring that managers operate efficiently from the point of view of stockholders. The juxtaposition to this is given in Jensen and Meckling(1976) where the optimum level of managerial discretion is focused upon.

To resolve the possibility of free riding a monitor is required but this itself creates problems: "One method for reducing shirking is for someone to specialise as a monitor to check the input of team members. But, in the parlance of Alchian and Demsetz, "who will monitor the monitor?" For the classical capitalist (unitary) firm this problem is resolved by the monitor adopting residual claimant status. Since his or her reward directly depends on how well the monitoring task is performed the incentive for the monitor to free ride is removed.

To recapitulate the essence of the firm within the Alchian and Demsetz(1972) schema stems from the moral hazard problem associated with team production. Within their text the main source of moral hazard occurs between labour and manager. This facilitates the necessity of monitor who has residual claimant status so that the incentive for this individual to shirk is removed. Jensen and

¹³ The formal structure of the principal-agent problem, as an issue of imperfectly observable action, is provided in the appendix to this Chapter. The issues dealt with there do not add substantive insights to the argument other than those raised already and so are not included in the corpus of the text. However, to the extent that the issue of shirking, and malfeasance, are important we consider it important to formally outline the structure of the model in the appendix.

objectives in spite of resistance from others. Cowling and Sugden(1987) have reinterpreted this to mean the ability to "make decisions over such strategic issues as a firms relationship with its rivals, nation states and workers, its rate and direction of capital accumulation, and its sources of raw materials, and its geographical orientation." Importantly, these decisions allow the firm to act strategically and to determine the direction that the firm takes. The power to determine the fundamental behaviour of the firm, its main objectives and how these are to be pursued.

A criticism of Zietlin's position is the failure to identify the *source* of economic power that enables a firm to derive, in the first instance, the ability to determine corporate objectives. That is there is no well developed theory of power upon which the analysis is based. Most economists would subscribe to the Dahl(1957) behaviourist view of power that A has power over B to the extent that the former can get the latter to do something that he or she had otherwise not intended to undertake.²² This is not the end of matters.

The ability of the capitalist enterprise to determine its objectives are clearly bound up with the degree of commitment made by the capitalist firm and the extent of information that it possess in relation to its rivals. As is now routinely standard in game theoretic models of market power, the ability to precommit (backed up by the notion of credibility) is a critical component of the power of the firm. For example, the strategic over investment in spare capacity to deter entry, or to attack, potential rivals represents a particular form of power that incumbent oligopolists possess. One of the particular ways that commitment is made credible in strategic environments is through reputation effects²³. In recent models of dynamic games with incomplete information a reputation for toughness becomes important and the need to maintain the reputation in the future ensures precommitment.²⁴ In an oligopolistic world, then, an important source of power is the vector of strategic devices that the capitalist enterprise can commit in order to maintain both power and control in the future.

In the recent Marxist literature two distinct forms of power relationship have surfaced. Roemer(1982) argues that the primary locus of capitalist power is in the unequal distribution of property. Bowles(1985), on the other hand, argues that capitalist power is located in the structure of control and surveillance mechanisms at the point of production. The notion of power and control that we have articulated here has more in common with Bowles : capitalist authority and power concerning the internal organisation of the firm, particularly the labour process, is a primary source by which

²² We are not in a position to develop here an adequate treatment of the uses of power in economics. A fuller analysis is given in Dahl(1957) and in the context of political and sociological power in Lukes(1977). For an excellent recent, but brief, survey of the use of power in economics see Bardhan(1988).

²³ Remember Hobbes's comment in Leviathan that reputation of power is power.

²⁴ See for example, Kreps and Wilson(1985), Levine(1989), Cripps(1990).

power is exercised. From this the power that capitalists have stems from the internal organisation of the firm and from the fact that firms in oligopolistic industries can exercise market power.

The authority and power of capital extends beyond the simple ability to dictate the future direction, and strategic decisions, of the enterprise. Indeed the power of the capitalist is to determine the very *structure* of the organisation. We can expect that the choice of organisational form will be introduced to benefit a capitalist mode of production by adopting a particular type of labour process. Marglin(1974,1984) demonstrates that the factory system was a necessary organisational form in order for the capitalist to divorce the worker from his or her product. The result was that the capitalist owner can reap the lions share of the surplus generated. He further argues that because knowledge is a quasi public good, and that an information advantage is the only meaningful advantage that the capitalist-entrepreneur possess, then this reinforces the capitalists need for organisational hierarchy. Without hierarchy knowledge is quickly diffused and the role of the entrepreneur is diminished. Hierarchy enables a longer lived part of the surplus to be extracted.

The analysis by Marglin(1974) illustrates that, as well as being detrimental to labour, the hierarchical choice of production is also inefficient. Manning(1986) has used this in a principal-multiagent framework to show that an employer will choose an inefficient organisational structure in the first stage of a two stage game so as to get greater payoffs in the second period.²⁵ In essence these models show that the capitalist can do better if organisational form is chosen strategically rather than if they were treated merely as a given. The multi-divisional form (M-Form) organisation, and restructuring, advocated by Williamson(1970) can be interpreted, in part, as an example of a strategic choice of organisational form. Williamson(1970) argued that the adoption of M-Form, operated along least cost lines, would have the same efficiency properties as the classical unitary form firm. The appropriate installation of control and feedback procedures (Eg. systematic accounting procedures responsible to a general office) would dispense with the inefficiency associated with cumulating hierarchical levels.²⁶ In turn the recognition that this implies higher profits can be made than otherwise would be the case suggests that M-Form can also be used as a strategic device.

The ability of the firm to act strategically, one dimension of which is the choice of organisational form another is to determine the direction of the enterprise. Indeed this is what Cowling and Sugden(1987) convincingly argue in their reinterpretation of the theory of the firm. Moving the debate away from the distinction between market and non-market activity, Cowling and Sugden(1987)

²⁵ The model is further explored in Dixon and Manning(1989)

²⁶ Williamson(1970) also argues that the M-Form firm will have the property of an internal capital market, resolving any problem of moral hazard or adverse selection faced by companies in the outside equity and debt markets. However, we only want to establish here that the Williamson M-Form can be interpreted as a strategic device.

define the firm as "...The means of co-ordinating production from one centre of strategic decision making." There are two points within this definition that need remarking upon. First, the concept of co-ordination, for it to have real meaning, must involve both direction and time, otherwise the concept of the firm becomes a *static* idea. Second, given that we are considering capitalist enterprises then the notion of hierarchy, and the subordination of labour within the sphere of production, should also be included. The concept of a coordinating centre does not capture this idea fully. This suggests an appropriate definition of the capitalist should include the firm as a locus of hierarchical strategic decision making for the benefit of a dominant class interest.

The importance of this conception of the firm can be seen by comparing it with the internalisation or efficiency approach. By way of illustration consider the production of a commodity that requires two processes to fashion some finished good. If both processes occur within the ambit of a legally defined firm then the firm is a Coasian firm because of the market non-market distinction. But it is also a firm as defined here if production is organised strategically for the benefit of a capitalist class. If one of the processes is now subcontracted to out-workers then this part of the enterprise can no longer be categorised as a Coasian firm - a contract is established between the subcontractor and the Coasian firm by way of the market. In our schema the sub-contracted worker still fall within the ambit of strategic hierarchical control of the firm. By reference to a study by Mitter(1986), Cowling and Sugden(1987) illustrate their theoretical concept that the number of production workers employed by Benetton throughout Northern Italy is underestimated by a factor of four due to Benetton's substantial sub-contracting arrangements. The clear implication is that the extent of the capitalist enterprises locus of control is not a trivial matter.

The fact that exchange involving sub-contracting falls outside the ambit of the Coasian firm but inside that based on strategic hierarchical control poses a number of problems. At one level the degree to which out workers are dependent upon the locus of control of the firm will determine the actual scope and influence of the capitalist enterprise. As an empirical matter this raises difficulties in assessing the actual border of the firm and how we wish to operationalise the term control. Whilst the borders of the firm and the degree of sub-contract dependence will not show up fully in company accounts, this only points to the need for cautionary interpretation of data. From a theoretical perspective the aim in defining the capitalist enterprise is to identify clearly the salient features of the firm. At a practical level the definition of control is also problematic. Berle and Means(1932) argue that a shareholding of 20% facilitates effective control of the enterprise, but Cubbin and Leech(1983) suggests that when a critical percentage exists then this can be as low as one percent.

Indeed we can examine some of the pronouncements by executives of major corporations and see how they interpret the scope of the enterprise and the concept of control. Consider the following

extract drawn from the 1976 Annual Report of the Anglo American Corporation of South Africa: "The term 'group' has a wider meaning in the South African mining industry than its statutory definition...the parent (mining) house not only administers companies that are not necessarily subsidiaries, but provides them with a full range of technical and administrative services, and is able to assisting them in finding capital for expansion and development."(1976)

The importance of this statement is that it points to a wider strategic and developmental role of the modern corporation than envisaged by the internalisation approach. The centre of strategic decision making determines the future direction of the company by controlling the financial, technical and administrative aspects of subsidiaries connected to Anglo American. On the concept of control, the chief executive of Anglo American (Harry Oppenheimer) is quite clear : "When I say control I do not necessarily mean fifty one percent."

One final comment is noteworthy here. Marglin's(1974) paper pointed to the necessity of a hierarchical factory system to facilitate capitalist control. The analysis here presented the capitalist enterprise as a locus of hierarchical strategic decision making. However, the actual formulation of hierarchy need not imply a top-down structure within the legally defined enterprise. Any form of organisational structure that maintains the dominance of the strategic centre over labour is sufficient. A juxtaposition to the Marglin analysis emerges : He presented a historical account of the subordination of all forms of wage labour based upon the argument that power precedes technical imperatives. The factory system and Fordism was a particular strategy, designed for a particular epoch, that suited the purpose of maintaining control of labour by capital. The analysis here implies that firms operating in an era of monopoly capitalism can strategically choose organisational structure, for example flexible production systems including sub-contracting, to achieve the aim as before.²⁷

3.5.1 Monopoly capitalism and democracy within the enterprise.

We have described the capitalist enterprise as a locus of strategic hierarchical decision making which enables the firm to determine in large part its own environment and direction. The organisational structure and strategic decision making corpus of the enterprise raises many important issues but the fundamental one is the ability of workers and the wider community to determine their own future. Our aim here is to illustrate that the maximisation of the communities social and economic welfare requires that all individuals participate equally in decision making and that this is incompatible with the capitalist enterprise as we have conceived it.

²⁷ As with Marglin(1974) the belief here is that capitalists determine the shape of technological process by controlling the rate of product and process innovation. Ie technological process is a variable to determined by forces such as capitalist efforts to maximise profits. This contrasts to the recent views of Gorz(1989) who argues that there is an inevitable logic of competitive market led technological process that neither capitalists (or workers) can escape.

The case for participatory production, at least in some guise, can be made for a variety of economic reasons. Weitzman(1984,1985) claims that performance linked profit sharing schemes can ameliorate high unemployment rates by inducing greater wage flexibility. In addition it is claimed that profit sharing can boost productivity and evidence to this effect is found in Cable and Wilson(1988). On a more fundamental level the welfare of an individual, or for the community as a whole, cannot be maximised unless people have real control concerning decisions on how to allocate scarce resources. For society as a whole this notion can be approximated by a Scitovsky social welfare function with equity, income distribution and allocative efficiency as principle arguments. The possibility of achieving the maximum societal and economic welfare rests firmly on each individual having at least the potential to effect real outcomes from his or her choices.

Herein lies a paradox between the possibility of participatory production and the essence of neo-classical economics. As a theoretical requirement neo-classical theory requires that individuals make choices over consumption and investment bundles. This appears at first sight to be wholly consistent with what we want : individuals participating by making choices. Concluding that there is a correspondence between neo-classical theory and participatory production (or full democracy) turns out to be false. Neo-classical economics, as explained in previous sections, assumes a symmetry between capital and labour. The failure to recognise fundamental power asymmetries results in a loss of distinction between the democratic and undemocratic to the extent that it does not even figure as an issue in neo-classical economics.²⁸

To begin to understand the fundamental conflict that occurs in the capitalist enterprise, as well as the consequent aversion to participatory production in the workplace by capitalists, we need to examine the status of labour in capitalist society. An important distinction was drawn by Marx between labour and labour power. What characterises capitalism is not the market non-market distinction but the purchase and sale of the labourers ability to work. To distinguish between the workers ability to work and his or actual work, Marx referred to the former as labour power and the latter as labour. Under capitalism labour power is commodified and the worker sells labour time to the capitalist.²⁹ This duality between labour and labour time is crucial to understanding why capitalists object to workers participating fully in the key decisions of the firm. Once the distinction has been drawn we can immediately identify a key feature of labour, as an input into the production process, which is not

²⁸ The pareto criteria is one example of the liberal polity which assumes away fundamental issues of power. The voluntary exchange framework that it assumes makes it impossible for one person to become worse off following a reallocation of resources. In practice we know that this criteria is seldom met.

²⁹ As Marx(1865) states : "What the working man sells is not directly his labour, but his labouring power, the temporary disposal of which he makes over to the capitalist." But note that a similar conception is found in Hobbes's Leviathan "The value or worth of a man is his price : that is so much would be given for the use of his power."

shared by other factor inputs. Since, barring slavery, the ownership of labour cannot be divorced from its productive activity the purchase of labour time can never resolve the inherent conflict between capital and labour. The corollary of this position is that all other factor inputs share a common property : once purchased all debt is discharged from the previous owners of the scarce resource and so no persistent conflict arises. Of course we are abstracting here from the issue of whether there exists a fair exchange in the good in question to begin with. What we are suggesting here is that once the exchange has taken place then all debt has been cancelled.

This notion of fundamental conflict in the production process, based on a duality between labour and labour time, allows an interesting juxtaposition with neo-classical and radical explanations of the intra firm capital-labour relationship. For the neo-classicist the contract between a firm, or owner manager, and a worker is simply an issue of contract design within a principal agent structure. In particular the owner-manager (principal) imperfectly observes the action of a worker (agent) who, by virtue of the moral hazard, has an incentive to shirk. The resulting conflict between the manager and the owner-manager and worker can potentially be resolved by the design of an appropriate contract that entices the worker that entices the labourer to work hard, hence not shirk, of his or her own volition.³⁰ But the radicals distinction between labour and labour time is much deeper than this and not just simply an issue of malfeasance. Marxist's point to a fundamental difference between capital and labour, based upon the enduring power asymmetry in favour of capital, which is feature that the principal and agent structure cannot capture. Indeed many Marxists, see for example Fine(1984), argue that because workers must sell their labour time this accounts for their subordinate position in the capitalist firm.

The implication of this for Participatory production is that involvement in the making of key decisions of the firm by workers (for example over the rate and direction of capital accumulation) is inconsistent with the essence of the capitalist enterprise. Enabling workers to have real control over their work patterns and intensity of work load is to extricate from the capitalist the power to generate a surplus. This is not to say that various dimensions of participatory production will not be observed in a capitalist society.³¹ For example profit sharing, and employee share ownership schemes can be designed to achieve a degree of worker involvement. But this will be restricted by the extent that the productivity gains from the introduction of such schemes are not offset by a fundamental loss of control of the enterprise by the capitalist. Advocating and using such schemes does not reflect a move to a more democratic form of work organisation but simply reflects a strategy employed by the firm

³⁰ The technical appendix to this Chapter documents in more detail the structure of this model.

³¹ Indeed, such participation may be advocated by capitalists in times of crisis or as a strategic device to make the worker feel as if he or she has more involvement in the fortunes of the enterprise than is actually the case.

to aid worker discipline. The adoption of profit sharing schemes can be viewed as a positive aspect of worker motivation. Negative sanctions also exist as a worker discipline device. For example, Green and Weisskopf(1990) in a sample of 3-digit U.S. industries find an important role for unemployment for eliciting greater work intensity and productivity.

So our basic point is that extending participation within the workplace is of fundamental importance for a any concept of democracy. We have illustrated that it is at this point that a conflict emerges between capital and labour and in consequence between capitalism itself and democracy. The real, full and equal participation by all in the firm undermines the essence of the capitalist enterprise. Since the duality of labour implies an irresolvable conflict between capital and labour, and in turn the necessary subordination of wage labour by capital, the capitalist enterprise is based upon hierarchical lines. Whilst some degree of involvement by workers in decision making within the capitalist enterprise may be present this will not in general be full and equal participation necessary for the democratic organisation of production. Recalling our previous two stylised conceptions of the firm we can immediately confirm that the capitalist enterprise is inconsistent with a view of the firm as a wider association or polity in the sense that this would imply the development of real decision making to workers. Such a step would require the radical transformation of the social relations within the corpus of the modern enterprise.

3.5.2 Impediments to achieving greater economic democracy.

So far we have pointed to the fundamental inconsistency of the capitalist enterprise with the concept of democracy in the work place where workers have an important input into the key decision of the direction of the enterprise. However, the capitalist enterprise is not an homogeneous or monolithic entity as it is viewed within the neo-classical paradigm where it is seen essentially as a top down unitary structure. Various guises and formulations of the capitalist firm will have different implications for the possibility of achieving greater democratisation of the working environment. We can separate out two logically different routes by which the potential for democratisation within the enterprise is impaired. The first is the internal hierarchical structure of the firm itself. A simple capitalist enterprise can be categorised as two levels of hierarchy with an owner manager directing the working patterns, routine and effort of subordinate workers. Within this type of firm, regardless of the structure of the industry within which the firm operates, be it more or less competitive or oligopolistic, there is an important issue of how decision making and democracy is distributed amongst the key actors within the firm. As more and more cumulative hierarchies are added to the internal structure of the firm, for example as the firm adopts a multi-divisional structure, the ability to solve the problem of how to distribute decision making becomes more complex. The reason for this is that cumulating

hierarchies establish a distance relation between workers on the one hand and the centre of strategic decision making on the other. In this situation, as the number of hierarchies spiral, the ability and potential of achieving greater democracy will, of course, become more difficult.

A second issue, in addition to changes in the internal structure and organisation of the modern corporation, concerns the nature of the product market environment that the firm operates in and this will have implications for the extent and nature of economic democracy that we observe. Our main theoretical perspective is that the growth in product market concentration that in general will imply less observed economic democracy. The smaller in scale is the scope of the capitalist enterprise, independently of its actual internal structure, the higher is the potential for workers to reinstate some measure of control over their working lives. This is not, however, divorced from the internal structure of the enterprise since we would expect smaller scale capitalist enterprise not to exhibit the unwieldy multi-divisional structures that larger ones do. However, the smaller is the extent of the power of the enterprise in the product market then the more likely is the possibility that some elements of economic democracy can be achieved. The corollary to this argument is that greater seller concentration implies less democracy in the absence of any countervailing tendencies that might arise.³² Higher levels of seller concentration, usually accompanied by ever increasing hierarchical structures, tend to make the task of implementing economic democracy more difficult since the locus of strategic decision making moves further away from those individuals who are trying to exercise control over it.

However, the distance relation between workers and the centre of strategic decision making, which impedes the growth of economic democracy within the corporation, can be achieved by means other than the growth in product market concentration. Such a device is the recent growth in transnationalism. As firms make the decision to locate production in more than one country the further away are workers from the centre of strategic decision making. Our theoretical perspective must therefore be that as product markets become more and more concentrated and large national firms turn into transnational concerns then the ability of workers to exercise effective control of the pattern of their working lives diminishes accordingly.

We can derive some indication of the extent to which there are impediments to achieving greater economic democracy by considering the growth in concentration and the prevalence, or otherwise, of transnationalism in the economy. The vast majority of the production of goods and services takes place in large corporations, although these firms account for only a small number of the actual firms. We shall confine our comments to the case of the U.K.. The share of the largest one

³² This notion is predicated on the assumption that there are no countervailing power effects. For example the growth in concentration accompanied by strong trade unions can imply that workers conditions are better than they would otherwise be. But we would not expect this to be the general case.

hundred firms in manufacturing net output is some indication of the fewness and bigness of modern British economy. In 1909 the share of the top one hundred firms accounted for 16% of the total, by 1953 the figure was 27% and by 1980 it was 41%. In the United States a similar trend is observed. In 1909 the share was 22%, by 1947 it was 23% and in 1977 it was 33%. However, these figures will persistently understate the true degree of product market concentration and hence over state the extent of economic democracy in the firm. Because in the calculation of the aggregate concentration ratio many of the smaller firms included are either partial or full subsidiaries (or are satellites) of the large ones, then this will tend to underestimate the actual degree of concentration.

Not only has the capitalist enterprise been growing over the last century it has also been geographically extending and diversifying its activities. The growth in transnationalism reflects a second barrier to the introduction of economic democracy within the work place. The transnational corporation is a special case of the capitalist enterprise where the locus of hierarchical decision making occurs across national boundaries. The twin developments of the internationalisation of production, and the recent liberalisation of trade barriers have given the transnational enterprise a significant degree of leverage not previously enjoyed by the nationally based firm. The internationalisation of production engenders considerable scope in the setting of the terms of franchising, subcontracting, and the rate and direction of capital accumulation by the transnational capitalist enterprise. With this development two parallel effects will be observed. First, democratically arrived at national decisions to control the activities of these corporations will be increasing thwarted as the transnational either relocates production or issues a credible threat that it will do so.³³ The second effect falls on labourers in differing countries. The threat of relocating production in any given country acts as a worker discipline strategy stemming the growth in real wages or for ever increasing productivity levels. Because of the inherent difficulties in establishing effective international trades unions, stemming in part from the national, language and cultural differences between workers in different countries, it is unlikely that the growth in transnationalism will be offset by a parallel growth in international union power.

The actual importance of transnational companies has been recently surveyed by, among others, Dicken(1986) and Cowling and Sugden(1987). The biggest private employer, General Motors, had by 1983 nearly three quarters of a million workers. Union Carbide, the giant chemicals company, nearly one hundred thousand employees. In the U.K. the most readily available information on the extent of transnational activity is to be found in the Census of Production Summary Tables. It reports the sales and employment of foreign enterprises in British manufacturing. In table 3.1 below we report

³³ The threat to relocate is made credible by the tendency of capitalist economies to stagnate. The possibility of high levels of unemployment weakens the bargaining position of governments in setting the parameters and terms of transnational development.

the shares of total manufacturing for the period 1975-1987.³⁴ The picture that emerges is of a significant and dominant presence of foreign transnational activity in the U.K. Of course we must immediately say that this measure of transnational activity is systematically biased downwards since it omits entirely transnationality originating in the domestic economy. By 1975 transnational corporations accounted for 18.8 percent of sales in manufacturing. This has risen over the decade and by 1987 stands at 20.14 percent which represents a growth of 6.65 percent since 1975. However, not only does transnational activity account for one fifth of all sales in U.K. manufacturing, transnationals also account for approximately one eighth of total manufacturing employment. In 1988 the share of foreign enterprise employment in total employment was 13.01% a rise of 4.04% on the 1977 value. Both measures clearly indicate not only a dominant presence but also an increasing and sustained dominance of transnationalism in U.K. manufacturing since the mid 1970's.

Table 3.1 : Share of Foreign Enterprises in total employment and sales of U.K. manufacturing 1975-1988.									
	1975	1977	1979	1981	1983	1985	1987	1988	% Δ 75-86
Emp.	12.520	14.073	14.252	14.977	14.578	13.767	14.980	13.047	4.043
Sales	18.799	21.210	21.700	19.409	20.372	19.714	20.034	20.138	6.648

Source : Data derived from the Census of Production Summary Tables, various issues. A Foreign Enterprise is defined as enterprises that are controlled or owned by companies overseas. All figures are expressed as percentages. %Δ denotes a percentage change in the variable.

In terms of the arguments we have presented here the significant growing dominance of transnationalism, given their ability to determine strategically the geographical direction and scope of the enterprise, implies a declining potential for the achieving the goal of worker / economic democracy.

However, the figures for the whole of the manufacturing industry conceals the changing composition of industrial production. In table 3.2 we detail the sectoral distribution of share of sales in total manufacturing. The striking feature of the data is the dominance, and continuing increase in importance of the growth in the dominance, of transnationals in key strategic industries of British manufacturing. In important strategic industries such as chemical, office machinery and data processing and the manufacture of motor vehicles foreign transnational corporations have shares in total industry sales in excess of 30%. Indeed in the manufacture of motor vehicles the growth in foreign

³⁴ But note that the estimates post 1980 are based on a revised definition of the Standard Industrial Classification and so the figures are not strictly comparable.

Table 3.2 : Sectoral distribution of the share of foreign enterprises in the sales of total U.K. manufacturing.

	1981	1985	1988	%Δ
Metal manufacturing	16.318	17.366	11.865	-37.530
Manufacture of non-metallic mineral products	7.716	6.870	9.245	16.547
Chemical industry	33.553	33.439	30.214	-11.053
Production of man made fibres	19.387	9.259	10.972	-76.688
Manufacture of metal goods	10.626	11.964	12.461	14.723
Mechanical engineering	25.781	23.543	22.678	-13.683
Office machinery and data processing equipment	42.983	50.485	58.539	26.573
Electrical and electronic engineering	23.373	21.453	21.397	-9.232
Manufacture of motor vehicles and parts thereof	46.302	47.929	50.757	8.778
Manufacture of other transport equipment	2.197	2.182	2.275	3.437
Instrument engineering	38.169	25.815	25.756	-48.196
Food, drink and tobacco manufacturing industries	13.890	13.734	14.744	5.796
Textile industry	4.636	4.459	4.329	-7.084
Footwear and clothing industries	4.625	3.179	4.540	-1.867
Timber and wooden furniture industries	2.085	3.259	3.392	38.534
Manufacture of paper and paper products; printing and publishing	15.511	17.706	19.213	19.265
Processing of rubber and plastics.	24.861	24.615	22.243	-11.772
Other manufacturing industries.	17.962	13.109	9.769	-83.875

Source : Derived from the Census of Production Summary Tables, various issues. %Δ is the percentage change from 1981-1988.

transnational activity has resulted in an increase in sales of the total sector controlled by TNC's from 46.3% to 50.76%. These figures must be evaluated in the light of important limitations in the data. The *Census* defines the foreign enterprise as a U.K. producer with at least 51 percent of its shares owned by companies incorporated overseas. It fails to account for subcontracting arrangements which will underestimate both the shares of employment and sales controlled by transnationals. The important point being that these figures, because they do not take a wider view of the power and ambit of control of the firm will systematically bias downwards the estimates of foreign transnational activity.

3.6 Implications and conclusions.

The subject matter of this chapter was motivated by the need to reassess the nature of the firm in the light of the development of the monopoly stage of capitalism, and increasingly because of the growth in transnational activity. Orthodox economic theory treats as implicit that the true nature of the firm is benign or neutral. However, casual observation of any capitalist enterprise makes it apparent that the most obvious feature of the firm is the suspension of the co-ordination of economic activity by the price mechanism. This fact motivated Coase(1937) to justify the legitimacy of the capitalist enterprise within a transactions costs framework. Since Coase's(1937) seminal work the growth in the size of firms, geographically as well as in terms of product market considerations, means that the time is apt to reconsider the essence of the capitalist enterprise. The essay has endeavoured to provide a critique of the so called efficiency school. To that end we showed the transactions cost framework rested on a number of assumptions, that are often not made explicit in their analyses, concerning the nature of economic agents within the firm. In particular we stressed the importance of the symmetry of economic agents assumption and the consequences of relaxing it. Following in the spirit of Marglin(1974) and the arguments made by Cowling and Sugden(1987) we argued that the essence of the firm was not to be found in the artificial distinction between market and non-market activity but in concentrating on the nature of production itself. Indeed, we argued that the capitalist enterprise was the ability to strategically determine and control its environment. We extended the Cowling and Sugden definition(1987) by arguing that their definition did not adequately bring out important factors of the modern enterprise namely the preservation of dominant group interests and the subordination of labour in the control of decision making within the firm. We further argued that the growth in geographical and product market influence of the firm was an indicator of declining economic democracy. We provided some fragmentary evidence to illustrate our argument.

The implications of reconsidering the essence of the firm are wide and far reaching. Indeed, what we have been doing is establishing a *framework* by which we can understand the nature of the capitalist enterprise. We have established a theoretical perspective from which to think about the

capitalist enterprise in modern industrial society; a perspective which is radically different from the Coasian or transactions costs approach. Under the schema we have developed here the world is not characterised as Cowling and Sugden(1987) state by "voluntary exchanges yielding Pareto efficient outcomes". Indeed we have argued against this symmetry view.

Our analysis, then, has provided us with a different methodological starting point by which to examine firms within contemporary capitalism. It will colour our opinion and perspectives about how firms operate within product and labour markets. However we have not as yet examined the motives and behaviour of firms within product and labour markets and how trades unions, as representatives, of organised labour will potentially react. This is the subject matter of the next chapter.

CHAPTER FOUR

Monopoly Capitalism, Oligopoly Theory and Trade Union Power.

4.1. Introduction.

In the previous Chapter we examined the nature of the firm and the implications for economic democracy of the tendency towards concentration and centralisation of production. Fundamentally we concluded that the firm should not be understood merely as a structure of symmetric agents but we should examine where power is vested. The economy was not made up of voluntary exchanges yielding Pareto efficient outcomes but of firms who call the shots in deciding on the nature of organisational structure and where, and in what direction, strategic acts take place. Hence we established a framework within which to understand the motives, behaviour and action of firms. This perspective will naturally colour the way in which we think about firms and for this reason alone is of fundamental significance. In this Chapter we use this framework to understand the relationship between the performance of firms and industries and industrial structure.

In section 4.2 we consider briefly the relationship between monopoly capitalism and competition. This is followed by an analysis of performance and structure within the Structure Conduct and Performance tradition. We present some important caveats in using this structure as a basis for understanding monopoly capitalism. Indeed, we show that there are some fundamental problems in the analysis relating to equilibrium and causation. We illustrate some under which a primary role for concentration can be reestablished within these models. We then consider the role of trade unions on this structure and argue that there is an important role for trade unions in influencing firm and industry performance. Finally we offer some concluding comments.

4.2. Monopoly capitalism and competition.

Monopoly capital, according to Auerbach and Skott(1988), represents the dominant radical paradigm for understanding modern industrial political economy. Recently a number of authors (for example, Green and Sutcliffe(1987), Fine and Murfin(1984), and Auerbach and Skott(1988)) have criticised some of the main strands within monopoly capitalism.¹ Our objective here is to briefly set out some of the main themes in monopoly capitalism in the light of these criticisms and other recent

¹ As a good first approximation monopoly capitalism can be understood by reference to its key exponents. : Baran and Sweezy(1966), Cowling(1982,1989), Cowling and Sugden(1987), Hilferding(1981), Kalecki(1971), Lenin(1916) and Steindl(1952). The recent survey by Sawyer(1988) provides an excellent overview of the contribution of each of these theorists in both a theoretical and historical context.

research.

An understanding of the thrust of theories of monopoly capitalism can be gleaned from Sweezy(1990). He states :

"Among Marxian economists 'monopoly capitalism' is the term widely used to denote the stage of capitalism which dates from approximately the last quarter of the nineteenth century and reaches full maturity in the period after World War II" P. Sweezy, 1990,

This assertion has the advantage that it captures the historical nature and development of monopoly theory from as distinct from a period of competitive capitalism which evolves to a stage of monopoly.

This definition can be improved upon. Sawyer(1988) claims that :

"The defining characteristic of theories of monopoly capitalism is that developed capitalist economies are seen as essentially dominated by firms who operate in oligopolistic industries by which we mean that the significant firms are few in number but control most of the output." M. Sawyer, 1988,

Together these statements capture two of the central themes of monopoly capitalism. First, it is a social and historical theory which can be used for the periodisation of capitalism. Second, it describes the fact that oligopoly, where production is controlled by few producers, is rife in modern industrial capitalism.

Some traditional Marxists have argued that to accept the notion that the competitive stage of capitalism is followed by a monopoly stage is to accept that there has also been a wholesale diminution in competition. Green and Sutcliffe(1987) argue that the tendency towards centralisation and concentration of production means that monopoly theorists see competition, a state of rivalry and conflict between capitals, as on the decline.

"Within each industry, and over the whole economy, production is more and more concentrated among the top giant firms. Hence, the degree of competitiveness in each market is said to be falling as firms are increasingly able to parcel up market shares by agreeing not to cut prices." Green and Sutcliffe, 1987,

Hence these authors focus on *declining competition* as the defining characteristic of monopoly capitalism rather than the implications of oligopoly for price formation *deduced* from the desire by firms to maximise profits. Indeed Auerbach and Skott(1988) assert that declining competition is the key feature of monopoly capitalism :

"The monopoly capitalist tradition has chosen to conceptualise industrial development as the movement from an atomistically competitive environment to one which may be described using Marshallian monopoly theory." Auerbach and

Skott, 1988,

These authors then choose to interpret the existence of widespread oligopoly to necessarily imply a fundamental decline in competition. This decline is analogous to a linear sliding scale from perfect competition to monopoly as described in neo-classical theories of the firm. The notion of declining competition is substituted as the central feature of monopoly capitalism. But as we argue below the central issue is not declining competition *per se* but what are the implications of oligopoly for the pricing decisions of firms. At times there may be intense rivalry between rival capitals in terms of brand proliferation, excessive patenting, advertising, and investment in spare capacity. At other times the environment may be much more stable. Indeed, in the context of wholesale price cutting behaviour by firms, Baran and Sweezy(1966) argued that :

"Unstable market situations of this sort were very common in the earlier phases of monopoly capitalism, and still occur from time to time, but they are not typical of present day monopoly capitalism. And clearly they are an anathema to big corporations with their penchant for looking ahead To avoid such situations becomes the first concern of corporate policy, the *sine qua non* of orderly profitable business operations." Baran and Sweezy, 1966, p. 58

So to argue that monopoly capitalism simply equates with declining competition is a misrepresentation of the thrust of the theory. Whether or not rivalrous behaviour is observed or not, or indeed whether alleged competitive behaviour is more apparent than real, will depend upon the environment that firms are operating within. Cowling(1983), for example, charts the evolution of the degree of monopoly during slump conditions. His analysis focuses directly on deducing the behaviour of firms, given their desire for profits, with the onset of recession. He concludes that price cutting may occur in the early phases of the slump but as adverse conditions become prolonged, and the desire for profits, make collusion a very real possibility, and hence the degree of monopoly may well rise. In short behaviour depends, *inter alia*, on the environment firms find themselves. Instead of positing that monopoly capitalism simply means declining competition, authors in the monopoly capital tradition have tried to evaluate and deduce the consequences for pricing behaviour from oligopoly. This is a theme that is echoed in the analysis below.

The insight that monopoly capitalism gives is the recognition that capitalism reached a turning point at the end of the last century. Indeed, this very fact was recognised by both Marx and Engles in the final volumes of *Capital*. Indeed the conclusion reached by Engles as early as 1894, and is worth citing at length, provides the starting point for theories of monopoly capitalism :

"... new forms of industrial enterprise have developed, as we know, representing the second and third degree of stock companies..... The results are a general chronic overproduction, depressed prices, falling or even disappearing profits; in short the old boasted freedom of competition has reached the end of its tether and must itself announce its obvious, scandalous bankruptcy. And in every country this is taking place through the big industrialists joining in a cartel for the regulation of production. A committee fixes the quantity to be produced by each establishment and is the final authority for distributing the income orders. Occasionally international cartels were established But even this form of association in production did not suffice. The antagonism of interests between firms broke through it only too often, restoring competition. This led to the concentration of the entire production of industry in one big joint stock company Thus, competition has been replaced by monopoly." F. Engels, 1894, *Capital* vol. III, p.437.

Accepting that capitalism is characterised by monopoly tendencies requires an analysis of the behavioral implications of widespread oligopoly rather than assuming that increasing concentration automatically implies less rivalrous or competitive behaviour.² What is required is an analysis of the type of behaviour that we can expect from firms given that oligopoly is the normal situation.

4.3. Structure conduct performance, and the degree of monopoly.

Given the widespread presence of oligopoly we require an analysis of the implication of this fact for the structure of prices, and distribution of income, within industrial economy. The model by Cowling(1982) represents our starting point and is an analysis inspired directly by Kalecki(1971) and Baran and Sweezy(1966). Its advantages are three fold. First, it is a formal restatement of Kalecki's degree of monopoly theory. As such it explores the link between concentration, the price-cost margin and profit share using a structure conduct performance model. Second, it examines the distinction between overhead and direct labour and the different distributional implications of rising concentration for each. Finally, it identifies the potential stagnationist tendencies which may be induced by a process of concentration. What concerns us here is the relationship between structure, conduct and resulting performance taking into account some of the criticisms that have been levied against the analysis since its publication.

The formal relationship between concentration and Kalecki's degree of monopoly model is

² I will return to the theme of the conception of rivalry and collusion within oligopoly below. Furthermore rather than get embroiled in the analysis of the concept of competition at this stage it is worth referring to Auerbach(1988) and Sweezy's(1981) excellent essay on the relationship between competition and monopoly.

based on an extension to the original Cowling-Watson(1976) model. A simple representation of this relates to a closed economy characterised by an homogeneous product industry. Each firm has a profit function $\pi_{ij} = (P_j - AC_{ij}(q_{ij}))q_{ij} - FC_{ij}$ where π_{ij} is profits of firm i in industry j , $P_j(\cdot)$ is price in industry j which is a linear negative function of industry output $Q_j (= \sum q_{ij})$. The term AC_{ij} is average variable costs, which is a function of own output, and FC_{ij} is overhead and fixed costs. The profit maximising first order condition for this model is simply :

$$\frac{\delta \pi_{ij}}{\delta q_{ij}} = P_j + q_{ij} \frac{\delta P_{ij}}{\delta q_{ij}} - MC_{ij} = 0 \quad (4.1)$$

The profit maximising condition for firm i can be rearranged, as is well known, to express the individual firm's price cost margin or Lerner Index as :

$$\left(\frac{P_j - AC_{ij}}{P_j} \right) = \frac{(1 + \lambda_{ij}) MS_{ij}}{\eta_j} \quad (4.2)$$

where MS_{ij} is the market share of the i th firm in industry j , η_j is the absolute value of the price elasticity of market demand, and λ_{ij} is the Bowley conjectural variation term :

$$\lambda_{ij} = \sum_{k \neq i}^N \frac{\delta q_{kj}}{\delta q_{ij}} \quad (4.3)$$

By substituting the Bowley conjectural variation term into the first order profit maximisation condition it is clear that the margin has a maximum at $\lambda_{ij}=(1/MS_{ij})-1$, corresponding to the monopoly equilibrium, and a minimum at $\lambda_{ij}=-1$. The former makes the price cost margin equal to the inverse of the price elasticity of demand, the latter makes the short-run margin equal to zero. In section 4.4.2. below we discuss the implications of inserting mechanistic rules into the first order condition. Notice λ_{ij} conceptually has intra industry variation. This is merely the Cowling and Watson result.

If we define a function co-efficient $\alpha_{ij} = (dq_{kj}/dq_{ij})(q_{ij}/q_{kj})$ which is interpreted as the extent to which firm i expects its rivals to respond to marginal changes in its output, then by using equation 4.3 the individual firm price cost margin can be expressed as :

$$\left(\frac{P_j - AC_{ij}}{P_j} \right) = \frac{\alpha_{ij}}{\eta_j} + \frac{(1 - \alpha_{ij}) MS_{ij}}{\eta_j} \quad (4.4)$$

And since α_{ij} lies within $[0,1]$ because λ_{ij} is bounded by $[-1, (1/MS_{ij})-1]$ the firms profit margin corresponds to a convex combination of $1 / \eta_j$ and (MS_{ij} / η_j) with the weight given by α_{ij} .

Multiplying the firm level equation throughout by MS_{ij} , retaining our initial assumptions, and

assuming that simple aggregation does not induce problems associated with vertical integration and so summing across firms in the industry yields the industry equation :

$$\left(\frac{\pi_j + FC_j}{R_j} \right) = \frac{\alpha_j}{\eta_j} + \frac{(1 - \alpha_j) H_{ij}}{\eta_j} \quad (4.5)$$

where the left hand side is the industry average price cost margin, PCM_j , and H is the Hirschman-Herfindahl index. The collusion parameter is now of course an output weighted average of the collusion of firms within the industry [$\alpha_j = \sum \alpha_{ij}^2 q_{ij}^2 / \sum q_{ij}^2$].

Equation 4.5 can be treated as a formalisation of Kalecki's degree of monopoly theory as it indicates that the average price-cost margin is a function of the absolute value of the price elasticity of demand, the degree of industrial concentration, and the extent of industry collusion, α . The absence of collusion, where proportionate changes in the output rival firms does not induce firm i to change its output, ($\alpha_j=0$) puts a lower bound on the set of outcomes under oligopoly (ie. $PCM_j = H/\eta_j$). Importantly, the lack of collusion does not imply competitive behaviour, and the actual outcome in terms of the degree of monopoly still depends upon the degree of concentration and on the market elasticity of demand. The upper bound on the average price cost margin (which implies $\alpha_j=1$) is the joint profit maximisation solution $PCM_j=1/\eta_j$. So equation 4.5 can be treated as a convex combination of the monopoly solution ($\alpha_j=1$) and the Cournot outcome ($\alpha_j=0$) with the weight defining the actual outcome for the degree of monopoly given by α_j . The actual outcome that we observe under monopoly, is in the first instance, decided by the extent to which members of the oligopoly can co-ordinate their output policies.

Cowling(1982) argues that to a considerable extent the components of the degree of monopoly are under the control of a capitalist class. The process of concentration, coming via differential firm growth or horizontal merger, will affect the degree of monopoly directly by raising the index of concentration, H . In consequence, this increase in concentration itself is likely to reduce the costs of collusion, hence raising the likely α . The combination of this indirect and direct effect will imply a move away from the oligopoly lower bound towards a monopoly solution. In addition, Cowling(1982) argued that an enhanced sales effort and product differentiating activities will create greater dependency and inertia among consumers. This implies a lower value of the price elasticity of demand and hence a larger average PCM_j . Having examined the main themes influencing the degree of monopoly we now examine some of its features in greater detail.

4.4. Caveats in using structure conduct and performance as a basis for monopoly capital theory.

Having established the basic framework of the original Cowling(1982) statement of the degree of monopoly theory we now turn to some of the potential limitations and extensions of the approach. These fall under the general headings of equilibrium and causation, the strategic use of capacity, rivalry and collusion within oligopoly, and unions and the degree of monopoly. We shall consider these in turn.

4.4.1. Equilibrium and causation.

A particular problem with equation 4.5 is that it is tempting to conclude that product market concentration is a determinant of the degree of monopoly. In general this line of reasoning is incorrect. This is easily seen because equation 4.5 can just as well be read from left to right as right to left hence the difficulty in inferring that concentration determines margins from this equation alone. The formalisation of this idea is given in Clarke and Davies(1982). Their principle argument, which allows them to deny the existence of a causal relationship between structure and performance, rests on the idea that market shares are endogenous and so cannot determine the margin. Instead shares and margins are co-determined. They show that the price-cost margin can be expressed as a reduced form equation where the right hand side of the equation includes the number of firms, costs, conjectural elasticities and the market elasticity of demand. Since shares do not enter into the equation they are correct in the narrow sense that shares do not contemporaneously determine performance. But this does not imply that shares can never determine margins since it is quite conceivable that current conduct is a function of past market structure. So Clarke and Davies(1982) have not raised any real fundamental conceptual issues in the determination of the margin.

But the model does have a fundamental problem identified in the classic works of Stigler(1964) and Fellner(1949). The Fellner-Stigler criticism rests on the notion that any output configuration different from the equilibrium output vector leads to an output response by a rival which is different from the original firm's output conjecture. This clearly indicates that the original firm's conjecture about its rivals output reaction is wrong and should be altered. But this is not explained, or implied, by the model. This criticism, along with some extensions to it that are to follow, raise the fundamental point that the behavioral content of the model is severely flawed, and that rather than unearthing behaviour of firms within oligopoly the model is content with assuming it.

To see this contradiction we can refer back to equation 4.1 from which all subsequent analysis was derived. We can write the firm's profit maximisation condition as a reaction function which expresses firm *i*'s best output response given the strategies employed by the other *n-1* firms. These reaction function strategies can include the rivals output, cost conditions, and conjectured response

functions all of which are captured in the term dP/dq_{ij} . For a linear market demand function (implying downward sloping reaction functions) an interior solution exists but any output choice other than the equilibrium will result in a change in output by the rival illustrating that the original firm's conjecture was wrong.

To further explore this consider the limiting case of a Cournot duopoly where the firms A and B hold Cournot proper assumptions ie a fixed and independent zero output response by the rival. In this case the assumption is eventually borne out in the equilibrium situation but for the period of time approaching the equilibrium the assumption is quite false. If firm A produces a quantity which maximises its profits (on the assumption that B maintains its rate of output) then firm B will respond by changing its output so as to maximise its profits (on the assumption that A maintains its output rate) whereupon A will also adjust its output etc. Cournot's insight is that this duopolistic interdependence ultimately results in an equilibrium output configuration which B can produce indefinitely (on the assumption that A produces its current output rate) because A eventually chooses the output rate which actually justifies B's output on the assumptions that it makes.

But this implies that both firms A and B will choose the right output for the wrong reasons. Each is assuming the other is following a policy of fixed output whereas in reality they are following a strategy of varying output so as to maximise own profit. It is only if both firms accidentally choose the equilibrium output that the output response that they assume is justified.³

The geometric representation of this argument is presented in figure 4.1. The abscissa measures A's output rate, and the ordinate B's. The curve RF1 expresses A's output response as a function of B's output, and RF2 the curve that maps B's best output as a function of A's output. The shape of the reaction functions is given by the postulate that each maximises its profits given that its rival maintains its output. Assuming that market demand is linear, and constant (zero) costs then both functions decline monotonically. The principle proposition, that an equilibrium sustainable fixed rate of output can be produced by each, is verified at the intersection of the two curves, at E. All points to the left of the intersection point, E, induces A's output to rise and B's to fall, while points to the right induce A's output to rise and B's to fall. Eventually, an equilibrium is established at E which in a simultaneous move model implies that both firms will be on their reaction curves at the perfect Nash equilibrium. Stability and uniqueness of E require that the reaction functions be drawn as in figure 4.1 and this follows from the assumption of linearity of market demand and constant costs.

From the diagram it is verifiable that so long as each firm makes Cournot assumptions about rivals behaviour then any position out of equilibrium cannot be consistent with firms making choices

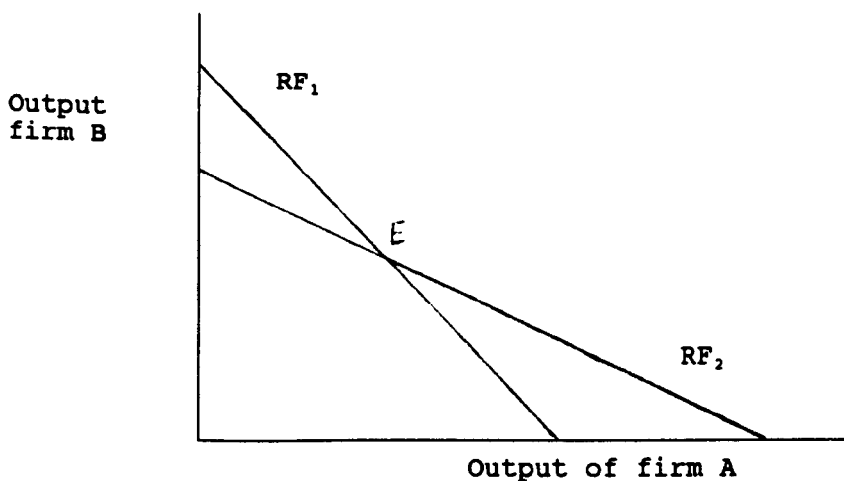
³ Even in this case it cannot be said that the output conjecture is right. Whilst it is true that the other firm goes on producing the same rate of output this is not because of the "correctness" of the mutual assumption that the firms follow a strategy of producing fixed output irrespective of its rivals output. The solution has come about merely by accident.

about output for the correct reasons. Instead we end postulating the movement towards an equilibrium for completely the wrong behavioral reasons. And even in equilibrium a rate of output is produced by each on the basis of fallacious reasoning. As Fellner observes :

"the analysis cannot be adjusted in such a way as to make the firms be right for the right reasons, instead describing a situation where firms are right for the wrong reasons."

This is important since it strikes right at the centre of this approach to oligopoly modelling. Furthermore the problem cannot be resolved simply by extending the Cournot beliefs from zero output responses to some other functional response as in the conjectural variation models.

Figure 4.1 : Reaction functions for a Cournot Duopoly.



If we extend the Cournot assumption from assuming a fixed maintained output response by rivals to a conjectural variation, then we can draw similar reaction functions to those in figure 4.1 where the introduction of this new notion merely affects the initial positions of the curves. It is immediately obvious that the introduction of a conjectural variation term cannot remove the problem that the equilibrium output levels are achieved for the wrong reasons. After all, the Cournot formulation of the problem is simply nested within this structure as a zero conjectured variation. This is recognised by Fellner(1949) :

"This means that the original assumptions were incorrect. It means this regardless of whether the original conjectural variation, expressing itself in the functions, is zero (as in the Cournot model proper) or other than zero".

But in addition we face another problem in situations out of equilibrium, or away from points such as E, in figure 4.1. The stability properties upon which the reaction functions are based, ensuring that a point such as E can be attained, rest on the assumption that the movement towards an equilibrium result only in movements along the curves and not shifts in RF1 and RF2. Only in such cases can a disrupted equilibrium be restored. But there are quite compelling reasons to believe that the firms within the duopoly (or more generally oligopoly) will become doubtful concerning the realism of their initial assumptions about their rivals behaviour. Such misgivings and uncertainties will tend to produce fluctuations and shifts in the reaction functions themselves and make the whole modelling strategy approach unstable. In consequence these perturbations will invalidate the reaction function approach since it is relatively straight forward in a position away from equilibrium for either party or firm to realise that they have made incorrect assumptions. In such a situation if either firm changes its assumption about its rivals reaction (hence mapping out a different set of reaction curves) then the relationship between the firms within the oligopoly has altered in such a material way as to cast doubt on whether the Cournot equilibrium can be restored. Hence, since Cournot assumptions proper, or other conjectural variations, are quite likely to result in the positioning of the actual reaction curves. Clearly, a function that shifts as soon as movements along it occurs has doubtful analytical use as a tool of analysis. But we can in fact say more than this. Even at the intersection point when the reaction function is augmented to include a non-zero output response the firms are only correct in the sense that firm B produces output which only appears to justify firm A's current output choice, and by the essential symmetry of the problem, firm A produces output which justifies firm B's assumptions. But this justification is a very fragile thing : any systematic test of either firms conjectural variation assumption would immediately, by the very construct of the problem, invalidate it. And then we are back to the situation above where an out of equilibrium position can just as well lead to shift in rather than movements along the relevant curves.

So by reexamining the fundamentals upon which equation 4.5 is predicated, which is also the basis for arguing that a relationship exists between structure and performance, has unearthed an inconsistency not accommodated by the model. First, it implies inconsistent behaviour out of equilibrium; second, even in equilibrium firms hold expectations for the wrong reasons, third, any point other than the intersection will not ensure a move back to equilibrium if there is a change in assumed conjectures which results in shifts in rather than movements along the reaction curves. Since this is an inconsistency at the centre of the analysis some careful interpretation is required if any headway in establishing a relationship between structure, conduct and performance is to be made. Indeed, Cowling and Sugden(1987) argue that the Fellner-Stigler criticism (ie. movements towards equilibrium reveal inconsistently held output conjectures) is so important that some of the suggestions

advocated to circumvent the problem are themselves so highly restrictive that an alternative avenue is required altogether to examine the determinants of margins.

For example, one potential way around the problem is to suggest that the model only holds in equilibrium. Cowling and Sugden(1987) suggest that this is of little real value since to argue that the model is only valid in a Nash equilibrium is to say nothing about why the situation arose in the first place. But our criticism here is different in that even in equilibrium the model will say little about a firms behaviour because a relationship exists between structure and performance that are based upon conjectures that if ever tested will be wrong. The second response to the Fellner-Stigler criticism is that firms treat the oligopoly model like an "as if" situation ie duopolists act "as if" they faced reaction functions RF1 and RF2. But again as Cowling and Sugden(1987) point out to argue an "as if" case is completely different from arguing "what is". In short the reaction curve approach does not tell us why or how firms behave. But we have suggested here something different in addition. If firms are in any position away from the Nash equilibrium we can have little confidence that the Nash equilibrium can be restored if being equilibrium results in shifts in rather than movements along the reactions curve. In short, firms do not even have to behave "as if" any more.

Having arrived at this conclusion it is not to suggest the degree of monopoly approach is flawed. On the contrary, because the Cournot modelling above fails to establish unequivocally that a relationship exists between structure and performance, along with the firms behaviour, is not to imply that it does not exist. Cowling and Sugden(1987) maintain that the Cournot approach provides an interesting starting point at which to begin to unearth, rather than assume, the behaviour of firms. In essence they are arguing that to deny a relationship between structure and performance, on the arguments presented above, is to act in an anti-historical way : "This all very well but it should not be forgotten that the reason such formal models were initially so exciting was precisely because they attempted to formalise an even longer tradition of oligopoly modelling" So to argue, for example, that the Cowling and Waterson(1976) model suffers an endogenous market structure problem, as do Clarke and Davies(1982) in denying the existence of a relationship between structure and margins, is to adopt a particularly narrow interpretation to the problems involved in oligopoly. In the contrary the central, almost intuitive idea, argued here is that the behaviour of firms will affect its performance and that this seems to be an appropriate start to the understanding oligopolistic interaction.

4.4.2. Collusion, structure and the degree of monopoly.

The analysis of the previous section points to a fundamental problem with the conjectural variations model as a basis for understanding the relationship between structure, conduct and the degree of monopoly in a monopoly capital world. Whilst such models are important because (a) the

capture the quintessential interdependence of firms decision making and (b) particular oligopoly solutions like Cournot turn out to be special cases of the conjectural variations approach, they still fall foul of Stigler's(1964) insight that the assumed behaviour by rival firms is not profit maximising. As Stigler(1964) states :

"A satisfactory theory of oligopoly cannot begin with the assumptions concerning the way in which each firm views its interdependence with its rivals. If we adhere to the traditional theory of profit maximisation enterprises, then behaviour is no longer something to be assumed but rather something to be deduced." Stigler(1964, p 44)

In terms of equation 4.4 Stigler is rightly observing that values for the conjectural variation term are no more than mechanical rules that are imposed on the profit maximising condition *once* it has been derived. The assumed behaviour then is assumed rather than deduced from profit maximising behaviour.

Stigler's response to this problem is the recognition that the pursuit of profit by firms within an industry means that they will behave in a way so as to maximise profits. But the combined profits of all firms in an industry are maximised when the whole set of firms acts as if it was a single monopolist. So profit maximising behaviour, consistent with profit maximising outcome, meant that firms will attempt to collude, monopolise markets, and hence achieve the joint monopoly profits. As Cowling and Sugden(1987) state :

"That is the recognition of each others retaliatory power means firms will tolerate each others presence in the market to the extent of avoiding situations which leave each and everyone of the firms in a worse position otherwise they would simply be cutting their own throats by being worse off and suicidal tendencies are not a general feature of firms' behaviour."

Indeed Stigler(1964) asserts that profit maximising behaviour implies firms will attempt to achieve the collusive (monopoly) solution and the only thing preventing them doing so is the potential for each firm to gain at the expense of the others, at least over the short period, by chiselling and engaging in secret price cutting. The concept of collusion then takes primacy of place in oligopoly theory and the problem of *enforcing* the joint profit maximising solution becomes an information problem which all firms have to deal with. Indeed, Stigler's(1964) paper shows how the number of sellers, the number of buyers, the frequency of purchases and so forth all determine the stability of collusion within oligopoly.

The concept of collusion, therefore, strikes at the heart of the oligopoly problem, when

assuming profit maximising behaviour, and is the key feature guiding firms' conduct. However, collusion is present in all industries and so at first sight does not appear useful in determining conduct and the degree of monopoly within an industry simply because it is always present. But as Cowling and Sugden(1987) note :

"the consequences of collusion *can* vary across industries and thus will be reflected in observed price cost margins."

So the differential degree of collusion is useful in explaining the differences in observed price cost margins across industries. If firms are successful in enforcing collusion the best outcome will be the joint profit maximisation solution, a situation which cannot be improved upon. This suggests that the upperbound given by perfectly collusive behaviour is the joint profit maximisation solution which relates the degree of monopoly, μ , to the inverse of the absolute value of the price elasticity of demand, $1/\eta$, so $\mu=1/\eta$.

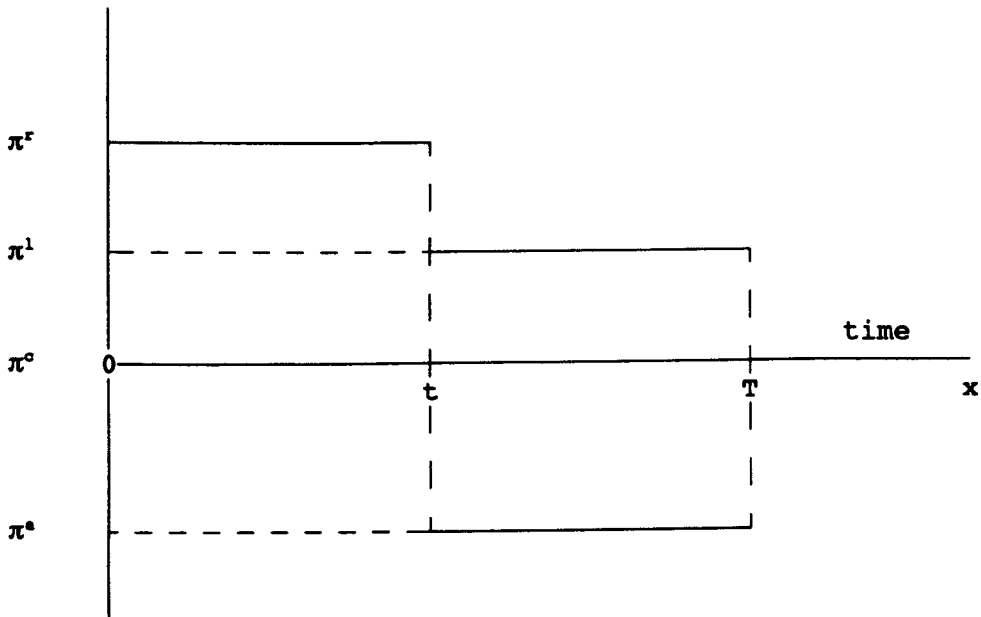
However, it remains to explain why full collusion may not be achieved in some industries. Again the guiding principle is the concept of collusion. If firms are not maximising joint profits it implies at least one firm from the whole set of firms within the industry believes it is better off by departing from the joint profit maximising collusive solution. If this were not the case then the firms are not engaging in behaviour that is profit maximising, and they are all worse off which implies they would want to collude.

The interesting case raised by Stigler(1964) is that full collusion is not attained because at least one firm believes it is better off by secret price cutting and there are information costs by rivals in enforcing the collusive agreement. Recently these issues have been recognised and incorporated into models of oligopoly that attempt to reestablish the importance of structure in determining performance within the general environment of collusive behaviour but avoiding the arbitrariness of the behavioral assumptions in traditional structure conduct performance models.

An example which captures these considerations is given in figure 4.2 and is derived from Cowling and Sugden(1989), but see also Cowling and Sugden(1987) and Cubbin(1983). It is assumed that firm i has a finite planning horizon and is only concerned about profits until time, $t=T$ on the x axis. Assume that the firm contemplates a cut in its price at time $t=0$ but the rival firms in the oligopoly do not respond until time $t=t' < T$, and it is assumed that there is no time left for any counter strategy for firm i to enact before the end of the planning horizon at time $t=T$. The result of the price cut at time $t=0$ is to immediately increase the firm i 's profit from π^c to π^f . Following the analysis by Stigler(1964) and Baran and Sweezy(1966) the price decrease has two effects on buyer behaviour that result in the increase in profits. First, there is a substitution effect as buyers switch from substitutes brands into firm i 's product and second, firm i crowds out and attracts customers that were previously

supplied by its rivals. At time t the rivals retaliate by price cutting on the basis that the original cut in firm i 's price is chiselling or part of a collusive leadership strategy, hence attracting back previous buyers and lowering firm i 's profits. Furthermore, assume that firm i is uncertain as to the exact response that the rivals will actually make but given their response knows what its profits will turn out to be. For simplicity the Cowling and Sugden(1989) model assumes that firm i entertains only two possible reactions by rival capitalists. Either the price cut by firm i is viewed as an act of collusive price leadership, in which case rivals adjust prices so as to leave firm i with profits π^l , or the rivals believe that the original price cut was an act of hostility and therefore adjust price structures to leave firm i with profits π^h . Since rivals will not view favourably an attack a hard nose strategy would be enacted that must leave $\pi^h < \pi^l$.

Figure 4.2 : Time path of firm i 's expected profits.



However, what we are concerned with here is whether or not the firm will actually cut price and this is the most interesting feature of the Cowling and Sugden(1989) model since it makes this decision contingent upon both the *timing* and *nature* of the reaction by rivals. Firm i 's expected or conjectured profits can be written as :

$$E(\pi) = t(\pi^l - \pi^c) + p_i(T - t)(\pi^h - \pi^c) + (1 - p_i)(T - t)(\pi^l - \pi^c)$$

where p_i is identical to the probability firm i attaches to all firms acting as if firm i 's price cut was a hostile attack, and E is an expectational operator. Expected profits, $E(\pi)$ are simple a convex

combination of the two potential outcomes facing firm i , the weights given by the probabilities of each event. Clearly if $E(\pi) > 0$ then firm i more likely to cut price than not. Similarly, the lower is $E(\pi)$ then the likelihood of a price cut is less likely. Moreover it is easy to show that an increase in the probability that firm i 's price cut is interpreted as an attack the lower will be the expected profits and hence the less likely the price cut will actually occur. This intuitive result is established by partially differentiating the expected profit function with respect to probability p_i .

$$\delta(E(\pi))/\delta p_i = (T - t^*)(\pi^a - \pi^c) + (T - t^*)(\pi^l - \pi^c) = (T - t^*)(\pi^a - \pi^l) < 0$$

So the higher is the probability that the price cut is an attack the lower is the expected profit of firm i , and presumably the less likely a price cut.

However, whether or not the price cut actually occurs the model has highlighted a number of important features. First, the performance of firms are influenced by when and how rivals respond to the firms action. In terms of figure 4.2 this is particularly important because it determines the position of t^* , and whether profits after this period are π^a or π^l . Second, The elapsed time until the retaliatory action determines the extent of profits that the firm can glean before a reaction and π^a and π^l the magnitude of the profit reduction post reaction. Third, the higher the probability that a price cut is interpreted as an attack serves to reenforce collusive behaviour because it makes the expected future profits of a breakaway less attractive. Forth, the size of π^a relative to π^c and π^l , determines what Cowling and Sugden call the "retaliatory power" of rival capitals. The conclusion that we are drawn to is that the closer the reaction time by rival capitals, and the higher the probability that this is interpreted as an attack then the less likely is a price cut. The corollary to this is that the firms will tend to collude due to the power of rival firms, captured in the magnitude of π^a , to inflict loss on the firm that chisels. To avoid such a situation where the firm will be worse off the tendency will be to avoid such market situations and collude.

It is at this juncture that structure again becomes an important determinant of industry performance and so assumes a prime role in shaping the industry degree of monopoly. Stigler's (1964) concern was to illustrate the conditions under which collusion was feasible and consistent with profit maximisation behaviour. His analysis was based on firms' attempts to rapidly detect chiselling or price cutting by rivals and hence the possibility of enforcing the collusive solution. He concludes that the probability of detection varies positively with the degree of industry concentration. So the ability of rivals to detect, retaliate and enforce cartel rules about collusion are all positively contingent upon the degree of concentration. Since we argued that the greater the retaliatory power the less likely is price cutting and hence the greater industry degree of monopoly, this implies that the degree of monopoly is also an increasing function of concentration simply because retaliatory power increases with concentration.

This conclusion is important because of the interpretation it gives to the traditional structure performance model. It nests within the general ambit of collusive behaviour a model of structure, conduct and performance. As Cowling and Sugden(1987) explain "we can conclude : concentration (ie. structure) determines price cutting (ie. conduct), and conduct determines price cost margins (ie. performance)." But also the Stigler(1964) model is important because it illustrates that the structure of industry is an important determinant of the ability to retaliate and hence collusion and industry performance. So market structure itself is an important variable on which to focus.

A similar conclusion is reached by Cubbin(1983). His model illustrates that there is an equivalence between the traditional conjectural variation models and a model of imperfect collusion. The importance of the Cubbin model is that it provides a justification for the use of conjectural variation models which is more robust to the Stigler-Fellner criticism regarding the arbitrariness of concerning rivals behaviour.

4.4.3. The planned use of capacity.

Having established the basic link between structure and profitability, noting some important caveats to the analysis, we explore now the interrelationship between profitability and strategic investment using a Cournot model. We show that the use of precommitted investment results in a divergence from the socially optimal level of investment. That is when investment is treated strategically there is an inefficiency, the nature of which depends on the oligopoly model under consideration. If the model is Cournot we demonstrate that there is too much investment in capital.

In this section we explore the relationship between profits, strategic investment and excess capacity. We have argued that industrial society is characterised by large firms operating within an environment where there exists considerable scope to influence any particular state of that environment. Firms can recognise and use their strategic power. Having established the potential link between profit margins, the degree of collusion and concentration there is a need to evaluate the circumstances under which such a potential to extract economic surplus will become an actuality. There are two areas of immediate interest. In the first instance will excess profit result in predatory behaviour on the part of other firms to try and capture part of this surplus? We shall argue below that the recognition and use of strategic investment results in a relatively stable market environment where wholesale entry and price wars among incumbent producers are not the norm. In the second case we need to illustrate that cooperation (collusion) is relatively robust and that it will not, in the normal course of economic activity, become unstable. We consider this in section 4.7.

A recent survey by Sawyer(1988) consigns the excess capacity phenomenon to being largely a macroeconomic consequence of the development of monopoly capital. We can think of excess

capacity as having two elements. In the first case it is the planned over investment in all forms of capital. For example the over investment in plant and equipment by firms. But the concept of excess capacity is more general than this since it can be over investment in research and development, learning by doing, product and brand proliferation etc. It is therefore a very general concept which we will argue is characteristic in the evolution of monopoly capital. In the second case excess capacity is the actual existence of under utilised resources due to the stagnationist tendencies inherent in an oligopoly world dominated by monopoly capitalism. Examples are all too familiar. Idle machines, empty plants and establishments, closed enterprises and unemployed labour are all too familiar in industrialised economies. The important distinction, then, is that excess capacity may be planned or unplanned, potential or actual and this distinction needs to be drawn clearly. Observed excess capacity may be the outcome of optimising decisions by firms, or the consequences of other macro economic forces. Clearly the relationship between monopoly capital and strategic competition is where the use of excess capacity is a planned process. The allusion to macro economic excess capacity, in the context used by Sawyer(1988), refers to a facet of the monopoly capital literature that considers there to be a tendency towards underconsumption. The real possibility of a potential stagnationist tendency derives from the fact that a tendency for the degree of monopoly to rise implies a planned downward revision in the level of investment consistent with the planned reduction in output that itself is implied by the increase in the degree of monopoly. For example see Cowling(1990) and for an analysis based on the implications of savings behaviour and corporate control see Pitelis(1986).

An early model that demonstrates excess capacity as an optimising solution is Chamberlin's(1933) large numbers model. Tangency of the average cost and revenue curves occurs in the long run at a point of zero super normal profits. Entry and exit are free, and utility is derived from product variety in the model. The question as to whether Chamberlins solution is socially inefficient is unclear. Certainly firms produce at a point that is less than the minimum point on the average cost curve, and hence there exists excess capacity. However there is a trade off between product diversification and not operating at minimum cost. The model is allocatively inefficient if any welfare gains from product variety (proliferation) are less than the costs of the excess capacity. Waterson(1984) and Dixit and Stiglitz(1977) consider the issue.

Sawyer(1988) describes three tendencies in the monopoly capital literature that explain the persistence of excess capacity. Steindl(1952) suggests that fluctuating demand conditions, and the need for a suitable response over the trade cycle implies and requires the maintenance of spare capacity. The argument is as follows. Rather than operate at full capacity it is optimal to operate somewhere below this so that should there be an unanticipated increase, or shock, in demand this can be met by the firm by using the reserves of built in excess capacity. There are two points. First the notion of

optimal inventory stocks is not incompatible within a neoclassical world of exogenous stochastic shocks. Indeed, Chenery(1952) builds a model of excess capacity for this purpose. Second, and fundamentally, in a world characterised by secular stagnation tendencies the maintenance of spare capacity of any significant magnitude may not be necessary. The notion of building excess capacity to meet fluctuations in demand rests on the concept that demand fluctuates around some predetermined steady state. In times of high demand the built in excess capacity is required to meet product demand. However an economy that has a bias towards stagnation does not require significant capacity to be built for demand purposes alone. This is not inconsistent though with building excess capacity for strategic reasons.

Within the monopoly capitalism tradition there has been some attention paid to the importance of potential entry. This is especially true of the analysis by Cowling(1982) where the use of Cournot conjectural variation oligopoly model is predicated on the assumption that the number of firms in the industry is fixed - which is another way of positing that the margin is not subject to erosion by potential entrants. To a large extent the analysis presented by Cowling(1982) rests on an argument by Spence(1977) that firms hold spare capacity as a strategic device to deter hostile attacks from outside firms. The essence of the argument is that potential entrants stay out of the market occupied by the current incumbents because by entering they face the risk that the incumbent firms can expand output and drive the profits, that potential entrants hope to achieve, to zero.

The Spence(1977) proposition (and the extensions to it that are considered below) has a number of implications pertinent to the issues here. The first relates to the concept of a potential rival. The usual way that the notion of potential entry is couched is within an essentially asymmetric product market environment. The models posit a dominant firm, or group of firms, whose activities may be curtailed by the existence of an active competitive fringe. That is the existence of monopoly rents earned by incumbent oligopolists stir into action firms on the periphery of the oligopoly group who then attempt to make inroads into those rents. But this misses the essential symmetry of both rivalrous and collusive behaviour. The real issue concerning potential entry in an era of monopoly capitalism is whether one capitalist enterprise is contemplating entering the market dominated by another firm, where this other firm is a potential rival for the former's market. This is no more than saying that there is an essential symmetry in a world of conglomerated firms, where all have access to broadly similar knowledge and technology, a point often missed in the models that consider potential entry.

Generally speaking strategic competition refers to the behaviour of at least one agent, that tries to elicit a response pattern or alter the expectations configuration of other agents. Within the game theory literature essentially one player adopts pre-play strategies designed to alter the outcome of the post play game. The work of Spence(1977) is an example of such activity where the strategy refers

to investment in excess capacity, and the game involves trying to deter entry. Within the industrial organisation literature this has been the dominant way that the game theory model has been couched.

But the traditional approach to entry deterring behaviour is based on the Sylos postulate. The most fundamental weakness of this axiom is that it lacks credibility - ie. market participants hold expectations that if faced with the fait accompli of entry that are not borne out in actuality. One particular resolution to this problem that has appeared in the literature rests on refining the concept of equilibrium in the "post-entry game" in such a way as to make the threat of output expansion credible. Dixit(1980,1982) is an example of this which has important implications for the Spence(1977) argument that incumbent firms can invest in spare capacity to deter entry. Dixit(1980) shows that the original Spence(1977) argument is fragile and results in an imperfect equilibrium. However, the general argument made by Spence(1977) has been resurrected by various authors, for example Dixit(1982), Bulow et. al.(1985) and Kirman and Masson(1986). What has changed is the nature of equilibrium in the second stage of two stage games.

However, it is a weakness of these recent models that whilst entry deterring strategies are in fact pursued, implying that actors are trying to determine the environment in which they operate, they are still very passive and predetermined. The incumbent focuses on a particular strategy, and once the rules of the game are understood the result follows as an equilibrium. This is unfortunate, because it rigidly implies no entry ever, if the strategy is successful, and does not really characterise a dynamic world. The only way entry would happen is if there were changes in the exogenous variables of the model.

Moreover, one can also question how realistic these attacks of entry on established oligopolists by new entrants trying to establish within a market are? If the dominant firm - competitive fringe model is inappropriate, as argued by Cowling(1990), then this rather asymmetric model of oligopoly is more apparent than real as a description of oligopoly structure and behaviour. The real question should then focus on the relationship between oligopolist members themselves, and how they interact with other oligopolistic groups. That is the intra and inter oligopolistic question within an essentially symmetric world. The issue is further explored in Cowling(1990) who argues that "the real issue of entry, within a modern industrial economy, is when a corporation established in one market is considering invading another market dominated by another, where the latter is a potential rival in the former's market. It is this aspect of symmetry of rivalry that is lacking in the usual modelling of entry."

This essential symmetry is an important feature of the modern capitalist enterprise. We argued in Chapter three that the firm can be seen as essentially a locus of hierarchical decision making. This allows the enterprise considerable scope and flexibility in determining its own destiny and direction.

This is the basis of arguing that there is a general symmetry between firms within oligopoly. This symmetry means that firms can attack or defend as needs necessitate. The ability of firm B to deter entry by A will be its ability to defend and retaliate, which in itself requires the existence of spare capacity. This not to suggest that entry will not take place but is a function of many factors, not least the expected time it takes for other firms to retaliate to an incursion into its market.

Such an interpretation has a lot in common with the tit-for-tat analysis explored by Axelrod(1983). If we assume that both firms think of themselves as insiders (incumbents) it provides a rationale for the existence and maintenance of excess capacity. The firms adopt strategies to ensure that rivals do not seek to gain some advantage that might lead to an unstable market situation. The result of such behaviour is to minimise the number of times tit-for-tat is actually played.

The discussion has indicated that the essential symmetry between firms within oligopoly means that the maintenance of spare capacity can be used as a strategic entry deterring device. As Cowling(1990) points out the deterrent to entry is the very immediacy of retaliation and in turn this is conditional on having spare capacity. This is likely to be the norm, although depending on circumstances, an attack by one firm into the market of another is possible, but we expect the norm to be that outcomes within oligopoly groups would not be undermined by potential entry. Some existing evidence by Smiley(1988) points to the not infrequent use of excess capacity as an entry deterring device. But there is another facet to the issue of the strategic use of capacity that is worth exploring. Namely, if firms treat their current stock of capital strategically we can show, by reference to the recent work by Dixon and Manning(1989), that there is too much investment in capacity. That is excess capacity follows from firms treating the capital stock strategically.

The basic issue for incumbent oligopolistic producers is how they can influence their environment so as to enhance their profit position. Investment in capital stock provides such a link. It is sensible to distinguish between two different time horizons for firms. Output decisions of firms are treated as short-run phenomena whereas the capital decisions of firms are longer period choices. That is when the firm chooses the price output configuration they treat the current capital stock as exogenously given. Since capital has been precommitted it follows that firms can utilise its investment decision strategically. That is a firm in a previous time period can generate a strategic investment in capital and so affect the current product market outcome. The current stock of capital, it is argued is neither arbitrary or unique. The logical question then becomes how will the nature of competition in the product market affect the firms investment decision?

If we follow Salop(1979) and distinguish between strategic and innocent investment decisions then the problem is further clarified. If a firm makes an innocent (non-strategic) decision to invest in capital then by duality the choice of capital minimises the cost of producing a particular level of

output. The choice of both capital and labour requirements in this particular schema is essentially symmetric. If the choice of capital stock is made strategically then an asymmetry is introduced between capital and labour. Now capital is chosen not only to minimise production costs, but also on how it affects subsequent outcomes in the product market. We can demonstrate that the choice of one factor input (capital) results in a strategic inefficiency in the production process. Moreover certain restrictions on the nature of the equations demonstrates when strategic investment successfully deters entry.

To model this strategic process, which by its very nature is dynamic, we need to distinguish between at least two time periods. To this end we shall consider a two stage game which is interpreted as the distinction between the short and longer period decisions. In the first stage a firm makes choices about its capital stock. In the second period firms interact and, for convenience, we can characterise a product market equilibrium which treats the capital stock choice at the first stage as given. The choice facing any particular firm is how to choose the capital stock in the first period so as to gain an advantageous position in the second stage. In essence this is a device whereby firms use precommitted capital decisions to attain Stackelberg advantages.

The first issue we encounter when considering how the structure of this model is going to affect the internal efficiency of the firm is the type of competition that we assume to prevail in the product market. (the second stage of the game.). For example, in general, whether we choose a Cournot or Bertrand model, with or without conjectural variation component, will alter our results. For our purposes assume that the second stage product market is characterised by Cournot-Nash competition. We shall then extend the model to incorporate a non-zero linear conjectural variation term in the second stage.

The following simple model illustrates the point.⁴ Assume a symmetric oligopoly denoted $i=1,2$ where profits, π_i , are simply sales revenue, R_i , minus costs, C_i . Interdependence in the model is captured via the revenue function such that each firms revenue depends on own output and others outputs: $q=(q_1, q_2)$. The cost function depends solely on own output and own capital stock: $C=C(q_i, k_i)$. Assume both profit and revenue functions to be strictly concave in own output. The profit function is : $\pi_i = \pi_i(q, k)=R_i(q) - C(q_i, k_i)$. If firms choose their factor inputs of capital stock (and also labour requirements) innocently (ie. non-strategically) thereby ignoring the fact that the choice of capital can affect the product market equilibrium, then capital cost-minimisation implies : $\delta C/\delta k_i=0$. This is a familiar result that implies that the choice of capital stock is decided so as to be at the minimum of the cost function. The strategic use of investment in capital, and its affect on output, can be

⁴ The model presented here is based on a similar exposition to that found in Dixon and Manning(1989). The aim of these authors is to examine the nature of competition and efficiency.

characterised by the following function : $q_i = q_i(k_i, k_j)$ for $i \neq j$, where the operator $q = q(\cdot)$ is embedded in to optimisation decision in the second stage.

Assuming Cournot-Nash at the product market stage then the solution to this problem in the product market for any given choice of k is :

$$\frac{\partial \pi_i}{\partial q_i} = \frac{\partial R_i}{\partial q_i} - \frac{\partial C_i}{\partial q_i} = 0 \quad (4.6)$$

Where the equation in 4.6 implies that each firm must be on its own reaction function in equilibrium. How do we analyse the effect of the investment decision in this model for the second stage? Quite simply we substitute the function given by $q_i = q_i(k)$ into the firms profit maximand which then specifies a reduced form profit equation in terms of capital stock : $\pi_i(q_i, k) = R_i(q_i(k)) - C_i(q_i(k), K_i)$ which says that whilst profits are determined by sales revenue and costs the impact of investment in capital on total output is now taken into consideration. Totally differentiating this with respect to own capital and rearranging yields the first stage optimal Nash solution:

$$\frac{\partial \pi_i}{\partial k_i} = \frac{\partial q_i}{\partial k_i} \left(\frac{\partial R_i}{\partial q_i} - \frac{\partial C_i}{\partial q_i} \right) + \frac{\partial R_i}{\partial q_j} \frac{\partial q_j}{\partial k_i} - \frac{\partial C_i}{\partial k_i} = 0 \quad (4.7)$$

Using equation (4.6), and the property of the envelope theorem, the first term on the right hand side is zero. This implies that equation (4.7) can be rewritten such that the optimal cost minimising capital stock decision when investment is treated strategically is :

$$\frac{\partial C_i}{\partial k_i} = \frac{\partial R_i}{\partial q_j} \frac{\partial q_j}{\partial k_i} \quad (4.8)$$

This tells us the cost of producing the equilibrium output as the capital stock of firm i varies. If the right hand side is positive there is too much investment and if it is negative too little. Only if the RHS is equal to zero do we achieve the least cost efficient outcome defined as when capital is chosen innocently.

What might we legitimately expect the sign of (4.8) to be? With Cournot Nash duopoly and treating outputs as substitutes we expect $\partial R_i / \partial q_j$ to be negative, and so whether there is over or under capitalization depends on the sign of $\partial q_j / \partial k_i$. That is the effect on the product market second stage equilibrium of firm i given the capital stock of firm j . The change in output of firm j as firm i changes its capital requirements represents movements along firm j 's reaction function as opposed to shifts.

Hence the sign will depend on the slope of j's actual reaction function. Because of symmetry we know that $\delta q_j / \delta k_j$ will in fact be negative. As firm i increases its capital stock this shifts out its reaction function. The new equilibrium is represented by a movement down firm j's reaction function hence its negativity. This implies that in symmetric oligopoly/duopoly, where outputs are substitutes, and the second stage is characterised by Cournot-Nash behaviour, there will be over-capitalization and consequent inefficiency. This result clearly indicates that the strategic use of capital results in an inefficiency which is also characterised by too much investment in the scarce productive factor capital.

The product market stage of this two stage process can be augmented. A more plausible explanation would want to introduce a conjectural variation component into the analysis. We extend the condition defined by equation (4.6) by allowing a non-zero linear conjectural variation to be made in the product market about how the other firm will change output as the original firm changes its output decision. That is we augment the output decision $q = q(q_1, q_2)$ to be $q = q(q_1, (q_2, q_2(q_1)))$ and specifically set the linear conjectural variation to be $\delta q_j / \delta q_i = \psi$. Allowing this extension provides a modified second stage Cournot-Nash solution:

$$\frac{\delta \pi_i}{\delta q_i} = \frac{\delta R_i}{\delta q_i} - \frac{\delta C_i}{\delta q_i} = -\psi \frac{\delta R_i}{\delta q_j} \tag{4.9}$$

Using (4.9) and following the same procedure as before yields the following optimal first stage choice of capital:

$$\frac{\delta C_i}{\delta k_i} = -\frac{\delta R_i}{\delta q_j} \frac{\delta q_i}{\delta k_i} \left(\psi - \frac{\delta q_j}{\delta k_j} / \frac{\delta q_i}{\delta k_i} \right) \tag{4.10}$$

Equation (4.10) is the analogue of equation (4.8) with the introduction of a conjectural variation component. The next task is to consider the appropriate interpretation of this model. If we consider the right hand side of this equation we note that $-\delta R_i / \delta q_j \cdot \delta q_i / \delta k_i$ will have a positive sign, implying that the nature of inefficiency will be determined by the terms inside the brackets $\{\psi - (\delta q_j / \delta k_j) / (\delta q_i / \delta k_i)\}$. We know that ψ is the firms conjecture about the response of firm j to changes in the output of firm i. The latter term, $(\delta q_j / \delta k_j) / (\delta q_i / \delta k_i)$, is interpreted as the actual slope of firm j's reaction function. How might we see this difference between actual and potential elements? As the capital stock of firm i increases it shifts out its own reaction function leaving that of j's unaffected. Hence this latter term is interpreted as the slope of j's reaction function to changes in i's output.

Whether we observe under or over capitalization, hence inefficiency and too much investment,

will depend on whether in the second stage the conjectured response ψ is greater or less than the actual response. There are two cases of immediate interest. In the case of Cournot conjectures where $\psi=0$, given that we presume that the reaction functions are negatively sloped, then we observe that there is over capitalization. Why is this? Since $\psi=0$ the evaluation of whether there is excess capacity and over capitalization rests on the sign of the product of the two terms $[-\partial R_i/\partial q_j \cdot \partial q_i/\partial k_i][-(\partial q_j/\partial k_i)/(\partial q_i/\partial k_i)]$. The first term we established was positive. This is also true for the second term hence with Cournot conjectures there is over investment in capital. If we assume Bertrand type competition in the second stage such that $\psi=-1$ then assuming the change in output of firm i is greater than the change in output of firm j as i changes its capital stock then there will be under capitalization.

It follows from this discussion that there are several important points. First the relationship between product market competition and the internal efficiency of the firm is not simple. In the simple case of quantity setting oligopoly the treatment of investment as a strategic commodity results in over capitalization and hence social inefficiency. The algebra of the problem suggests that the introduction of conjectures muddies the relationship. But what is clear is that only in special circumstances will the choice of capital investment be fully efficient in the sense that the solution coincides with that which would be the case if investment was treated non strategically.

For the interim we can conclude our discussion of investment in excess capacity by stating that we expect there to be an inefficient over investment in plant and equipment. However, this choice is made on the assumptions of rationality from the point of view of the oligopolists.

4.5. Monopoly capitalism, rivalry and collusion.

In the previous section we showed that collusive outcomes under oligopoly are not likely to be undermined by the threat of potential entry. In an essentially symmetric oligopolistic world there is an element of stability in firms actions when completing incursions into markets where rivals are dominant. We examine here further the nature of this stability within oligopoly and argue that it is not as fragile as is commonly thought.

The concept of rivalry and collusion was introduced initially by Cowling(1982) where he argued that : "rivalrous behaviour and collusion coexist and result from a high degree of concentration within a specific market. The closer the rivalry, the more immediate is the response to any attempt to secure an advantage, but the very immediacy of the expected response serves to maintain the degree of collusion ... it makes a breakaway movement unprofitable."

Collusion, however, is not a static concept but one that requires a process of history to elapse. To this end investigators look back in time to understand our current position, assess the present in

terms of both history and formal explanation, and look forward to judge what current behaviour beholds for the future. Indeed this is the very method that Morishima(1984) has recently advocated. He suggests that economic theory in the absence of historical evaluation is empty. "What is more important is a knowledge of historical experience and the observation and formation of the way in which actual institutions work." (Morishima,1984)

Following the methodological lead of Morishima, the relationship between an essentially static theory of monopoly capitalism, and a theory of cooperation, evaluating the importance of the latter in explaining the stability and continued development of the former is provided. The theory of cooperation suggested by Axelrod(1984) can be used to explain the gains from cooperation and its potential usefulness in explaining the stability of collusive behaviour within oligopoly.

Cowling(1982) provided a model of monopoly capitalism that demonstrated that rational, profit maximising, capitalists have an incentive to collude over price and output decisions. The result was derived from the observation that highly concentrated industries are more likely to have the opportunity to cooperate given the proximity of firms within the industry. This an extension of the proposition by Stigler(1964) that collusion is an increasing function of concentration. It was further argued that because there is considerable control over the determinants of the degree of monopoly then there is also a tendency for it to rise over time. This is analogous to the tendency of the surplus to rise documented in Baran and Sweezy(1966).

For this important result to hold there are a number of auxiliary requisites, in particular that intra group cohesion in the oligopoly is relatively stable, and that the degree of monopoly is not eroded by the activities and actions of firms or corporations outside the oligopoly group. Importantly Cowling argued that intra group collusion was indeed stable but because there was always the possibility of firms within the group trying to seek an advantage over other members, there existed also an element of rivalry. This reasoning resulted in the concept of 'rivalry and collusion' which suggested that although there was potentially rivalrous behaviour between members in an oligopolistic group, the tendency was to recognise the gains from colluding and hence the stability of the arrangement.

From this concept of rivalry and collusion we get the idea of an optimally concentrated spacing of firms within the oligopoly, such that should cheating in fact occur by one member other members of the group can react swiftly and severely to punish that member so ensuring that cheating never emerges as a general outcome. That is "rivalrous behaviour and collusion coexist and result from a high degree of concentration within a specific market."

However the success of this solution to the issue of maintaining internal cohesion needs to be assessed further. Implicit in the early explanation offered by Cowling(1982) for the stability of an

oligopolistic relationship is that high concentration and the swiftness and exactness of punishment is sufficient to ward off the temptation to cheat.

Whilst intuitively plausible this explanation has a number of defects. In particular concentration and retaliatory speed are only necessary conditions to ensure the stability of the oligopoly group. There are other features that have to be taken into account to ensure sufficiency. A problem with the model is that inadequate attention is paid to the strategic nature and interaction of the firms within the oligopolistic group. The strategic nature of the firms manifests itself since the behaviour and activity of one firm, whether this is actual or potential, will cause both the expectations and possible actions of the other firms in close proximity to the original firm to be modified. To an extent this defect is modified in Cowling and Sugden(1987) but this has focused extensively on the time interval in the retaliation to defection rather than demonstrating why cooperation is advantageous in the first instance. This is the major problem with the model, namely that given that there exists strategic interaction, and interdependence, of the firms within the oligopoly the gains to cooperation have not been made explicit.

By demonstrating these gains explicitly we are able to specify both the necessary conditions for stability in the oligopolistic group, in the form of concentration and retaliation possibilities, and for sufficiency the potential benefits from cooperation.

Whilst there are obvious gains from cooperating and adopting joint profit maximisation behaviour one should not assume this will happen but unearth it. In particular to impose this solution on the model is to deny that there is in fact any question to be resolved when considering the issue of collusion among members of an oligopoly.

In order to illustrate the gains from cooperation and to demonstrate the cohesion of the oligopoly group we turn to the analysis of Axelrod(1984)

4.5.1. The evolution of cooperation.

The purpose of the model developed by Axelrod(1984) is to investigate the conditions under which cooperation emerges among otherwise self centred individuals without the need to resort to an autonomous (coercive) policing agent. Cooperation is an observed phenomenon which Axelrod seeks to explain theoretically using elements of game theory in particular the repeated Prisoner's Dilemma (P.D.) structure. The objective is to explain the evolution of cooperation rather than to characterise stability of an equilibrium situation.

This research agenda contrasts to the recent literature in macroeconomic game theory {Eg. Barro and Gordon(1983), Backus and Driffil(1985) and Levine (1988)} which focuses on the conditions and characterisation of equilibrium conditions that ensure that policy actions undertaken

exhibit credibility. One methodology emphasises the dynamic and evolutionary nature of the concept of cooperation, and the other the importance of the equilibrium solution. The following analysis considers the structure of Axelrod's initial model and its possible usefulness in explaining the evolution of Monopoly Capital. Central to the explanation of cooperative evolution is the strategy Tit for Tat (TFT) which specifies an initial action of cooperation and then mirror the strategy of the opponent in subsequent moves. It is argued that pursuing Tit for Tat results in an evolutionary stable system (ESS) which has the positive attributes of being initially cooperative and responsive to other strategies. The strategy is usually couched in terms of the Prisoner's Dilemma to which we turn. The model is a two agent (firm, person) non-zero structure which has the following structure :

Bimatrix Payoff Table			
	Firm Two		
		Cooperate	Defect
Firm One	Cooperate	(3,3)	(0,5)
	Defect	(5,0)	(1,1)

Each agent elects a strategy to cooperate or defect without communication with the other agent. To this extent the game is non-cooperative. However, strategic interdependence is captured in the payoff structure which is contrived to be "mixed motive" (Vickers (1985)). The payoffs observe the following inequalities.

$$T > R > P > S \text{ and } R > (T+S)/2$$

The first set of inequalities ensure the "mixed motive nature of the game, such that temptation (T) dominates the reward(R) which dominates the punishment (P) which in turn dominates the so called suckers payoff (S). If $R > T$, ceteris paribus, then the problem of cooperation is instantly solved since the gains from cooperation always dominate those from acquiescing. The second set of inequalities illustrate averseness to risk.

The game is expressed in normal form which specifies the players, possibilities and payoffs. In order to ascertain what happens in this game we need to specify the behaviour of the players. In particular we assume that firms behave Nash non-cooperatively. A Nash equilibrium occurs when each firm is choosing its strategy optimally given the strategy of the other firm. A dominant strategy is a strategy that is strictly preferred to any other. If the specified bimatrix game is played once and for all the "defection" strategy is dominant.

Axelrod specifies the payoff structure as symmetric implicitly characterising agents/firms

preferences as identical. For example two equal firms might be able to plan/play a low output strategy associated with the cooperative outcome. Backus and Driffil(1985) demonstrate that the payoff structure in the P.D. model can be associated with an underlying quadratic preference ordering of the respective agents. This need not be identical for both players and such formulations lead to an asymmetric payoff matrix.

The relevance of the bimatrix P.D. structure to the evolution of monopoly capital stems from the specification of the payoffs. If we begin with the premise that there exists a core group of firms operating within a specified product market, the temptation outcome represents each firm's ability to alter price or output given that the strategy of the others remains constant. Consequently this represents the increased profits that are available. Such a notion is also consistent with the theory of rivalry outlined in Cowling(1982). The cooperative outcome is pareto superior for both players rather than playing the Nash defect option illustrating that there are mutually advantageous gains from collusion. This reward is consistent with the notion of collusion forwarded in Cowling(1982). The mixed motive structure of the P.D. game has implicitly embedded in it the notion of rivalry and collusion, represented by the temptation to cheat and at the same time the rewards of cooperating, and stems directly from the nature of the strategic interdependence between the firms. In consequence the mutually advantageous gains from cooperation between firms is demonstrated from first principles, rather than relying on assertion, and that these gains can be associated with the prisoner's dilemma structure. It remains to demonstrate the conditions under which the gains from cooperation are reaped.

Given that defection is the dominant strategy in the one shot game, and since the payoffs are outlined as above, there are three questions to be answered. (1) Under what circumstances will cooperation emerge as a successful tendency? (2) Having emerged, will it be stable for the agents who play the option cooperate? (3) Is it robust to other less cooperative strategies, or do those who cooperate suffer exploitation from non-cooperatives?. We now turn to the resolution of the issues of emergence, stability and robustness.

We note, however, the fact that research is undertaken to demonstrate the conditions under which cooperation is a viable outcome in interactive situations between agents, demonstrates a dissatisfaction with having to rely on continued defection as the only solution to a strategically interactive game. Put another way, human nature when faced with social interaction has a tendency to find cooperative positive solutions to problems rather than negative regressive and harmful ones. Thus underlying the cooperative research agenda is the notion that there are gains to cooperation that are not being realised. This is reflected in the model by the fact that the sum of the payoff from cooperating is greater than any other configuration.

Axelrod(1984) demonstrates that his results, in terms of cooperative evolution, rest primarily

on players interacting over time. For brevity the nature of the propositions and some initial caveats to the model are consigned to the appendix.

Importantly emergence and stability of cooperation in this schema does not need to rely on: (a) commitment (b) reputation (c) opponent elimination (d) changing the structure of the model. There are two immediate points. First, whilst repeated interaction is necessary it is not sufficient to ensure cooperation. In particular it will rest on the actions of the other player and also how much the future is valued relative to the present. That is cooperation is not independent of the strategy of the other player nor the time discount factor, or in Axelrod's terminology " the shadow of the future", in repeated games. This is proposition one in the appendix.

Second, the literature in economics has focused on points (a) to (d) in explaining deterrence and cooperation. For example Dixit(1982) considers situations under which the pre entry phase of a Nash game may be exploited to the incumbents advantage in the post entry outcome. By altering the cost function that the incumbent faces in the post entry phase there exist a set of conditions that deter entry. This result assumes, and imposes, cooperation within the incumbent oligopolistic group and entry deterrence is achieved by altering the payoff structure, or at least restricting it as far as the entrant is concerned, in the post phase game. In the analysis by Axelrod the auxiliary assumption of altering the structure of the game is not necessary. Such activities though are not incompatible with the notion of Tit for Tat but serve to enhance the result. The purpose of the Tit for Tat strategy in the evolution of cooperation is to demonstrate its general robustness.

Consider the evolution of cooperation and how it is achieved. There are essentially three stages to the analysis. First, cooperation cannot emerge when there is continued defection by other players. If agents are scattered and have infinitesimal probabilities of meeting again then cooperation is unlikely. Cooperation will emerge if, to use Axelrod's terminology, clusters of agents exist and that these agents reciprocate. This will occur even if the volume of interactions are small. The notion of reciprocation is a contingent strategy that specifies that cooperation is played on the first move and thereafter mirror the strategies of the opponent. It contrasts to uniform strategies such as "all defect" which do not take into account the behaviour of opponents. The usefulness of this assertion is clear. It is capable of explaining why in the early phases of industrialisation, and capitalism, small and essentially atomistic firms were able to cooperate on the basis of recognition and frequency of interaction to facilitate growth in cooperation and ultimately concentration.

Second, once cooperation has emerged and is based on reciprocation, that is based on the Tit for Tat strategy, it is shown to be optimal (in the sense of yielding higher payoffs to each) against other strategies (See proposition two in the appendix). A cautious strategy based on the unequivocal principle of cooperation but punish for one period should defection occur outperforms other

sophisticated formulations. This stage explains why cooperation within oligopoly is sustainable and sensible, rather than the assumed chiselling phenomena that is assumed to characterise dynamic oligopoly. It was found in the round robin empirical tournament conducted by Axelrod that TFT dominated other strategies.

Third, Axelrod argues convincingly that a strategy based on reciprocation "can protect itself from invasion by less cooperative strategies . Thus the gear wheels of social evolution have ratchet effects." Axelrod(1984) In the context of oligopoly it implies that oligopolistic groups are safe from being invaded from outside agents. The intuition behind this is that once a cooperative group is established the best that any invading strategy can achieve is to adopt cooperation.

Consider the advantages and disadvantages of Tit for Tat in the evolution of cooperation. We note that the P.D. structure has the feature that if we specify workers and firms as the two players in the game then the inexorable logic of the situation is that there are gains to be had from workers and firms cooperating. This notion is traditionally considered in the participatory production literature. See for example McDonald and Solow(1981) and Cable and Charles(1989) and references therein. The structure of the P.D. model does not force us to specify who the agents playing the game are for the results of the model to hold. Consequently specifying one agent as the firm and the other as a worker is legitimate. These models of participatory production have tried to demonstrate that there are gains to workers, firm owners and managers from cooperation.

But such a structure has some undesirable features for the Monopoly Capital and Marxist schools of thought. These traditions have emphasised the ultimate non-cooperative nature between those who own the means of production, and workers. The notion rests on demonstrating that there is an ultimate conflict in the labour process since profit maximisation rests on extracting labour from labour power which is a negative attribute in a workers preference ordering. Braverman(1974) considers this in detail. In such circumstances, where conflict emerges from the nature of the production process, we would expect the defection outcome to occur if applied to the P.D. structure.

Things are never this clear-cut though. The production process is a mixture of strands of tension and mutual advantage. If complete antagonism in the sphere of production between workers and capitalists is always the case then no output would ever be produced. In consequence there is likely to be some advantage in cooperating in the production process. This line of reasoning must be tempered with some fairly rigorous caveats about the nature of this advantage. First cooperation may be more apparent than real between the worker and the corporation. According to Marglin(1974) the choice to work in hierarchical firms verses not working and starving is no choice at all. Thus the fact that we observe production and hence try to infer elements of cooperation may be erroneous. Instead we may be observing an inevitable forced relation between hierarchical firms and workers in conflict,

rather than the outcome of contractual transactions due to mutually advantageous gains. This type of reasoning may be more likely in underdeveloped and third world countries, rather than firms operating in Western Europe and the United States.

The discussion brings to the fore the issue concerning perceived preferences and attitudes of those employed in the production process. For example, in Western Europe individuals in the employ of a large (transnational) organisation will view the production process as more or less antagonistic depending on their assigned status within the corporation. On the one hand some individuals will perceive their interests are broadly commensurate with the continued success and interests of the organisation, and others who will perceive their gains as deriving from the expense of the firm. In essence this reaffirms within the P.D. model the distinction drawn by Kalecki(1971) between the interests and status of a salariat/managerial class, engaged in the firm irrespective of output levels, and those of a manual class whose fortunes are linked to the output decision of the firm. This demonstrates that the structure given in the P.D. model cannot be interpreted as rigid, fixed or literal, but is capable of broad interpretation.

One of the major advantages of TFT in the evolution of Cooperation is the emphasis placed on strategic interaction. Unlike the Walrasian (neoclassical) system where prices are assumed parametric, repeated strategic interaction allows firms to harness their environment to reap the rewards from cooperation. Understanding the structure of the of the model allows the pareto inferior solution of the one shot Nash game to be avoided. The idea is not new. Engles recognised the importance of harnessing those laws which would otherwise be inevitable: "The laws of his own social action, hitherto standing face to face as laws of nature foreign to, and dominating him, will be used with full understanding, and so be mastered by him."

Many of the advantages already outlined here are also been considered in Patchen(1987). In particular the fact that rationality is not required for the results to hold, but only reciprocation, is high lighted. The substantive part of Patchen's analysis concentrates on the strategic weakness in the TFT strategy of the possibility of an unending sequence of echoes when the game is played. These have been demonstrated in the appendix and a possible remedy outlined. In the light of this an extension to the TFT strategy is suggested based on the notion of augmenting reciprocation by a series of conciliatory initiatives. To avoid the problem of continual conflict Patchen suggests utilising the strategy developed by Osgood(1984) called Graduated Reciprocation and Tension Reduction (GRIT). The idea is simple and suggests that in instances where conflict arises a series of small conciliatory moves are made to encourage cooperation. Patchen provides evidence from the international political arena to support this notion. We notice that this development has not undermined the notion of TFT but enhanced it by "fleshing out" the practicalities of eliciting cooperation in conflict situations.

A substantial criticism of the TFT strategy is made by Hirshleifer and Coll(1988). Contrary to the tournament of Axelrod they find in simulated experiments that the Tit for Tat strategy does not dominate the population of feasible strategies. This itself is counter to the statistical paper forwarded by Orkin(1987) who demonstrated that the TFT strategy was in fact quite general, and safe from invasion. How are these two notions reconciled? Essentially each result depends on the nature of the social structure assumed. Hirshleifer's contention is that if the assumptions made by Axelrod do not apply then TFT is not a robustly successful strategy.

There are two major points. The first is that Axelrod has assumed a Round Robin Tournament with the implicit assumption that players seek to maximise cumulative scores, whereas the actual social environment may be an elimination structure. In this case TFT does badly as it never beats opponents on the first move. This is not surprising since the strategy "always defect" cannot be beaten by any strategy. The relevance of opponent elimination as a ruling social structure between firms is questionable. Dominant transnational corporations, essentially symmetric in nature, will only attempt elimination of opponents under extraordinary circumstances. The TFT result remains intact. since we expect cooperation to be the norm.

A more substantial criticism concerns the nature of the matrix and the fact that it allows only the option to elect two strategies, either of cooperate or defect. In the real world we have a continuum of choices on the degree to which we cooperate. To this end Theodore To(1988) has extended the binary choice, defect or cooperate, to a sliding five point scale ranging from full defect to full cooperate. A computer simulation was conducted on the basis of the resulting five by five matrix. It consisted of a round robin tournament in which each strategy plays each of the other rules.

It was found that a modified TFT strategy that retaliated one degree less than the opponents defection had the highest average score. Moreover in a regression analysis of the average number of points earned by a strategy on various explanatory regressors it was found to be highly positively correlated to three factors. First was the average number of points a strategy allowed its rival to earn during the tournament. The motto being do not be greedy! Second a dummy variable that equals one if the strategy did not defect first was highly significant. Finally, the responsiveness of the strategy, captured by a dummy that is equal to one if the strategy reacts to the previous move was found to be positive. Interestingly this extended matrix structure, the round robin tournament and the resulting regression analysis illustrates some interesting points in favour of TFT. In particular a strategy that is nice, in the sense that it is not first to defect; responsive in the sense that it allows for the others strategy; and punitive in the sense that it is not exploitable provide the ingredients to gain high payoffs in repeated games.

We conclude this section by noting that the original model developed by Cowling(1982) did

not demonstrate explicitly the gains that firms have when cooperating. By using the structure of the Prisoner's Dilemma these gains are easily seen, and the notion of rivalry and collusion incorporated within it. However for these potential gains to be realised the model must be couched in a dynamic framework. It is the repeated game, coupled with the notion of Tit for Tat, that allows the stability of collusion between firms to persist. That is, history matters. Recent evidence has suggested that as long as firms are not playing an elimination game, then Tit for Tat is evolutionary robust.

4.6. Union power and oligopoly.

We now turn our attention to the role of trade unions. A central theme in the analysis of monopoly capitalism is how the existence of strong trade unions will affect product market outcomes. Within the neo-classical literature unions have been essentially treated as an organisation, analogous to the conception of the firm, who seek to maximise an objective function where the relevant arguments of the function are wages and/or employment. For example, the monopoly union model treats trade unions as an organisation whose objective is to maximise the difference between the union wage and the wage that would prevail under competitive market conditions, or where trade unions are absent. In this conception the union first determines the wage, independently of the firm, whereupon the firm chooses the employment level so as to maximise profits. The labour demand curve is taken as given and the firm adjusts employment to its profit maximising iso-profit contour. In such situations wages (employment) are higher (lower) than the case where unions are absent. A number of propositions follow from the monopoly union conception of behaviour : First, the more elastic is the labour demand schedule the less effective will be organised unions in raising the wage rate above the competitive level and the more pronounced will be the effects of reducing employment when the firm chooses its profit maximising wage employment position. Second, the less elastic is the labour demand schedule the greater is the redistribution of rents from capital to labour. And third, the less elastic is the labour demand schedule the smaller is the "deadweight loss" area associated with neo-classical allocative inefficiency. These conclusions follow naturally from the Marshallian principles of derived demand.

Whilst the monopoly union model explicitly refers to the wage-employment trade-off effects resulting from successful trade union action the analysis does have some implications for various dimensions of economic performance. For instance, within oligopoly successful trade union action raising wages, implying a positive mark-up over the non-union wage, suggests that profits are reduced. Furthermore, so long as the proportionate fall in sales revenue exceeds the reduction in absolute

profits, it is also the case that the profit margin will fall.⁵ This conclusion is based upon a particular interpretation of the subsequent pricing strategy of firms within oligopoly. In particular so long as the individual firm is unable to pass on the wage increase in terms of price increases the margin, and share of profits, will fall. (ie the model assumes a zero price response by firms facing organised labour) Moreover, given that the functional distribution can be derived from this oligopoly pricing model, see for example Kalecki(1971) and Cowling(1982), our expectation is (based upon a zero price response by firms) that the share of wages will be higher in presence of union activity. Before considering further the legitimacy of the passive pricing policy by firms we must also consider other likely effects that unionism is likely to have.

At an intuitive level it seems at least plausible that unions will affect other dimensions of firm performance and activity other than profitability via their effects on wages. In particular, union power is also likely to shape productivity (see Clark(1984), Stewart(1987) and Machin(1988); investment and capital accumulation (see Burkitt and Bowers(1979), Grout(1984) and Machin and Whadwani(1990); and work intensity and intra-firm organisational structure (see Green and Sutcliffe(1990), Dixon and Manning(1989) and Faith and Reid(1987)). However, the actual effects of unionism on each of these components is partly ambiguous. We can illustrate this by considering heuristically the potential effects of union power on both productivity and investment.

The resulting move up the labour demand schedule following a union wage increase is among other things likely to elicit a substitution away from labour towards more capital intensive production. In terms of the Marxian imperative to accumulate this is consistent with a rising organic composition of capital (ie. the substitution of constant for variable capital). Moreover, in the neo-classical monopoly union model predicts that productivity will be higher in unionised firms than in non-union counterparts since the mark-up implies that the union wage is relatively higher. Hence firms will hire more productive labour. Both of these mechanisms would suggest higher productivity in unionised firms. However, if product prices respond to wage increases rapidly then the net effect of union power on productivity becomes ambiguous. Because monopolisation (ie. higher prices) will result in a reduction in output and employment then output per person employed will depend, inter alia, on product and demand elasticities and the degree of factor substitutability. (see for example Clark(1984).

⁵ Consider a simple case of a firm operating within an oligopoly facing a downward sloping average revenue curve with a profit function : $\pi = R(L) - wL$, where π is profits, R sales revenue, L employment and w the money wage rate. The marginal effect of the wage on profits is $-L < 0$ implying reduced profits. If unions only affect the wage level that would prevail in their absence we can define w_1 as the union wage, and w_2 as the non-union wage alternative and the mark-up as $w_2 - w_1 > 0$. The net union labour gain (or loss to capital) is equal to $\Delta\pi$ (see, Karier(1985)) where :

$$\delta\pi = \int_{w_1}^{w_2} L \delta w$$

However the general point raised here is that the effect of unionism is not as simple as predicted in the simple monopoly union model.

Turning to the potential effects of unionism on investment behaviour some authors have argued that whilst unions might capture a share of the surplus in the short period this comes at the expense of current investment so real wages are lower in the future than otherwise might be the case. (see for example, Burkitt and Bowers(1979)). This position has also been restated by Grout(1984) who argues that because profits are currently redistributed to labour expected future profitability falls, and hence deters current investment activity. Three qualifications to this position are necessary. First, the view that unions retard current investment and endangers future real wages, and wage share, is based on an axiom that investment expenditures are undertaken now so that workers will reap benefits in the future. However, in a monopoly capital world such investments are undertaken strategically so as to benefit those who are actually doing the investment. We would expect that investment and product and process innovation not to be undertaken for reasons of efficiency but as a strategic device to favour a redistribution towards capital and away from labour. Second, an oligopolistic world as we characterise it has a tendency towards excess capacity (see the arguments previously) so output, income and employment can be expanded and distributed among capital and labour according to some rule. Third, it is often argued in the neo-classical literature that the union push for higher wages results in a substitution away from labour to capital. On these grounds alone this implies a higher rate of current investment than would otherwise be the case.

What appears to matter in these explanations of union effects on wages is the behavioral response by firms in terms of prices. Kalecki(1971) maintained that because individual firms held pessimistic expectations about the response of rivals they are unlikely to raise prices to the same degree as the wage increase. In consequence, union can adversely affect the price-cost margin and increase wage share. This view, which embodies the behavioral assumption that firms are unable to co-ordinate their output and/or pricing policies. Cowling(1982) argued that in a collective bargaining institutional framework where wage outcomes are quickly transmitted throughout the industry, or bargaining is national or industry wide, then we can expect firms to engage in significant wage fixing strategies also. These are likely to come about in highly concentrated industries, or through the mechanism of multi-employer agreements, so we can expect wage increases to be quickly passed on in price increases. So wage increases are quite consistent with a limited effect on margins and wage share.⁶

However, the analysis so far has assumed that union care only about wages, so that wage-employment outcomes are always on the labour demand curve. This assumption has been

⁶ In Chapter seven we subject this hypothesis to the case where production is organised successively.

challenged by the recent efficient bargaining literature.⁷ In contrast to the monopoly union model this line of inquiry implies a quite different set of results in terms of output and employment.

By including an employment term in the unions objective function implies that the monopoly union model, where unions set wages followed by firms unilaterally setting prices with the solution on the demand curve, turns out to be Pareto inefficient. A superior position can be obtained by both firms and unions in a region lying in between the unions indifference curve and the firms iso-profit function : ie. a point off the labour demand schedule. The best outcomes, lying on the Edgeworth contract curve, are defined by the points of tangency between the union indifference map and the firm's iso-profit contours. Importantly, these can be of any shape, negative, vertical or positively sloped and so the efficient bargain models imply that employment levels are higher than those observed with the monopoly union model.⁸

To illustrate formally the efficient bargaining approach consider the following asymmetric Nash bargain :

$$\Psi = \underset{\text{argmax}}{ } [U(w, L)]^\alpha [\pi (w, L)]^{(1-\alpha)} \quad 0 \leq \alpha \leq 1 \quad (4.11)$$

where $U(\cdot)$ is the union utility function defined in terms of both wages and employment, $\pi(\cdot)$ is the firm's profit function [$\pi=R-C$ where R is revenue and C is costs], and α is interpreted as the union strength parameter. The relevant first order condition can be expressed as : $dR/dL = w - L(dU/dL)/(dU/dw)$ which indicates that the marginal product of labour is not simply equal to the wage but is lower because of the extra term on the right hand side which is equal to the product of the marginal rate of substitution of wages for employment in the union objective function and employment. So the extent of the deviation of the marginal product of labour from the product wage depends upon the relative importance of wages and employment in the union utility function. In general the efficient bargaining model predicts a higher level of employment than the monopoly union model. These models also imply that union power, by increasing wages and employment, can result in a higher than previously supposed wage share. Instead of the union bargaining over wages, and then letting the firm pick a lower optimal level of output and employment on the labour demand curve, which are transmitted into higher prices, unions and firms co-determine the level of both wages and employment.

⁷ For example see McDonald and Solow(1981) as the first to explore these issues in this context, and for a recent survey Ulph and Ulph(1988).

⁸ Whilst the approach is attributable to McDonald and Solow(1981) the sub-optimality of the monopoly union solution is clearly anticipated in the codetermination literature. (see for example McCain(1977).

Thus, the case of efficient bargaining over both wage and employment certainly allows the possibility that unions can adversely affect margins, and increase wage share. However, whilst it might seem intuitively plausible that unions care about both employment and wages we also have to consider the position of employers. Dowrick(1988) argues that employers will have an incentive to restrict the bargaining agenda to wages only hence maintaining the ability to determine the level of employment. This is also implied in the "right to manage" model where both parties bargaining over wages and employment but outcomes are subject to the constraint that they are on the labour demand schedule. So the question naturally arises as to why employers are keen to restrict the agenda? The analysis of Chapter three pointed to the fact that intra-firm organisation is as much a matter of power as it is questions of efficiency. Thus in a general sense we would expect employers to have as much control as is possible over as many key decision variables whilst restricting unions to a minimum number. But also the mere threat of job losses can serve as a credible deterrent against union inspired wage pressure. In such a situation, or where the legal framework within which unions operate favour employer rights to determine employment, firms will still operate along the labour demand curve and in general wage increases will not lead to a shift towards labour income.⁹

Having noted that we would expect that unions to have a limited impact on margins and the functional distribution it is also noteworthy that the evidence that has been presented so far tends to confirm that unions to adversely effect profit share. (see for example, Henley(1987) Conyon(1988)). Cowling (1990) suggests three reasons as to why this may be the case. First, unions can reduce profitability and profit share if their actions result in an increase in the degree of spare capacity in the industry. So in this case it is not unionism per se that is reducing profit share but excess capacity. Second, it is quite consistent with the Cowling(1982) and Kalecki(1971) model that the share of overhead labour (administrative, technical and clerical labour) rises with union power since salary increases are not passed on in price increases. Third, the existing studies typically examine the share of profits in cross section studies that are of a short-run nature. Since this truncates the full process described here this is one potential deficiency of the approach. In Chapter two we noted that there was little evidence that the share of profits has declined over the period 1962 to 1989 in the industrial and commercial company sector.

⁹ This is not to infer that bargaining over wages and employment never occurs. For example, unions can potentially have an effect on employment when they are strong, which would be consistent with periods of low unemployment, but in such situations they are actually less concerned with bargaining over jobs. Only in times of high unemployment do unions care fundamentally about jobs, and it is precisely in these situations which they are in a weaker position to actually bargain over jobs. This position has been articulated by Cowling(1990).

CHAPTER FIVE

Profit Margins and Collusion : An Empirical Investigation Using British Micro Data.

5.1. Introduction.

The traditional way in which industrial organisation researchers examine empirically the determinants of price cost margins, or the degree of monopoly, is the conjectural variations model. Here the excess of price above unit direct costs is determined by a number of factors including market share, the industry price elasticity of demand and the degree of strategic interaction among firms. It is well recognised that at the heart of this approach is the notion of collusion [see for example my comments in the previous chapter]. However, when modelling the determination of margins much of the existing empirical literature tends to treat the degree of apparent collusion as an "unobservable" that gets swept into the error term of a linear estimating equation.¹ The primary objective of this chapter is to examine the determination of profit margins and attempt to estimate the degree of apparent collusion implied by the classical conjectural variation oligopoly model. In doing so we are interested not only in unearthing the *existence* of interdependent firm behaviour but also in examining the *pattern* of firm's conjectural variation elasticities. In addition the analysis also attempts to expose the existence of a positive relationship between the degree of seller concentration and implicit collusion. The panel nature of our data set allows a particularly simple test of this relationship to be specified.²

In this chapter we use a balanced panel of 182 large British manufacturing firms over the period 1970-1986 to evaluate the determinants of firm profit margins. Using the conjectural variation oligopoly pricing model we examine empirically the nature of collusion among large firms in British manufacturing. Our modelling strategy, together with the panel nature of our data, allows us to retrieve estimates of the conjectural elasticity term implied by the conjectural variations oligopoly model and

¹ Some of the recent literature examining the empirical treatment of conjectures in the determination of margins is reviewed in Geroski(1988). Much of this literature estimates conjectures from demand and cost equations. This study departs radically from this approach by deriving estimates of the degree of apparent collusion implied by classical Cournot oligopoly models. This literature can be complemented by the recent evidence on the robustness of a structure - performance relationship reported, *inter alia*, by Geroski(1988), Salinger(1990), Schmalensee(1989) and Hay and Morris(1991).

² The importance of a relationship between collusion and concentration has been stressed, *inter alia*, by Cowling(1982) and Clarke, Davies and Waterson(1984). The latter authors argue that : "the key to the controversy [between market power of relative efficiency explanations of a positive margins concentration relationship] lies in the existence, or otherwise, of a systematic general relationship between α [the degree of collusion] estimates and concentration in the industry concerned."

to formulate a number of alternative hypotheses concerning both the nature and pattern of implicit collusion across firms and within industries. In essence the pattern of conjectural variations, or the degree of implicit collusion, can take three types. First conjectural elasticities can be equal to zero for all firms. This implies that firms behave in a manner predicted by Cournot. Second, conjectures can be non-zero within an industry but nevertheless equal for all firms. This suggests the presence of interdependence among firms within an industry group (ie. the rejection of Cournot behaviour) but that firm behaviour is homogenous. Lastly, firm conjectures can be unequal across firms (ie different for each firm). In this case behaviour is interdependent but firms within an industry group have differential responses to changes in market supply. The exact form of the tests are detailed in section 5.4 below.

This chapter also addresses a fundamental issue that has been raised in the Industrial Organisation literature, namely whether there exists a systematic positive relationship between market concentration and the degree of collusion? [see Stigler(1964), Demsetz(1973) and Clarke, Davies and Waterson(1984)]. Furthermore, since we would not expect firms to be indifferent to the presence of trade unions³ we further examine the nature of collusion by examining whether unionism too affects the degree of collusion in our sample. We incorporate both of these issues into our estimating procedure.

To briefly anticipate our main results we reject the Cournot hypothesis that firms make output decisions independently of rivals reactions. Furthermore, the hypothesis that firms have non-zero but homogenous conjectures is also rejected. Together these results suggest that we should derive individual firm specific estimates of the degree of apparent collusion. Hence we obtain and report empirical estimates of the conjectural elasticity term for a number of firms in our sample. It emerges that conjectures exhibit considerable inter firm variation which differ significantly from the average for all firms in our sample. In addition our results unearth a positive and significant relationship between the degree of seller concentration and the degree of collusion. This result provides an interesting juxtaposition to the Clarke, Davies and Waterson(1984) paper that also tries to estimate the degree of implicit collusion but using industry level data.

This chapter is organised as follows. Section 5.2 deals with the underlying theoretical models that informs our subsequent empirical analysis. We provide some comments on the debate between the efficiency versus market power interpretation of a positive margins-concentration relationship. In section 5.3 we briefly consider some of the existing literature. We provide a critique of some of the recent literature that has attempted to estimate the degree of apparent collusion. In section 5.4 we detail our modelling strategy and econometric tests. We present a brief evaluation of the data used in

³ For example the mounting evidence both in the U.S. and the U.K. suggests that unions have a negative association with profits. For example, this is found by Clark(1984) and Karier(1985,1990) for industry studies of the U.S. and Conyon and Machin(1991) for the U.K.

this chapter in section 5.5. In section 5.6 we present our estimates of firm specific conjectural variation terms along with our estimates of the determination of profit margins. Finally in section 5.7 we offer some implications and concluding comments.

5.2. Some theoretical perspectives.

In this section we characterise the conjectural variations approach to modelling oligopoly pricing. Cowling and Waterson (1976) develop a model of oligopoly pricing capturing strategic interdependence. It is assumed that there are a fixed number of quantity setting firms supplying an homogenous product. Each firm will have a profit function $\pi_{ij}=P_j(Q) \cdot q_i - c_i(q_i) - F_i$ where π_{ij} is the volume of profits of firm i in industry j , P_j is industry market price, q_i is the output of the individual firm i , and $Q (Q=\Sigma q_i)$ is market output. Fixed costs are captured by F_i and constant marginal costs, which have inter firm variation, by $c_i(\cdot)$. In the original Cowling-Waterson(1976) formulation the price cost margin for the profit maximising firm i is given as :

$$\left(\frac{P_j - MC_{i,j}}{P_j} \right) = \frac{(1 + \lambda_{ij}) MS_{ij}}{\eta_j} = \mu_{ij} \tag{5.1}$$

where $MC_i (= \delta c_i / \delta q_i)$ is marginal costs, $MS_{ij} (= q_i / Q)$ is the individual firm's market share in industry j , the absolute value of the industry price elasticity of demand is $\eta_j (= -(\delta Q / \delta P) / (P / Q))$, and $\lambda_{ij} (= \delta(Q - q_i) / \delta q_i)$ is a conjectural variation term. The term λ_{ij} is interpreted as how firm i believes all other rival firms react to changes in its own output decision. If λ_{ij} is equal to zero firms hold Cournot conjectures and the firm's price cost margin is $\mu_{ij} = MS_{ij} / \eta_j$. If $\lambda_{ij} = (1 / MS_{ij} - 1)$ then the firm's price cost margin reduces to the joint profit maximising collusive outcome, $\mu_{ij} = 1 / \eta_j$. So, as is clear from equation 5.1, the firm's price cost margin depends positively on market share, inversely on product price elasticity of demand and is further determined by the firms conjecture about rivals reactions to its output decisions.

Clarke and Davies(1982) extend the Cowling and Waterson(1976) model by augmenting the specification of the conjectural variation relationship. They model the conjecture term as $\lambda_{ij} = \alpha_{ij} (1 - MS_{ij}) / MS_{ij}$ where α_{ij} is termed "the degree of implicit collusion" [Clarke and Davies(1982) p. 279.]. The implicit rationale for this specification of the conjecture term λ_{ij} is that for a given market share of firm i , MS_{ij} , the magnitude of rivals response is given by the total of all rivals market shares to i 's own market share. It defines firm i 's belief about how all other firms in the market will change their output to a small change in its own output. Algebraically α_{ij} is also equal to the conjectural variation

elasticity since :

$$\alpha_{ij} = \lambda_{ij} \left(\frac{MS_{ij}}{(1 - MS_{ij})} \right) = \frac{\delta(Q - q_i)}{\delta q_i} \frac{q_i}{(Q - q_i)} \quad (5.2)$$

Substituting the Clarke-Davies(1982) formulation of λ_{ij} into the first order equilibrium condition 5.1 yields :

$$\mu_{ij} = \left(\frac{P_j - MC_{ij}}{P_j} \right) = \frac{\alpha_{ij}}{\eta_j} + \frac{(1 - \alpha_{ij}) MS_{ij}}{\eta_j} = \frac{[MS_{ij} + \alpha_{ij}(1 - MS_{ij})]}{\eta_j} \quad (5.3)$$

The Cournot model of oligopoly behaviour specifies a zero value for α_{ij} , so despite the existence of interdependence among firms it is assumed away by the individual firm in its quantity setting behaviour. However, this Cournot belief pattern by firms seems particularly implausible since the defining characteristic of oligopoly modelling is the recognition of mutual interdependence. Below we test this hypothesis for all firms in our sample. The lack of recognition of inter firm dependence place a lower bound on the outcomes under oligopoly of $\mu_{ij}=(MS_{ij}/\eta_j)$, but this lack of recognition does not imply the competitive outcome since margins are still conditioned by market share and the industry price elasticity of demand. As Cowling(1981) correctly observes this is a point often missed : the absence of collusion does not imply the competitive outcome.

The joint profit maximising solution, $\mu_{ij}=1/\eta_j$, implies that α_{ij} is equal to unity which establishes an upper bound on the firm's price cost margin. It implies that firm i bases its output decisions on the assumption that if it expands its output by one percent then rival firms will do the same. Interpreted in this way $\alpha_{ij}=1$ is an index of successful cooperation [see Martin(1988a) or Kwoka and Ravenscraft(1986)] as all firms act in concert to determine, in this case increase, market supply. So the actual value of α_{ij} can be interpreted as the degree of apparent or implicit collusion. A value of zero for α_{ij} implies zero collusion and $\alpha_{ij}=1$ implies perfect collusion, and $0 < \alpha_{ij} < 1$ specifying the intermediate cases of imperfect collusion. In terms of equation 5.3 the price cost margin is simply a weighted average of $1/\eta_j$, (perfect collusion) and MS_{ij}/η_j , (zero collusion) the weight given by α_{ij} .⁴

⁴ An alternative value of $\alpha_{ij}=-1$ has been suggested in recent literature (see Jaquemin(1987), Martin(1988a), Machin and van Reenan(1991), and Geroski(1988)). The implication is that if firm i restricts its supply by one percent rival firms will expand supply to exactly offset this by the same percentage. So firm i acts on the belief pattern that restricting output will cause rivals to act in a way to exactly counteract its output decisions. This has been termed "competitive" behaviour since it is clear from equation 5.2 that α_{ij} reduces the margin to zero. The term is a misnomer since although $\alpha_{ij}=-1$ this can occur for positive values of market share. But the very existence of substantial market shares constitutes market power and also violates the axioms of perfect competition. We would not expect, under oligopoly, to generally observe cases of α_{ij} less than zero - although we do test for it in our results section.

In our empirical analysis below we test whether, indeed, the degree of implicit collusion lies between zero and unity. However, there is a further important issue concerning the symmetry, or otherwise, of the degree of implicit collusion held by firms [see Geroski(1988) pp.114-116, Gallop and Roberts(1979) pp. 321-326]. For example all firms i in industry j , or across the entire population for that matter, can adopt the behavioural pattern predicted by Cournot. Firms make output decisions without reference to the potential reactions by rivals. This implies that $\alpha_{ij}=0$ for all firms, or at least some subset of firms. Alternatively all firms, or all firms within an industry, can have non-zero but nevertheless identical conjectural variation elasticities. That is firms each hold a belief pattern, perhaps dictated by past experience, that percentage changes in own output will lead to a given percentage change in the output of rivals, and that each firm holds the same belief. In this case $\alpha_{ij}=\alpha$ and in the presumably rare case of perfect collusion this would be equal to unity for all firms. The final case is that firms hold non-zero asymmetric beliefs about rivals potential reactions to percentage changes in own output. In this case the degree of implicit collusion is different for each firm. In the modelling strategy section below we consider an empirical test to distinguish between these competing hypotheses.

The specification of the margin in equation 5.3 throws some light on the efficiency versus market power debate in interpreting any positive relationship between margins and market concentration. The traditional explanation of a positive margins-concentration relationship centres around the argument that higher concentration, largely as a consequence of horizontal merger activity, allows firms considerable latitude in pricing behaviour.⁵ Higher levels of concentration facilitate collusion [see Stigler(1964), Cowling(1982) and Cowling and Sugden(1987)], or collusive price leadership, with the outcome that firms in relatively highly concentrated industries have higher observed margins. The counter argument by Demsetz(1973,1974) is that industries become more concentrated because certain firms within the industry possess superior efficiency advantages over their rivals. Demsetz(1973) argues that the differential efficiency (lower marginal costs) of leading firms engenders a skewed distribution of market shares and hence higher concentration. In sharp contrast to the "market power" thesis a positive margins-concentration relationship is explained by leading firm efficiency not collusive practices. The problem this presents for empirical research in industrial organisation is that there is an observational equivalence issue since an observed positive margins concentration relationship appears to be consistent with both the market power and relative firm efficiency hypotheses.

This has led some authors to propose that a simple test of the relative efficiency hypothesis

⁵ There is considerable merit in this view. Barton and Sherman(1984) examine the price and profit effects of horizontal merger in a case study of the U.S. microfilm market between 1970 and 1982. Their evidence strongly supports the view that increases in market share following two important mergers resulted in increases in relative prices.

is to unearth a positive intra-industry market share-margins relationship. Alternatively, if the market power hypothesis is valid then higher prices should benefit all firms equally and there should be little difference in the profitability of different sized firms within the industry. [see Clarke, Davies and Waterson(1984) and Kwoka and Ravenscraft(1986)].

However, inspection of equation 5.3 reveals that such tests are inadequate. Assuming initially Cournot behaviour, ie $\lambda_{ij}=\alpha_{ij}=0$ intra-industry margins can only differ due to differential efficiency (lower marginal cost functions). The lower marginal cost implies a higher margin and higher market share. But relaxing the Cournot behaviour assumption implies that this test is no longer valid and we cannot infer relative efficiency. For any given intra-industry cross section study profit margins can differ due to either differences in marginal costs, or differences across firms in the implicit collusion term α_{ij} . To the extent that there are differences in α_{ij} between large and small firms then this can explain higher margins. In short, the very real possibility of potential collusion implies that we cannot infer efficiency from intra industry cross section studies.

An alternative approach to discriminate between market power and relative firm efficiency has been suggested by Clarke, Davies and Waterson(1984) in which they explicitly make the estimated value of the degree of implicit collusion within the industry a function of seller concentration. If the market power hypothesis is valid then we would expect a positive and significant relationship to emerge. Alternatively, if the Demsetz(1973) view is to prevail a negative or insignificant relationship should be observed. Although seller concentration can be considered an important determinant of the degree of collusion it should not be regarded as the sole factor [see Cowling(1982), Cowling and Molho(1982)]. One such alternative factor is the presence of unions. We would not expect firms to be indifferent to the activity of trade unions and there is every reason to believe that union presence will shape, directly or indirectly, the degree of collusion [see Dewatripont(1987), Cowling and Molho(1982)]. This suggests that not only is concentration a determinant of collusion but so is unionism.⁶ If the presence of unions makes collusion more likely then a positive relationship should emerge. We account for both these factors in our estimating framework below.

5.3 Some existing evidence.

The Industrial Organisation literature is replete with models of oligopoly and theories of inter-firm dependence, however this burgeoning literature has not been matched by similar efforts to

⁶ Cowling and Molho(1982) argue in the context of the determination of labours share that firms have an incentive to unite in the face of union demands for higher wages in order to protect margins. This strongly suggests that unionism facilitates collusion by forcing oligopolists closer together in the face of common adversity.

empirically test or evaluate the nature or pattern of inter-firm dependence.⁷ In consequence there is a relative paucity of empirical evidence on the exact pattern of conjectural variations or implicit collusion in oligopoly. In the existing empirical literature the treatment of conjectures has proceeded in a variety of ways. One method of measuring the degree of apparent collusion [see the review in Geroski(1988)] involves the parameterisation of marginal revenue and cost functions to ascertain whether observed prices exceed marginal costs at observed outputs. With suitable data on inputs, as well as input costs, in addition to data on prices and outputs, it is certainly within the realm of possibility that one can estimate jointly the parameters of a production or cost function along with a marginal revenue function to test whether the latter is horizontal (ie test for price taking behaviour). But such methods can impose *a priori* much structure on the data by the choice of the functional form of the marginal revenue and cost curves. Typically, such studies have specified very neoclassical functional forms [see for example Appelbaum(1979, 1982) and Hall(1986) which reject, not surprisingly, the null hypothesis of price taking behaviour].

The rejection of price taking behaviour though is only one small part of the problem in examining interdependent behaviour among firms. The important issue is to examine what type of behaviour is likely to have generated the observed data. To this end researchers have been compelled to exploit the conjectural variation oligopoly model (discussed previously) where such interdependence is captured by the degree of apparent collusion or conjectural variation term. The existing literature appears to have arrived at a consensus that neither price taking behaviour nor Cournot behaviour is characteristic of firms or industries in modern industrial economy. Rogers(1983) estimated a conjectural variation elasticity for various firms in the U.S. steel industry over the period 1920-1940 and 1946-1972. His results demonstrate that conjectural variations do vary across firms, and he finds that smaller firms tend to have higher conjectural elasticities. Importantly, none of the reported estimates are negative so one can conclude that rivalrous behaviour has not been a characteristic of the U.S. steel industry. Gallop and Roberts(1979) report results for a conjectural variation oligopoly model using 160 firms in the U.S. coffee roasting industry in 1972. Importantly they reject Cournot behaviour among all firms in their sample. They report results of a conjectural variation model where small firms conjectural variations are compared relative to what they term "benchmark firms" in the industry. In effect these are the leading firms. This approach has the merit that the authors are able to distinguish between alternative belief patterns between large and small firms. However since they only have cross section data they cannot formally test for the exact pattern of collusive behaviour for each firm and this makes their results somewhat difficult to interpret.

⁷ This trend is not absolute though and recently efforts have been made to detect the existence of price taking behaviour and firm interdependence. Geroski(1988), in a review of monopoly power, estimates that there are about a dozen studies which examine conjectural variations directly.

However, it is possible to conclude that most firms in their sample have different conjectural variation terms to the leading firms. Other studies, too, reveal that non Cournot non-price taking behaviour is a distinct hallmark of industrial society. [eg. Itwata(1974) rejects Cournot behaviour in the Japanese flat glass industry; Appelbaum(1982) for the U.S. electrical machinery and tobacco industry over the period 1947-1971; and Slade(1986) for the retail gasoline market in Vancouver] Overall empirical studies to date point to non-Cournot firm activity.⁸

Another proposed method is to retrieve directly an estimate of α from a regression of profit margins on market shares. This approach is favoured by Clarke, Davies and Waterson(1984). Alternatively, a second proposed option is to treat the degree of collusion as a function of other market characteristics, eg. market concentration, which is then substituted into an equation such as 5.3. This approach is favoured, *inter alia*, by Kwoka and Ravenscraft(1986).

5.3.1. Directly retrieving estimates of apparent collusion.

An important study that attempts both to evaluate the degree of collusion implied the conjectural variation model and to relate the degree of collusion to seller concentration is the paper by Clarke, Davies and Waterson(1984). They present empirical estimates of the degree of apparent collusion obtained directly from an equation such as 5.3 using British manufacturing data between 1971 and 1977. Since they do not have data on individual firm margins or shares their unit of observation, as a proxy for a firm, is the size class band (excluding the smallest size class) available in the Census of Production. The data is pooled over the period 1971-77 to improve precision of estimates. Their proposed methodology is first to regress the profit margin of the i^{th} class in industry j , μ_{ij} , on market share, MS_{ij} , for each of the 104 suitable MLH industries available to them using the unrestricted estimating equation : $\mu_{ij} = \gamma_0 + \gamma_1 MS_{ij} + u_{ij}$. It emerged that only 29 out of the 104 industries exhibited a positive and significant margins-market share relationship. Second, according to the homogenous product oligopoly model the ratio $\hat{\gamma}_0 / (\hat{\gamma}_1 + \hat{\gamma}_0)$ provides an estimate of α for each industry. So for each industry, therefore, only where a positive margins-market share relationship was observed they report an estimate $\hat{\alpha}$. Considerable inter-industry variation in the estimates of α is observed from the pharmaceutical industry ($\hat{\alpha}=0.432$) to grain milling ($\hat{\alpha}=0.156$). Finally, they propose a regression of $\hat{\alpha}$ on a measure of concentration (for values of the degree of collusion that are positive) to test whether, according to authors such as Stigler(1964), a positive relationship between collusion and concentration exists. Their expectations are confirmed and a robust positive relationship

⁸ Although not addressing the issue of the conjectural variation directly in his estimating technique, Martin(1988b) has developed a model to test between price taking behaviour and market power. Using data for the U.S. motor vehicle and medical supplies industries Martin(1988b) finds evidence in favour of the market power hypothesis. The issue is further developed and explored in Martin (1988c)

between the degree of collusion, α , and concentration emerges. This result holds whether concentration is measured as the Herfindahl index or the five firm seller concentration ratio. Overall the Clarke Davies Waterson results are important since they not only illustrate the existence of significant implicit collusion but also that this value varies considerably over different industries. Also by relating the degree of collusion to a measure of seller concentration their results corroborate the Stigler(1964) hypothesis that higher levels of concentration facilitate higher collusion. In particular the result is evidence in favour of the market power hypothesis and against the Demsetz relative efficiency view.

The Clarke, Davies and Waterson(1984) paper has two distinct advantages. First, it proposes a direct test of the homogenous product oligopoly model and retrieves estimates of the degree of implicit collusion. Second, it relates the degree of collusion to concentration thereby claiming to verify empirically that collusion is facilitated by increasing concentration. The methodology employed by the authors is, however, subject to some criticism. The unit of empirical observation is the size class band in each industry as a proxy for the firm. However, within any size class band there will be a number of individual enterprises though and so they are implicitly ascribing to each firm within that size class band the same market share effect and degree of collusion. Moreover, since they have only seven years data they cannot derive an individual effect for each size class band. Instead they pool the bands within each industry and hence obtain an average industry estimate of the degree of collusion.⁹ Together this implies that Clarke, Davies and Waterson(1984) are not allowing for potentially important inter-firm variation in the estimates of α . In our empirical work below we can overcome this problem since we have considerable time series data for each firm.

An important issue concerns Clarke Davies and Waterson's(1984) proposed regression of their estimate of α on the concentration term in an estimating equation of the form : $\alpha_j = b_0 + b_1 H_j + u_j$, where H is the Herfindahl index of concentration and u_j is an error term. The hypothesis under examination is that $b_1 > 0$. There are three separate areas of concern which cast doubt on the validity of the final result namely that there exists a positive relationship between the degree of collusion and concentration in their data. First, concerns the issue of sample selection on the basis of the dependent variable that the authors suggest. Having initially estimated α_j for each industry from a first stage regression identified above Clarke, Davies and Waterson(1984) then exclude observations with estimated $\alpha_j < 0$. A second stage regression of α on concentration (for observed values of $\alpha > 0$) is then performed. This is advocated on the basis that industries where a non-positive market share-margins relationships is

⁹ For example, an industry with five size class bands would yield a total sample of 35 observations when pooled, hence only an average effect for the whole industry can be derived. Also note that industries with few size bands will have a smaller number of observations and can introduce small sample bias. Furthermore it is clear that Clarke, Davies and Waterson(1984) had to omit a several industries on the grounds that there were not enough size classes. By definition they have included only large industries in their study.

4.7. Implications and conclusions.

In this chapter we built upon our analysis of the nature of the firm to identify and explored some of the salient themes within the monopoly capital tradition. Initially we briefly examined the relationship between competition and monopoly capitalism. We concluded that it was more complex than some authors recognise, in particular that monopoly capitalism is subject to periods of both rivalry and collusion but we expect collusion to be the norm. We then went on to sketch how the traditional Cournot type modelling strategy, with its emphasis on structure and performance, can be used as a basis for understanding monopoly capitalism. We raised some fundamental concerns with this approach focusing on its implications for equilibrium analysis and causation. Importantly we showed, using Stigler's(1964) analysis, why the model does not assume profit maximising behaviour on the part of firms. However this problem can be resolved by the appropriate interpretation of the behaviour of firms. We then went on to illustrate how we do not expect the threat of entry to erode the degree of monopoly over time through the threat of potential entry. Indeed, we illustrated that firms can engage in various strategic strategies that make incumbent firms within oligopolies relatively safe from encroachment by rival capitalists. we then examined the conditions under which union behaviour, through collective bargaining can, encroach upon the surplus. We showed that whilst unions can erode margins if firms hold pessimistic expectations about the response of rivals this is not generally the case. where there is collusion over wage setting, or collusive leadership, then money wage gains can be marked up in terms of product price increases. In the following chapters we take up these issues and examine empirically the relationship between unionism, collusion and performance.

observed are incompatible with the homogenous product oligopoly model that they are testing. Such selection on the basis of the dependent variable will automatically bias the estimated coefficient on the concentration term in the second stage regression because the distribution of α_j is truncated [the nature of the bias is detailed in the appendix to this chapter or Maddala(1988, p. 284)].

Even if the problem of bias emanating from the truncated nature of the dependent variable is resolved there is a further issue. From the authors proposed second stage estimating equation there is a potential problem of bias between α and the Herfindahl index. In the first stage equation an estimate of α is retrieved from an equation which includes market share and in the second stage α is regressed on the Herfindahl index that is also related to market shares. Hence, the estimated effect of the Herfindahl index on α may be biased. Finally, the authors have estimated the effect of concentration on the degree of collusion from a two stage process. First, they estimated the degree of collusion and second they regressed it on a measure of concentration. However, since there will be an error associated with the estimated degree of collusion variable a more efficient estimating procedure would be to substitute the equation determining the degree of collusion into the first stage model and evaluate directly the effect of concentration on collusion (we consider this in section 5.4 below). Taken together these problems cast considerable doubt on the results provided by Clarke Davies and Waterson on the relationship between the degree of collusion and seller concentration.

5.3.2. Collusion as a function of market structure.

An alternative strategy for examining the determinants of firm level profit margins within the homogenous product oligopoly model is to treat the conjecture term as a function of other market characteristics. Recognising this Kwoka and Ravenscraft(1986) posit, with some justification, that the conjecture term λ is a linear function of market concentration, $CONC_j$. Specifically they assume that $\lambda_{ij}=\gamma CONC_j$ which, as is clear from equation 5.1, on substitution yields an equation for the original Cowling-Waterson(1976) model as $\mu_{ij}=(MS_i+\gamma CONC_j MS_{ij})/\eta_j$. And similarly for the Clarke and Davies(1982) model : substituting the determinants of the conjecture term into equation 5.3 the following equation : $\mu_{ij}=[MS_{ij}+\gamma CONC_j(1-MS_{ij})]/\eta_j$ is derived. The important point about this methodology is that conjectures are modelled as a function of other market characteristics. This allows certain restrictions to be placed on the subsequent estimating equations and allows estimates of the conjectural elasticity to be unearthed. Since data on profit margins, concentration, and market shares are available the Kwoka and Ravenscraft(1986) method implies that the degree of implicit collusion can be retrieved as the product of the estimated coefficient on the concentration interaction term in the

model : $\mu_{ij}=[MS_{ij}+\gamma CONC_j(1-MS_{ij})]/\eta_j$ and the mean of concentration itself.¹⁰

This approach has been recently adopted by Machin and Van Reenan(1991) in a study cyclicity and collusion among British manufacturing firms. They extend the specification of the conjectural elasticity term making the degree of collusion a function of four variables namely industry concentration, union density, imports in home demand, and the lagged profit margin. Having specified this rather *ad hoc* linear collusion function they then substitute it into an equation similar to 5.3 and retrieve an estimate of apparent collusion. For the period 1975-1986 they estimate the mean value of apparent collusion to be 0.139 which turns out to be significantly different from zero. Hence they, too, reject Cournot behaviour. Furthermore they present results for a time varying measure of collusion which over their sample period they suggest implies pro-cyclical collusive behaviour. However, their estimation method is subject to some criticism. First the functional form of the collusion term is arbitrary. This suggests that the estimated values of the conjectural elasticity will be strongly conditioned by which variables are assumed to determine the degree of collusion to begin with. The importance of this can be seen by examining their time trend of their estimate of collusion and the profit margin. The collusion estimate appears to track the profit margin well suggesting that the included lagged profit margin term in the collusion equation condition very strongly the resulting estimate of the degree of collusion. This latter point is important in explaining the supposed pro-cyclical behaviour of collusion. Since their estimate of collusion is fashioned so much by the lagged margin this suggests that their results are saying more about lagged margins over the cycle rather than collusion over the cycle.

Furthermore, there is an important conceptual issue on how one interprets this time varying estimate of collusion. Whilst an overall average estimate of the degree of collusion is a useful summary statistic for measuring collusive behaviour, the dynamic estimates presented by Machin and Van Reenan(1991) are difficult to interpret. For example how do firms react to changes in collusion? What is the expected nature of collusion over the cycle, and how does one test for it? Such issues are not addressed by the authors. So whilst their static estimate of the degree of collusion tells us that, at a minimum, (bearing in mind that this estimate is based on a functional form that may be mis-specified) non-Cournot behaviour exists their dynamic estimates of collusion are prone to considerable

¹⁰ Suppose that collusion is determined solely by concentration in the form : $\alpha_{ij}=\gamma CONC_j$. Substitution into equation 5.3 yields an estimating equation : $\mu_{ij}=[MS_{ij}+\gamma CONC_j(1-MS_{ij})]/\eta_j$. Once estimated this equation implies the degree of collusion is retrieved as :

$$\hat{\alpha}_{ij} = \hat{\gamma} \overline{CONC}_j$$

where a hat denotes an estimated value and a bar a mean value. It is also clear from the estimating equation that the industry elasticity of demand has to be assumed equal to unity. Indeed this is what Machin and van Reenan(1991) do in their study of collusion for the U.K.

error. Below we circumvent these problems by simply specifying an average estimate for each firm and our estimate of implicit collusion is not subject to the problems of functional form as are Machin and Van Reenans(1991).

5.4. Modelling strategy and test procedure.

Our objective in this section is to formulate an empirical framework to test the homogenous product oligopoly model presented in section 5.2. Furthermore we specify our empirical model in such a way as to retrieve directly an estimate of the degree of apparent collusion. We further specify our model so as to discriminate between competing types of oligopoly behaviour. Our objective here is not only to detect the existence of interdependent behaviour (that is the rejection of the Cournot hypothesis) but to unearth the pattern of conjectural variations among firms. The pattern of conjectural variations, or the degree of collusion, can take three types. First conjectures can be equal to zero for all firms. This is the Cournot behavioural hypothesis. Second, conjectures can be non-zero within an industry but nevertheless equal for all firms. This suggests the presence of interdependence among firms within an industry group but that firm behaviour is homogenous. Finally, firms can hold different (ie unequal) conjectures across firms. In this case behaviour is interdependent but firms within an industry group have differential responses to changes in market output.

Our initial empirical approach to examine these hypotheses proceeds in the spirit of Clarke, Davies and Waterson(1984). We use observed data on margins and market shares to unearth the degree of implicit collusion implied by equation 5.3 since we do not have readily available data either on prices or marginal costs. Our data set consists of a balanced panel 182 firms over a 17 year time period from 1970 to 1986. This unusually rich data source allows us to unearth the pattern of interdependence among firms in manufacturing. These 182 firms are distributed among some forty industrial groups under the Exstat classification scheme. Referring back to equation 5.3 the right hand side of this equation suggests that the degree of implicit collusion enters the determination of profit margins in an interactive way [as recognised by Kwoka and Ravenscraft(1986)]. We propose the following estimating equation as the empirical counterpart of the theoretical model described by equation 5.3 :

$$\mu_{ijk} = (P_{jk} - MC_{ijk}) / P_{jk} = \beta_{1i}MS_{ijk}^T + \beta_{2i}(1 - MS_{ijk})^T + \zeta_i + \varepsilon_{ijk} \quad (5.4)$$

where μ_{ij} is the price cost margin of firm i in industry j at time period t^{11} , MS_{ij}^T is a transformed market share measure. It is firm i 's share of sales in industry j at time t weighted by the industry price elasticity of demand. Similarly the term $(1 - MS_{ij})^T$ is also weighted by the industry price elasticity of demand. The importance of weighting these terms is that we can then interpret the estimated slope coefficients β_2 as the degree of apparent collusion.¹² The term ζ_t is a time trend included to capture time specific effects and ε_{ijt} is an i.i.d error factor. It is important to introduce this error term to account for all other omitted factors that influence the price cost margin. Whilst the homogenous product oligopoly model in section 5.3 suggests that margins are determined by three factors, namely the price elasticity of demand, the conjectural elasticity and market share it is likely that other factors are of importance too such as other size related advantages of firms, scale economies, and the role played by trade unionism.

The slope parameters to be estimated potentially have variation across all firms in the sample. That is we pool the data and potentially allow individual firm market share effects via β_{1i} and individual apparent collusion effects via β_2 .

The estimated coefficient β_2 , provides a direct estimate of the degree of apparent collusion since we have weighted the term $(1 - MS_{ij})$ by the price elasticity of demand to derive $(1 - MS_{ij})^T$. For any given firm the Cournot hypothesis of independent behaviour is that $\beta_2=0$ so that the firm believes that changes in own output will not result in changes in output by other firms. Non-independent behaviour is captured by the hypothesis that $\beta_2 \neq 0$. We can further specify the pattern of firm behaviour in this model.

The unrestricted nature of equation 5.4 permits a number of tests to be carried out on the nature and pattern of conjectural variations across firms by the imposition of appropriate linear restrictions. To begin with it is certainly within the realm of possibility that all firms in our sample obey the behavioural assumptions predicted by Cournot. Firms make production decisions without reference to rivals potential reactions. More formally, this imposes the linear restriction of Cournot behaviour :

¹¹ An additional point needs to be made. Fisher(1987) claims, for example, that the profit to sales ratio is an inaccurate measure of the Lerner index. Fisher(1987) proposes a non-linear transformation on the grounds that it reduces such problems. However, empirically, Machin(1991) finds that such transformations do not qualitatively affect the results in margins equations.

¹² We describe more fully in the appendix to this Chapter the rationale for weighting the independent variables used in the analysis. If the market share term is not divided by an estimate of the price elasticity of demand then the coefficient β_2 , as is clear from equation 5.3, is interpreted as the ratio of the degree of implicit collusion to the price elasticity of demand ($\beta_2 = \alpha_i/\eta$). In this case to interpret β_2 as the degree of collusion we would have to assume the price elasticity of demand was unity. Although this has been done by some authors (eg. Machin and Van Reenan(1991) it is not an entirely satisfactory solution hence the approach adopted here.

$$\beta_{21} = \beta_{22} = \beta_{23} = \dots = \beta_{2n} = 0 \quad \text{ie. for firms } 1, \dots, n \quad (5.5)$$

By estimating the unrestricted model in equation 5.4 and estimating a restricted model implied by the Cournot assumptions we can test whether Cournot behaviour is characteristic of all the firms in our sample. We can also test the Cournot restrictions for a subset of firms in our sample. Since we have forty industry groups within our sample of 182 firms we can test for the existence of Cournot behaviour in each of the industries.

If the Cournot hypothesis is rejected it can still be true that all firms have identical but non-zero conjectural elasticities. Firms might be expected to react to changes in market output but not to differentiate their reactions according to the source of that change. The formal representation of the equality of conjectural elasticities hypothesis is :

$$\beta_{21} = \beta_{22} = \beta_{23} = \dots = \beta_{2n} ; \quad \text{for firms } i=1, \dots, n \quad (5.6)$$

Again, we can also test the homogeneity or equality of reaction restrictions for a subset of firms in our sample. We test for the existence of homogeneous behaviour in each of the industries.

Failure of both the homogeneity and Cournot restriction would be highly suggestive of a more complex pattern of firm interdependence. To examine this we estimate for each of the 182 firms separately the model : $\mu_i = \beta_1 MS_i^T + \beta_2 (1 - MS_i)^T + \varepsilon_i$. We can then derive an individual degree of apparent collusion for each firm in our sample by examining the estimated coefficient β_2 (= α for each firm). We can then describe the frequency distribution of the estimated conjectural elasticity for all the firms in our sample.

Our theoretical section also highlighted the importance of seller concentration in shaping collusion. The Stigler(1964) hypothesis is that collusion is a positive function of market concentration. Furthermore, Cowling(1982) extends this by arguing that collusion is determined by a number of other factors. Once such factor being the presence of trade unions. Cowling and Molho(1982) argue that in the face of wage demands by unions oligopolists are likely to engage in collusive behaviour to protect margins. Both these hypotheses can be incorporated into our empirical framework. Suppose that the degree of implicit collusion is a linear function of the form : $\alpha_{ij} = \gamma_1 CONC_j + \gamma_2 UNION_j$ where CONC and UNION are respectively measures of concentration and unionism. This functional form is similar in spirit to that used by Kwoka and Ravenscraft(1986). From equation 5.4 β_2 is a direct measure of α_{ij} and hence substituting the determinants of the degree of collusion into this equation yields :

$$\mu_{ij} = \beta_{1i} MS_{ij}^T + \gamma_1 CONC_j (1 - MS_{ij})^T + \gamma_2 UNION_j (1 - MS_{ij})^T + \zeta_{ij} + \varepsilon_{ij} \quad (5.7)$$

where the Stigler(1964) hypothesis predicts that $\gamma_1 > 0$ if concentration facilitates collusion. In addition if increases in union presence results in a higher degree of collusion then $\gamma_2 > 0$.¹³

5.5. Data Description.

Our data set consists of a balanced panel of 182 large U.K. quoted companies over the period 1970-1986 derived from the Datastream International company accounts. In the appendix to this chapter we describe more fully both the selection criteria and data construction. Our data set is constrained to those companies that operate within the manufacturing sector so that we can match in relevant industry level data. Our objective was to achieve as long a time series as possible for each company so that it is possible to derive as precise an estimate of α_{ij} as possible for each firm. Since Datastream covers only large firms this generates some sample selection bias but this is a problem that is difficult to overcome or resolve practically. Furthermore, since we are looking primarily at large firms it can be plausibly argued [see Machin and Van Reenan(1991)] that these are the very firms that a study on the oligopoly power and collusion should consider. In figures 5.1 to 5.4 we describe the average annual behaviour of the key variables used in this study.

The time series behaviour of the firm level profit margin, μ_{ij} , is described in figure 5.1 which plots the average value for each year. The margin is defined as the ratio of trading profits which are inclusive of interest payments and depreciation to total firm sales. This measure is adopted since it is the best approximation to the theoretically relevant price cost margin that is available from company accounts data. We observe that profit margins fell during the 1970's (which is consistent with the evidence presented in chapter two) and reached a low value during the recession of 1981. Throughout the 1980's the profit margin then trends upwards (again consistent with the evidence presented in chapter two). In figures 5.2 to 5.4 we plot the annual means of market share, concentration and union density.¹⁴ We see that the market share variable appears to be tending up over the sample period, whereas the concentration variable on the other hand has fallen. The union density variable displays behaviour that is well known. There is evidence that during the 1970's union density was rising. However, during the Thatcher period and the recession years of 1980-1981 there is strong evidence of a pronounced decline in this variable.

¹³ Note that in contrast to the Clarke Davies and Waterson(1984) approach we estimate the effect of concentration on collusion efficiently by substituting the determinants of α into the original estimating equation. This uses all the information in the data set and does not truncate on the basis of $\alpha > 0$.

¹⁴ Again sources of data, definitions and matching scheme are presented in the appendix to the Chapter).

5.6. Evidence on collusion and the determination of margins.

Our test results examining the nature and pattern of apparent collusion are given in tables 5.1 to 5.4. Table 5.1 details tests of Cournot and homogeneity of behaviour among all firms in our sample. In table 5.2 we summarise the Cournot and homogeneity tests for each industry group. In table 5.3 we summarise Cournot and imperfectly collusive behaviour in our sample of firms. Finally, in table 5.4 we present estimated values of the degree of apparent collusion for each individual firm.

Turning first to the results of table 5.1. We estimated the unrestricted pooled model in equation 5.4 by Least Squares Dummy Variables (see Hsiao(1986)). We then imposed the Cournot restrictions that all firms in the sample behave independently of each other. The restriction was tested by calculating the difference in the sum of squared residuals generated by imposing the linear restrictions in equation 5.5. The calculated F statistic is 174.337 which is easily significant at the 99% level relative to the critical value of 1.25. We reject the Cournot hypothesis concluding that at least some of the firms in our aggregate sample do incorporate into their decision process their rivals expected reactions. Although we reject Cournot behaviour it is still possible that all firms in our sample have non-zero but homogenous conjectural elasticities. The restriction implied by equation 5.6 was imposed on the data. The calculated F statistic is 41.129 which is significant at the 99% level relative to the critical value of 1.25. The hypothesis is clearly rejected. At a minimum we can conclude that at least some of the firms in our aggregate sample hold different conjectural elasticities relative to each other.

Although we reject the hypothesis that conjectural elasticities are homogeneous across all firms the imposition of this restriction on the data provides a useful summary statistic. We pooled all 182 firms in our sample to derive an average estimate of the degree of apparent collusion on the basis of a unit price elasticity of demand. This resulted in the following estimated equation (asymptotic standard errors are reported in parenthesis) :

μ_{ijt}	$= 0.205MS_{ijt}^T + 0.1251(1 - MS_{ijt})^T$	$R^2=0.924, N=3094$
	$(0.013) \quad (0.0034)$	$F \text{ statistic} = 189.96$

The first important point to note is that the point estimate on the $(1-MS_{ijt})^T$ implies that we significantly reject the hypothesis of Cournot behaviour. Indeed, the estimated value of the degree of apparent collusion, or conjectural elasticity term, is 0.125. This suggests that the average firm contemplating changing its output by 10% believes that its rivals will change their output by 1.25%. Two points should, however, be borne in mind. First it is important to stress is that this non-time varying measure of the degree of apparent collusion eschews Cournot behaviour for the average firm. Second, since we are considering only the average value of the degree of apparent collusion this can conceal much inter-

firm variation in the conjectural elasticity¹⁵. We examine the variation in the conjectural elasticity estimates below. Compared to previous studies which estimates of the average degree of collusion for the U.K. the result here is very similar. Machin and Van Reenan(1991) using a different technique to that employed here find that the average conjectural variation elasticity is marginally higher at 0.139. It also compares favourably to the results presented in Clarke Davies and Waterson(1984).¹⁶

Whilst the restrictions of Cournot behaviour and homogeneity of behaviour may not be valid for all firms in the aggregate sample it can still be true for some subsets of firms. We estimated the restricted and unrestricted equations for each of the industry groups in our sample. The results are reported in table 5.2. For all 38 industry groups for which the models could be estimated we found that the restrictions of both Cournot behaviour and homogeneity of behaviour among firms to given change in output could be rejected. This important result suggests that none of the industry groups in British manufacturing cannot be said to be characterised by either Cournot behaviour or that firms have equal responses to output changes.

Taken together these results suggest that estimates of the degree of apparent collusion conceals a high degree of inter-firm variation. To examine the more complex pattern of firm behaviour we estimated the unrestricted model : $\mu_i = \beta_1 MS_i^T + \beta_2 (1-MS)_i^T + \epsilon_i$ for each firm individually in our sample by ordinary least squares. This was possible since for each of the 182 firms we have 17 years data. This resulted in 182 separate estimates of the degree of apparent collusion, one for each firm. In table 5.3 we detail the type of behaviour that emerged according to the number of firms that exhibited that behaviour. In these individual firm level regressions a number of results occurred. From the 182 firms it was found that the degree of apparent collusion, α_{ij} , was positive for 162 firms, the remaining 20 being negative. Of those that were positive it was found that 138 firms exhibited behaviour that was positive and significantly different from Cournot. The maximum value for α recorded was 0.603, and a minimum of -0.261. The average degree of collusion in the sample of estimated values was 0.126 with a standard deviation of 0.122. The average figure is of course very similar to that already highlighted previously. But the important point to stress is that the average figure conceals considerable variation in the degree of implicit collusion among firms. For the vast majority of firms in our sample (indeed 75.82% of firms) we can conclude the existence of a significant degree of imperfect collusion ie. values of α that lie between zero and unity. For those

¹⁵ This is obvious from the fact that previously we rejected the hypothesis that the conjectural elasticity was equal for all firms. Imposing such homogeneity gives all firms the same average effect.

¹⁶ We should note that the transformed conjectural variation model presented here (ie weighted by the price elasticity of demand) predicts that the estimated coefficient on the market share term should be unity. This hypothesis is rejected, suggesting at a minimum that the market share term may be proxying size related advantages of firms and not simply reflecting the elasticity of product demand.

firms 20 firms where a negative value for α_{ij} was recorded it turned out that only four, or 2% of the sample, were significant. We are bound to conclude that non-collusive behaviour is not characteristic of manufacturing firms. The implication is that 40 firms from our sample (or 21.98%) exhibited Cournot type behaviour.¹⁷ We can further conclude that rivalrous behaviour which would be captured by negative values of α is not a characteristic of the firms in our sample. Since the vast majority of firms recorded values of α between zero and unity this is strong evidence in favour of a degree of imperfect collusion. Indeed, it supports Cowling's(1982) contention that collusive behaviour is sustainable. Since we have presented an estimate of the degree of apparent collusion for each firm over a seventeen period we can conclude that on average over this period imperfect collusion, rather than pro-rivalrous behaviour, exists.

In Figure 5.5 we plot the frequency distribution of the 182 estimated conjectural elasticities, α_{ij} . Again we see that the vast majority of firms have estimated conjectural elasticities that lie between zero and one. Importantly, and as we would expect, there are no cases in which an estimated conjectural elasticity fell outside the interval $-1 < \alpha_{ij} < 1$, and in most cases behaviour is positive and non-Cournot (as seen by the number of firms to the right of zero on the x axis).

In table 5.4 we rank a number of firms in descending order by the value of the estimated conjectural elasticity term. For brevity we simply rank (in descending order) the top seventy five firms that scored the highest estimated value of the degree of implicit collusion. The highest value was recorded for the Scholes Group. It has a positive and significant estimated conjectural elasticity equal to 0.603. It suggests that this firm believes that if it were to change output by 10% rival firms would accommodate this by increasing their output by 6.03%. Likewise, say, for Courtaulds. It's estimated conjectural elasticity term suggests that if it changes output by 10% then its expectation or belief pattern is that rival firms will accommodate this by increasing output by approximately 3.4%. The table clearly shows both the variation across firms of the degree of implicit collusion and also the significance of such behaviour patterns.¹⁸

¹⁷ We recognise that there is an important issue concerning the potential endogeneity of market share and the price cost margin. To this end we re-estimated the 182 regression models using Instrumental Variable techniques, instrumenting the current value of market share with its lagged value (we lost one degree of freedom for each firm from an already limited sample). The resulting estimates produced similar but not identical results to the least squares procedure with several outliers emerging. However the rank correlation coefficient between the estimated conjectural elasticity term from the two procedures was 0.78 and so the problem of endogeneity may not be too severe. Using IV estimation 160 firms recorded a positive value of α , or 87.91% of the sample, and 22 negative (12.08%). Of those that were positive 127 were significant or 69.78%. Of those that were negative only 6 were significant (3.29% of the sample). Since this is a very similar picture to that described in the text we can therefore have confidence in the OLS results. For current purposes we remain with OLS estimates due to the complex issue of identifying a relevant instrument matrix for each of the separate 182 models to be estimated.

¹⁸ There is of course an important question concerning the sensitivity of the ranking of firms in table 5.4 to alternative estimation techniques. Estimation by I.V. did not drastically alter the ranking or conclusions so far drawn. For example Scholes had an α estimate of 0.623 and Courtaulds and value of 0.439. Both were significant. The following firms, along with their estimated significant α values in parenthesis, were among the highest ten estimated values of α for firms using

The results so far have illustrated that collusion is an important characteristic of firms in British manufacturing. Indeed, we reject the Cournot hypothesis and that firms hold identical conjectural elasticity patterns. Figure 5.5 and table 5.4 illustrate the considerable variation in the estimated degree of apparent collusion across firms. However, our theoretical section highlighted the importance of the determination of the degree of apparent collusion. We proposed that one can model the degree of implicit collusion as : $\alpha_{ij} = \gamma_1 \text{CONC} + \gamma_2 \text{UNION}$ where CONC and UNION are respectively a measure of concentration and unionism. If the Stigler hypothesis is correct, and concentration does facilitate collusion, then our a priori expectation is that $\gamma_1 > 0$. Similarly if unionism results in firms colluding more than they might otherwise do this suggests that $\gamma_2 > 0$. Clarke Davies and Waterson also suggested that the key to discriminating between the market power and efficiency views concerning observed positive relationships between margins and concentration was to unearth a positive concentration collusion relationship. This would be evidence in favour of the market power thesis. To this end we estimated equation 5.7, which substitutes the relationship between collusion, unionism and concentration into the original estimating equation 5.4, with the following results (asymptotic standard errors are reported in parenthesis) :

$$\mu_{ij} = 8.540 \text{MS}_{ij}^T + 0.1184 \text{CONC} * (1 - \text{MS}_{ij})^T + 0.1149 \text{UNION} * (1 - \text{MS}_{ij})^T + \text{Time dummies}$$

(2.417) (0.0094) (0.0082)

Adjusted R²=0.921, F statistic = 182.6

As is clear from the reported results the Stigler(1964) hypothesis is clearly confirmed.¹⁹ The positive and highly significant coefficient on the term $\text{CONC} * (1 - \text{MS}_{ij})^T$ is strong evidence that there exists a positive relationship between the degree of apparent collusion and seller concentration in our sample of manufacturing firms. Unlike the results presented by Clarke Davies and Waterson(1984) those here are free from the bias introduced by selecting only on positive values of α . This new evidence then, along with our results on the inter firm variation in the estimated values of the conjectural elasticity term, suggest that not only is collusion a very real phenomenon in British manufacturing, but also that it is likely to increase with monopolisation of product markets. Furthermore our results indicate that collusion is positively affected by union density. This entirely new result is consistent with the view adopted by Cowling and Molho(1982). Firms within oligopoly when faced by wage demands by

I.V. techniques. Bulgjin (0.757), Scholes (0.623) Electronic Rentals (0.459) Beatson Clark (0.497) Dowding and Mills (0.390) and Courtaulds (0.439).

¹⁹ The equation estimates each individual market share term freely by including 182 market share terms each interacted with a firm dummy variable ie. a MS term is estimated for each firm. Furthermore the included time dummies are jointly significant with a calculated F statistic of 30.39.

unions have an incentive to collude to protect profit margins. These results together illustrate that both the complex nature of implicit collusion across firms but also that one reason why one can observe a positive correlation between profit margins and concentration at the industry level is that more concentrated industries tend to be more collusive.

5.7 Implications and conclusion.

In this chapter we have placed the specification and nature of interdependent behaviour among firms within oligopolistic markets at centre stage. We developed an empirical test of the homogenous product oligopoly model in which we demonstrated that it was not necessary to impose Cournot or homogeneity restrictions on the pattern of firms conjectural variations. Instead this chapter we estimated the pattern of interdependent collusive behaviour from an econometric model of the firm's behavioural equations given by the first order conditions of profit maximising oligopolists. The model can be used to show at a minimum whether all or some particular set or subset of firms behave in the manner predicted by Cournot. This pattern of behaviour was overwhelmingly rejected. If we had not rejected the Cournot restriction this would presumably have meant that we could apply the working assumption of "competitive" behaviour more freely, but as we also demonstrated the absence of collusion does not imply the competitive outcome since margins are still determined by market structure. In short the absence of collusion does not imply the absence of market power. As such the closely attendant issues concerning the response by policy makers does not become markedly easier. Having rejected the Cournot assumption our results further suggest that studies of the empirical determination of margins should explicitly account for the degree of implicit collusion among firms. It further implies that omitting the pattern of conjectural variations may seriously bias estimated coefficients in such studies.

Since Cournot behaviour was rejected we further tested the hypothesis that conjectures were equal across firms within an industry. This test allowed us to ascertain whether individual firms had equal beliefs about their rivals reactions to changes in own output. If the homogeneity restriction was accepted this would imply that the industry was characterised by interdependent behaviour (non-Cournot) that was industry (or market) specific but not firm specific. In the event this restriction, too, was rejected. This result points to a rather complex pattern of interdependent firm behaviour. In an attempt to unearth this behavioural pattern our data permitted us to derive an individual specific firm estimate of the degree of apparent collusion. Again the results here suggested that for the majority of firms in our sample the null hypothesis of Cournot behaviour could easily be rejected.

Our estimate of the average degree of apparent collusion in our sample turned out to be approximately 0.11, a number consistent with recent similar studies. This estimate, though, conceals

considerable inter-firm variation in the estimated degree of collusion parameter. We reported estimates of the estimated degree of apparent collusion for a number of large companies in our sample.

Overall our results confirm the importance of placing the concept of apparent collusion at the centre of the oligopoly problem. Empirically it has emerged that interdependence among firms is an important hallmark of firm decisions. This study has gone some way to examine the nature and pattern of such firm inter-dependence and clearly points to the need for further, perhaps case by case, studies of firm behaviour.

Figure 5.1 : Average annual profit margins in 182 British manufacturing companies 1970-1986.

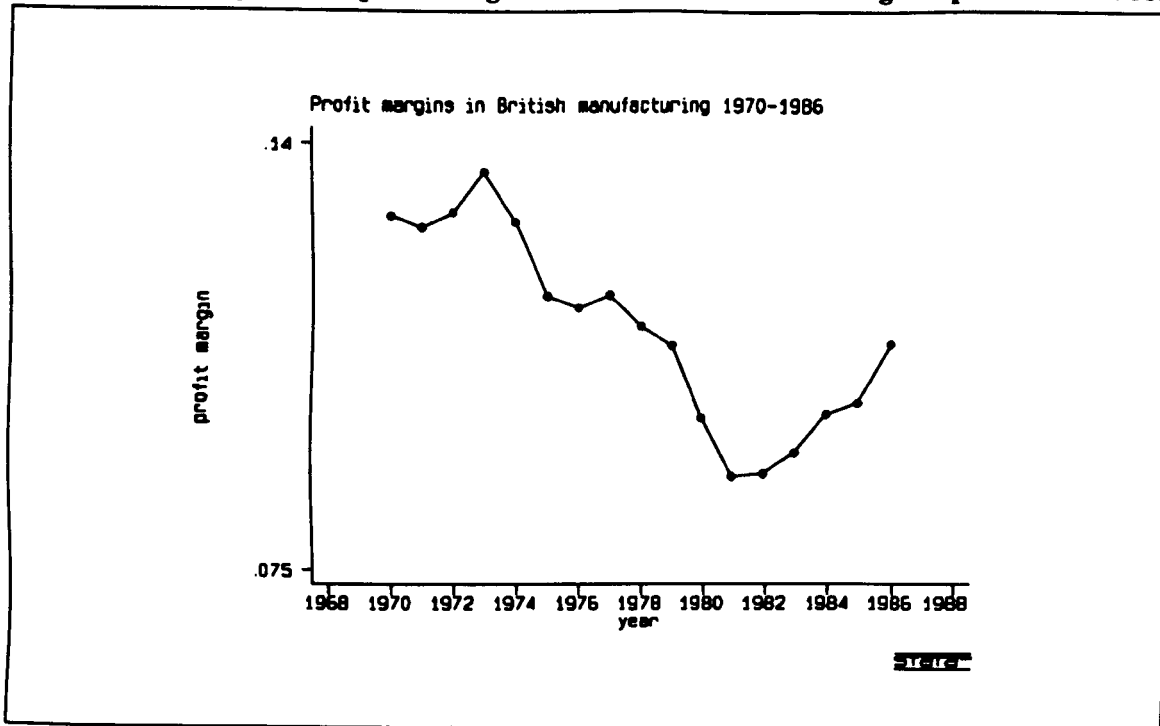


Figure 5.2 : Average market shares in 182 British manufacturing companies 1970-1986.

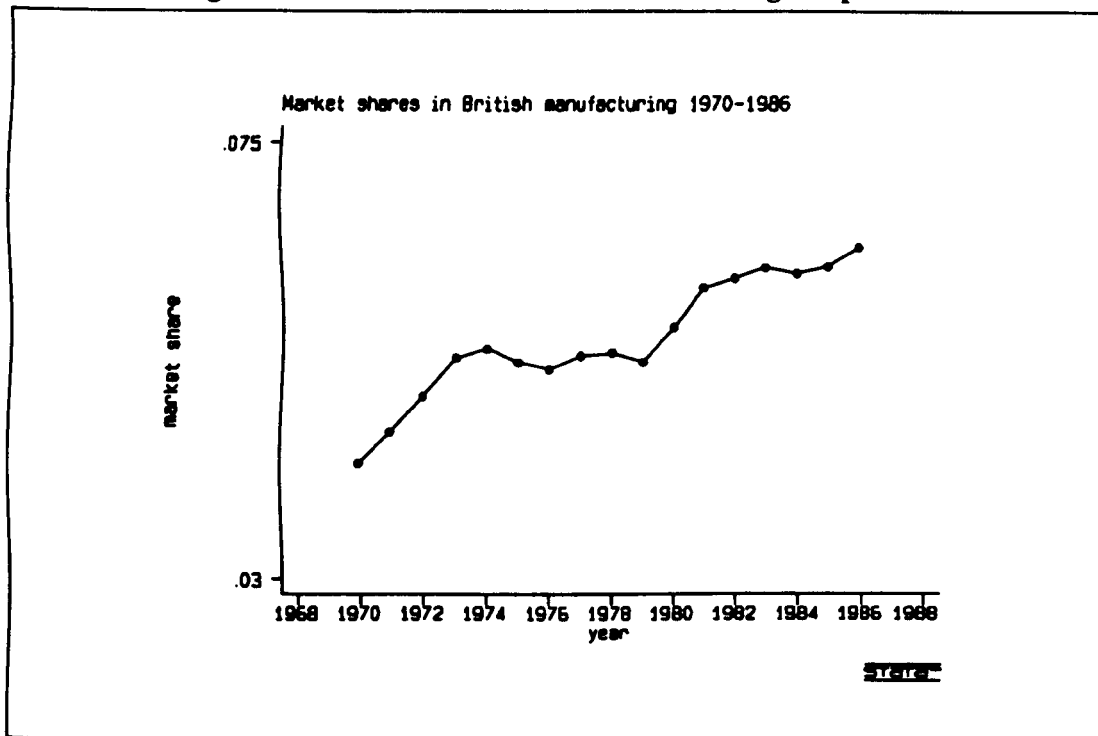


Figure 5.3 : Average concentration in 182 British manufacturing companies 1970-1986.



Figure 5.4 : Average union density in 182 British manufacturing companies 1970-1986.

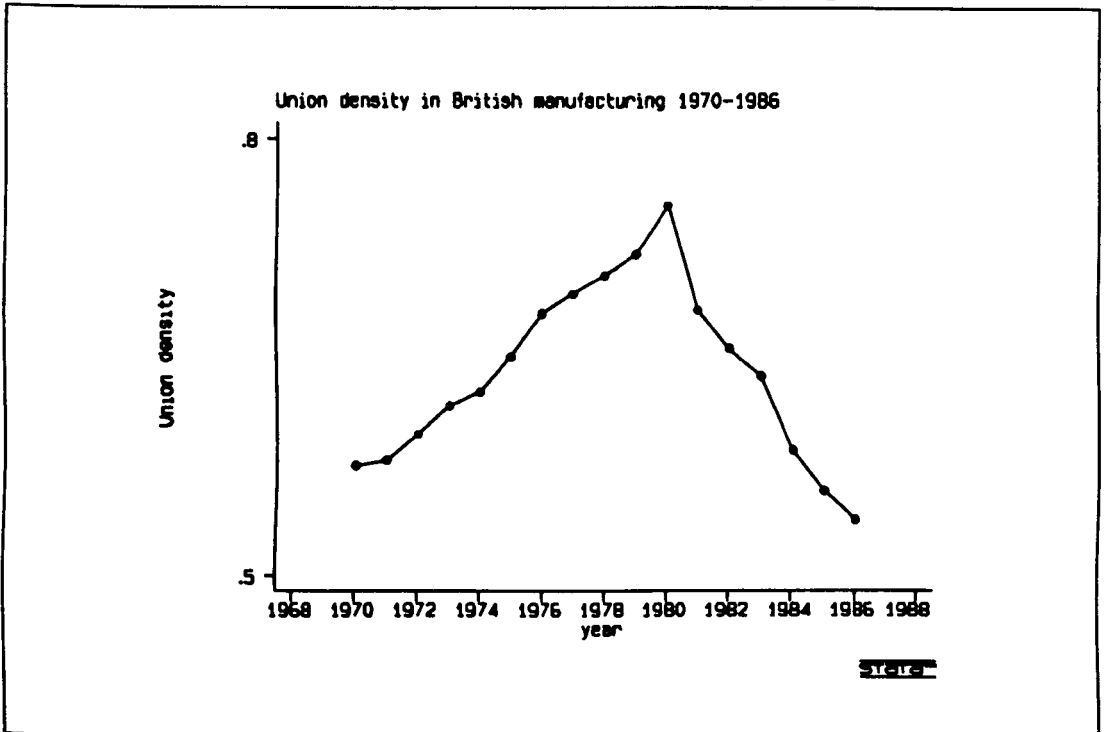


Table 5.1 : Tests of Cournot and homogeneous behaviour among manufacturing firms			
Model : $\mu_{ij} = (P_j - MC_{ij}) / P_j = \beta_1 MS_{ij} + \beta_2^*(1 - MS_{ij}) + \varepsilon_{ij}$			
Implied behaviour	Restrictions	F(d,n-k)	Calculated F statistic
Cournot zero conjectures	$\beta_{21} = \beta_{22} = \beta_{23} = \dots = \beta_{2n} = 0$	F(182,2911)	F=174.337
Homogeneous non-zero conjectures	$\beta_{21} = \beta_{22} = \beta_{23} = \dots = \beta_{2n}$	F(181,2911)	F=41.129

Notes.

1. d=difference in the number of parameters between the restricted and unrestricted equations, n=number of observations, k=number of parameters in the unrestricted equation.
2. The F value is an F test based on the unrestricted estimated model subject to the restrictions in column 1.
3. Model estimated for all firms in our sample.

Table 5.2 : Tests of Cournot and homogeneous behaviour among manufacturing firms for each industry		
Model : $\mu_{ij} = (P_j - MC_{ij}) / P_j = \beta_{1i} MS_{ij} + \beta_{2i}^*(1 - MS_{ij}) + \varepsilon_{ij}$ (estimated for each industry j)		
Implied behaviour	Restrictions	Number for which restriction fails
Cournot zero conjectures	$\beta_{21} = \beta_{22} = \beta_{23} = \dots = \beta_{2n} = 0$	38
Homogeneous non-zero conjectures	$\beta_{21} = \beta_{22} = \beta_{23} = \dots = \beta_{2n}$	38

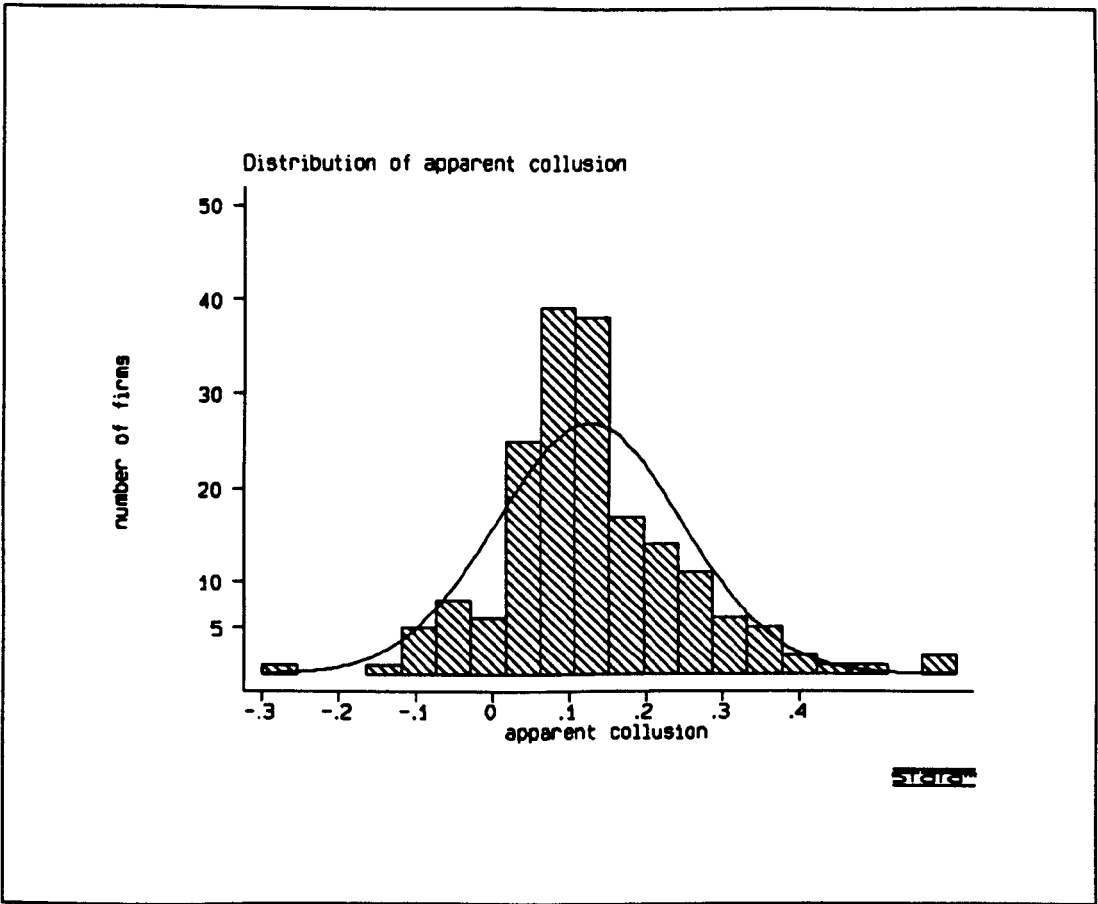
Notes.

1. d=difference in the number of parameters between the restricted and unrestricted equations, n=number of observations, k=number of parameters in the unrestricted equation.
2. The F value is an F test based on the unrestricted estimated model subject to the restrictions in column 1.

Table 5.3 : Conjectural elasticities of 182 firms in British manufacturing.

Type of behaviour	Number positive / negative	Number significant at 10%
Imperfect collusion $0 < \alpha_{ij} < 1$	162	142
Cournot behaviour : $\alpha_{ij} = 0$	na	36
Non-Cournot, non-collusive behaviour $-1 < \alpha_{ij} < 0$	20	4

Figure 5.5 : Distribution of apparent collusion in U.K. manufacturing firms.



Notes.

1. Estimates of the degree of apparent collusion estimated from Model : $\mu_{ij} = (P_j - MC_i) / P_j = \beta_1 MS_{ij}^T + \beta_2 (1 - MS_{ij})^T + \epsilon_i$ for each firm in our sample, where $\beta_2 = \alpha_{ij}$

Table 5.4 : Estimates of the degree of apparent collusion for 75 large manufacturing firms.

Name of firm	Estimate of apparent collusion	Standard error
Scholes Group	0.6028	0.0903
Bulgin, A.F.	0.5837	0.2865
Electronic Rentals	0.4708	0.0250
Beatson Clark	0.4545	0.0923
Dowding and Mills	0.3968	0.0355
Thorn EMI	0.3902	0.0202
Bristol Evening Post	0.3612	0.3293
Telephone Rentals	0.3555	0.0532
Desoutter Bros.	0.3475	0.0288
De La Rue	0.3401	0.0512
Astec (BSR)	0.3361	0.1538
Highland Distilleries	0.3112	0.0278
Courtaulds	0.3038	0.0526
Coalite Group	0.3014	0.0140
Maxwell Communications Corp.	0.2982	0.0863
Electro Components	0.2976	0.0122
Bowthorpe Holdings	0.2922	0.0350
Thomas Locker	0.2837	0.0280
Beecham Group	0.2740	0.0217
Hopkinson Holdings	0.2728	0.0561
ECC Group	0.2708	0.0239
Hawker Siddeley	0.2704	0.0409
Readicut International	0.2688	0.0213
Morgan Crucible	0.2627	0.0492
Senior Engineering	0.2584	0.0270
Collins, William	0.2457	0.0772
M.K. Electric	0.2418	0.0359

Allied Colloids	0.2418	0.0190
Aaronson Brothers	0.2410	0.0111
Avon Rubber	0.2355	0.0773
Davis G Holdings	0.2350	0.0572
Brown, Matthew	0.2285	0.0167
MB-Caradon	0.2234	0.0218
Adwest	0.2182	0.0240
Foseco	0.2176	0.0372
McCorquodale	0.2131	0.0603
Low Bonar	0.2119	0.0363
Early's of Witney	0.2098	0.0574
Tozer, Kemsley and Millbourn	0.2077	0.0641
Scapa Group	0.2021	0.0230
Brammer	0.2007	0.0188
Spirax-Sarco Engineering	0.1983	0.0171
Hardy's & Hansons	0.1959	0.0315
Bridport-Gundry	0.1958	0.0311
APV	0.1824	0.0101
BOC Group	0.1821	0.0394
Corah	0.1787	0.0548
United Newspapers	0.1780	0.0309
McKechine	0.1744	0.0343
Waddington, J.	0.1677	0.0656
Rugby Group	0.1613	0.0356
Armstrong Equipment	0.1613	0.0288
Laird Group	0.1600	0.0229
Blagden Industries	0.1579	0.0321
FR Group	0.1578	0.0129
Wolverhampton & Dudley	0.1566	0.0209
Smiths Industries	0.1532	0.0719
Mansfield Brewery	0.1526	0.0069

Rockware Group	0.1521	0.0517
Edbro	0.1494	0.0552
Ranks Hovis McDougal	0.1470	0.0228
Redland	0.1460	0.0085
Breedon	0.1459	0.0268
Vickers	0.1447	0.0293
Dowty Group	0.1443	0.0111
Portals Group	0.1441	0.0102
API Group	0.1431	0.0466
Marston, Thompson	0.1412	0.0085
BSS Group	0.1373	0.0194
Blue Circle Industries	0.1349	0.0234
LEC Refrigeration	0.1341	0.0249
Steeley	0.1341	0.0113
Ibstock Holdings	0.1328	0.0345
Avdel	0.1309	0.0350
Whitecroft	0.1304	0.0396

Notes.

1. Estimates of the degree of apparent collusion estimated from Model : $\mu_i = \beta_1 MS_i^T + \beta_2 (1 - MS_{ij})^T + \epsilon_i$ for each firm in our sample, where $\beta_2 = \alpha_{ij}$
2. Sample of firms 75 firms from 182 are presented in descending order from highest to lowest estimated conjectural variation elasticity.

CHAPTER SIX

Union Power and the Determination of Profit Margins. : An Empirical Investigation Using U.K. Manufacturing Industry Data.

6.1. Introduction¹.

Until comparatively recently the majority of economic analyses that have addressed the empirical issues and effects of unions on various economic indicators have tended to focus on wages and productivity. However, during the 1980's it has become clear that the effects of trade union action extend far beyond these key economic indicators. Much of this wider investigation has its empirical origin within the U.S. literature. Whilst a number of British studies are beginning to emerge, examining the empirical effects of union power on a variety of measures of profitability, there still remains a relative dearth of evidence regarding how general the effects of unionism is in extracting a share of profits.

Currently, the studies that exist in the U.K. have focused almost entirely, but not exclusively, on micro data sources.² In itself this particular empirical methodology presents a number of difficulties pertinent to the analysis to be presented here. First, such studies tend to be very time specific. This particular aspect calls into question whether we can use inductive logic to generalise the results that are gleaned from such analyses either across the economy as a whole, and whether we can expect the effects of unionism to persist over time. Second, the prevailing work also uses survey information from the Workplace Industrial Relations Surveys of 1980 and 1984. Whilst this approach has in itself a number of advantages, for example having access to a wealth of information about union activity, they are particularly culpable of not having suitable economic information about the nature of profitability.

For these reasons the current investigation prefers to examine the effects of union power on profitability using a sample of manufacturing industries for the mid 1980's. This allows us to circumvent some of the previous limitations in the literature and in consequence provide an interesting corollary and diagnostic of the sensitivity of these previous results.

The structure of the Chapter is as follows. In section 6.2 we review the existing literature on

¹ A substantial part of the chapter is joint work with Steve Machin to whom I extend my thanks for permission to use our joint research in this thesis. In particular, section 6.3 entitled profit margins, market structure and the role of the labour market is used our paper in the *Journal of Industrial Economics*, June 1991; the section beginning alternative modelling strategies of profit determination has appeared in *Economic Letters*, 1991.

² See, in particular, Machin(1990) and Machin and Stewart(1990).

profitability, and present some ideas as to why unions are able to capture a share of profits at all. The literature that we consider is derived principally from the U.S. and the United Kingdom³. Section 6.3 examines further the role of market structure and the labour market in determining industry profit margins. This is followed in Section 6.4 by our discussion of the data used in the analysis and the particular econometric modelling strategy to be employed. In section 6.5 we present our interim results for the impact of unionism on margins in British manufacturing. Having explored this issue we press the analysis further in section 6.6 by considering the relationship between market structure and the empirical formulation of the margin. In addition at this stage we present a model designed to test the hypothesis that unions ability to capture a share of profits is contingent on market structure. In section 6.7 we present the modelling strategy that distinguishes between alternative measures of the margin and also enables us to consider the effect of unions on these different formulations of the margin. The results of this estimation procedure are presented and discussed in section 6.8. Finally, we conclude our analysis with some implications, qualifications and potential extensions of our investigations in section 6.9.

6.2. Unions and Profitability : A Review of the Empirical Literature.

There exists a long history of Industrial Organisation investigations that attempts to examine the determinants of profitability of both firms and industries.⁴ These studies frequently focus on a large number of potential candidate variables that can be identified as the source of earning super normal profits. Uppermost amongst these is the product market structure within which the firm operates or within which the industry is located.

However, there is also a growing theoretical and empirical literature assessing the impact of trade unions on various measures economic performance. Much of this work has stemmed primarily from labour economists, with the initial research agenda being established in the U.S., and focusing heavily on the impact of unionism on wage determination and productivity differentials. Recently there has been a move to assess the impact of unions on profitability as a *de facto* key measure of performance.⁵

³ Although there are certainly many studies from continental Europe that show the existence of a positive and significant relationship between margins and market structure, typically these do not contemporaneously consider the role of trade unions on margins. [see for example Encaoua and Jaquemin(1982) for France, Jaquemin *et. al.* (1980) for Belgium, and Neumann *et. al* (1979,1983,1985) for Germany].

⁴ For example, see Scherer(1990) and the recent reviews in Schmalensee(1989), Salinger(1990) and Hay and Morris(1991, chapter 8). Geroski(1988) reviews these models, focusing on the interpretation of the market structure effect on profitability.

⁵ For the U.S. see the review in Addison and Hirsch(1989) and references therein. The U.K. literature is surveyed by Machin(1988)

As has been previously noted the industrial economics literature traditionally focuses on the relevant determinants of profitability. Formal models developed to assess the relationship between a measure of performance and structure, for example along Cournot lines, have typically failed to allow any explicit role for labour market effects. The way in which these models do allow trade union wage pressure to work is through its effects on the marginal wage function. But in distinction to this approach the labour economics literature, with its extensive use of bargaining models, has fairly robustly established a negative empirical relationship between measures of unionism and profitability - this especially true for those studies emanating from the United States. Within the U.K. there still remains, despite the some of the recent evidence, a relative dearth of evidence to establish this result empirically for the case of Britain.⁶

Despite what appears to be an empirically lead result that the overall effect of measures of union power is to reduce profitability (to which we will turn below) it cannot be established de facto that this will always be the case. The theoretical impact of unionism on profits has generally been recognised as partly ambiguous. A knowledge of union productivity and wage effects, taken together with an assessment of labour share, allows an estimate of the effect of unionism on unit costs. For example, if labour's share is 0.60 and the union wage premium is 15%, then a positive productivity effect of 9% will leave the individual firms unit costs unaltered.⁷ But in general, though, the effect of unionism on the profitability of firms is quite difficult to ascertain. Clark(1984) has demonstrated that the union effect must also be taken in conjunction with the nature of the bargaining settlement, product market structure, and the substitution between capital and labour. Generally, in support of the intuition suggesting managerial opposition to labour organisation, the direct impact of unions is suspected to subvert the profitability of the capitalist enterprise.

This result of this intuition can be demonstrated for a host of bargaining models that have appeared in the labour literature. (for example, see the recent contribution by Dowrick(1989) building on the original formulations of McDonald and Solow(1981)). For the strong efficiency case, the term employed in Brown and Ashenfelter(1986) it is easy to illustrate that union gains are at the expense of profits and that margins are eroded by labour activity.⁸ But as noted the result is further extended

⁶ However, there are exceptions. Recently Machin(1989) and Machin and Stewart(1988) have established negative union effects on measures of financial performance in the U.K.. This evidence pertains to micro data sets, and one of the studies relates to a qualitative dependent variable. There exists the need to establish the generality of the conclusions.

⁷ This is of course contingent on a host of, perhaps restrictive assertions. For example, it assumes a positive union effect on productivity evidence for which is presented in Machin(1988). In addition, it also presumes either that the firm is fully unionised or that non-union workers also receive the wage premium. (see Addison and Hirsch(1989)).

⁸ To illustrate this point assume firms maximise the profit function $\pi(W,L)=R(L)-WL$ where π is profits, $R(\cdot)$ is revenue, W is the wage rate, and L is employment. Union objectives are captured by a simple utility function defined in terms of wages and employment $U=U(W,L)$ which is parameterised in terms of a rent maximising trade union which maximises the

in the analysis in Dowrick(1989,1990)

The idea that union power will result in lower margins has been addressed in the literature. An empirical conclusion, noteworthy by its near universal acceptance, is indeed that union power does depress margins. Furthermore the result appears to be established regardless of the level of aggregation (in particular whether the analysis is conducted at the line of business, firm or industry level), the specification of the profit measure (return on equity, Tobins q, or the price cost margin) or the time period under investigation. However, as is quite evident from the review presented by Addison and Hirsch(1989), the majority of this evidence, but by no means all, pertains principally to the U.S. economy. In consequence, there does exist an empirical need to ascertain whether the same result applies generally in the U.K. This is probably all the more important given that the British system of collective bargaining nationally, supplemented with firm by firm settlements, represents a radically different environment from the one that labour unions operate within in the U.S.

As well as the direct effect on profits an important question arises as to the sources of union gains. A pertinent feature of the literature is that a unions ability to extract part of an economic surplus is contingent on the market environment of the firm or industry. As such the degree to which there are significant product market imperfections, or that there exists labour excess capacity, is likely to impinge on the power and ability of unions to capture a share of profits. The existence of product market imperfections, or more generally the widespread existence of oligopolistic structures, have lead to the "ability to pay" hypothesis being forwarded as a candidate by which union militancy may extract part of the rents made possible by the general monopolisation of markets. (for example see Mishel(1987)). As Rapping(1967) states "unions are more effective when bargaining in industries in which product market competition is absent and the ability to pay is high." This assertion is also quite consistent with the view expressed by Kalecki(1971) that union gains are possible due to the existence of a significant degree of monopolisation.⁹ A straight forward test of this hypothesis is whether the interaction between the degree of product market imperfection and unionism reduces profits, ceteris paribus. Within the U.K. at present no such evidence exists at the industry level of aggregation. (But see Dowrick(1990) for the closely related issue of wage pressure effects on profit margins). For the

differential between union wages, W , and a fall back level, W^f , multiplied by total employment, L . Define the asymmetric Nash bargain:

$$\Omega = \Omega(\pi, U) = \arg\max[(W - W^f)L]^\alpha [R(L) - WL]^{(1-\alpha)} \quad \text{where } 0 < \alpha < 1$$

and α measures the relative strength of the firm and the union. If we define a function coefficient for the predistribution profits as $\mu = [R(L) - WL]/R(L)$, then the Nash equilibrium in profits is $\pi/R = (1 - \alpha)\mu$ suggesting the rate of return is lower in unionised firms. Of course, in this Nash framework the "size of the pie" is unchanged by the degree of unionisation : if μ is, however, altered by the presence of unions, as we argue in this chapter, the solution is much less clear cut. Nevertheless the prediction that we wish to adopt is that unions may matter for the determination of profit margins.

⁹ Although as was made clear in Chapter 5 this is also predicated on firms holding pessimistic expectations about the reactions of its rivals to its own price changes.

U.S. most studies, for instance Karier(1985,1988), Voos and Mishel(1988), and Ghosal(1989) find that profitability is reduced by unions operating in more highly concentrated industries. Whilst these studies principally apply to industries the results have been also attested to by Salinger(1984) in a firm level study. But we should note that Domowitz et. al.(1986) in their panel of industries find that such a relationship does not materialise.

An early British investigation by Cowling and Waterson(1976), using Minimum List Heading (MLH) first differenced data for the 1960's, finds that unionism, measured as density and lagged one period, has little effect on price cost margins. Until comparatively recently this study stood alone for directly assessing the impact of unions on profits in the U.K.. Machin(1991) investigates the relationship between unions and profitability in a sample of large U.K. firms in 1984 and 1985 by construction of an elementary panel of data. The data set employed is derived from Datastream International and augmented by variables from the U.K. production series. The dependent variable is the ratio of profits to sales. Importantly he finds that unionisation, measured alternatively as recognition and coverage, significantly reduces profitability vis a vis comparable non-union firms. In addition, tests support the contention that successful rent seeking is established in firms that have a degree of product market power. Furthermore this union gain is enhanced when labour is organised in highly unionised industries.

The issues identified by Machin(1991) are further considered by Machin and Stewart(1990). These authors investigate union performance effects by exploiting data from the 1980 and 1984 Workplace Industrial Relations survey. This microeconomic study utilises a qualitative indicator of financial performance to test the direct effect of unionism on profitability, and the salient interactions between market share and unionisation. The resulting ordered probit estimates corroborate an expected negative union effect, and union gains are to be made in plants which operate in high market share product markets. These two microeconomic studies, taken together, support findings in the U.S. literature. The specificity, however, of the data sets, and their snapshot cross section nature, imply that further research is required. This has been initiated in Conyon and Machin(1991) who exploit a panel of British manufacturing industries for the mid 1980's. Using male manual employee coverage as a proxy for union power they establish a significant negative union effect on the degree of monopoly. A recent interesting juxtaposition to the Conyon and Machin(1991) paper is presented in Dowrick(1990). This particular paper does not consider the effects of unionism, per se, but instead, by reference to a bargaining model, focuses on the importance of wage pressure in a sample of British manufacturing industries. The principle conclusions are that an estimate of wage pressure significantly depresses the average margin.

Studies relating the share of wages in value added, concentration and unionism exist and from

these one can automatically imply an impact of labour unions on profits from these. Since the level of concentration is negatively related to wage share, and unionism positively so, by appealing to the identity from which these are formulated, profit plus overhead share is negatively related to unionism and positively related to concentration. Cowling and Molho(1982) in a study of the U.K. for the late 1960's found a robust negative relationship between wage share and seller concentration; but union power (variously measured) although positively related to unionism was not robustly so. The results imply that the effect on profits plus overhead share, too, are sensitive to the union measure. Henley(1987) for the United States and Conyon(1988) for the U.K. find empirical evidence that concentration is negatively, and unionism positively, related to wage share. This implies a negative relation between unionism and profit share.¹⁰

The empirical literature that has analyzed the union impact on profitability, whilst growing in its scope and importance, still remains a relatively new area of investigation as far as the U.K. is concerned. As such this suggests that there is still a need to further inquire into the generality of the relatively few studies that have emerged so far in Britain. This is even more important given that the existing studies in the U.K. typically apply to particular data sources where inductive reasoning about their wider generality might not be appropriate. But in addition these studies all fail to take account of the dynamic adjustment of profitability and do not answer the question of whether there exists a longer term effect of union power on profitability. Since these notions have yet to be systematically examined in the context of the U.K. economy there is clearly a requirement for an investigation to examine the longer term impact of union power on margins and the mechanisms by which unions extract part of the economic surplus.

6.3. Profit Margins, Market Structure and the Role of the Labour Market.

A popular view held by many industrial economists is that the structure of an industry plays a fundamental role in the determination of industrial performance.¹¹ This part of the Chapter considers the determination of profit margins in a panel of U.K. industries in the 1980's. We diverge from the conventional Industrial Organisation approach in this part of the Chapter in a number of ways, some of which affect the impact of concentration on profit margins.

Firstly, there is a potential role for labour market variables to influence profit margins. Theoretically, this follows from models of union-firm bargaining or efficiency wage models, which

¹⁰ In chapter 8 we consider explicitly the determination of labour's share in British manufacturing. We explore there the existing evidence linking seller concentration and unionism to wage share (and what automatically amounts to the same thing : profits plus overhead share).

¹¹ See, *inter alia*, Scherer(1980) or Waterson(1984). Much of the recent empirical work is surveyed in Geroski(1988) and Schmalensee(1989)

we consider below, both of which suggest that workers are able to gain a share of industry rents. But also it emerges from the empirical observation that union power is an important determinant of profit margins.¹² Hence, we investigate whether the interaction between product and labour market characteristics is of importance in determining industrial performance.

Second we utilise a panel of industry-level data for the U.K. in the 1980s. Having a time series element to our analysis therefore means that in our empirical work we can confront the issue that some of the key variables in Industrial Organisation models of the determination of profit margins are endogenous.¹³

Thirdly, in deriving industry-level structure-performance equations, it is often assumed that marginal and average costs are equal. We consider the empirical implications of relaxing this assumption.

To briefly anticipate the main results of section 6.5 below, we find an important role for labour market factors as union power and unemployment both impact negatively on our preferred measure of profit margins. Indeed, the evidence suggests that the estimated effect of industry concentration is biased downwards when these labour market variables are not considered.

These results provide an interesting comparison with the recent paper by Dowrick(1990), who considers the relationship between union bargaining and industrial price-cost margins. He computes industry specific measures of wage pressure and finds that this significantly reduces margins. The approach offered here differs from this in a number of ways, in particular by using data on direct union coverage.

We proceed as follows. In the next part we outline some theoretical considerations and econometric modelling strategy to be adopted. We then present the results and then offer some interim conclusions on the nature of unions and profitability in our sample of industries.

The Impact of Market Structure.

Generalised Cournot quantity setting oligopoly models imply a positive relation between the

¹² At the industry level, most of this work is based on U.S. data : see, among others, Freeman(1983), Karier(1985,1988,1989) and Voos and Mishel(1986). For the U.K., however, there is little evidence on product and labour market interactions using industrial data (but for evidence using more disaggregated data see Blanchflower and Oswald(1988), Machin(1990) and Machin and Stewart(1990)). For a related analysis on the relationship between unions and wage share see Conyon(1989) and Henley(1987).

¹³ The panel nature of the data means that we have available in our data set predetermined variables from previous time periods for use as valid instruments in the estimation procedure. Another approach (not followed here) is to impose certain identifying restrictions on the structural model and estimate a simultaneous equation model of structure-performance relations (Eg. Geroski(1985)).

excess of price over unit costs and a more highly concentrated market structure.¹⁴ Consider a firm with the profit function $\pi_i = (P_j - AC_i(q_i))q_i - FC_i$, where π_i is profits, $P_j(\cdot)$ is price in industry j which is a negative function of industry output $Q_j (= \sum q_i)$, AC_i is average variable costs which are a function of own output q_i and FC_i is fixed or overhead costs. The first order condition for firm i can be written as :

$$\left(\frac{P_j - AC_i}{P_j} \right) = \frac{MS_i (1 + \lambda_i)}{\eta_j} + \frac{(MC_i - AC_i)}{P_j} \quad (6.1)$$

where MC_i is marginal costs, $MS_i (= q_i/Q_j)$ is i 's market share, η_j is the industry absolute value of the price elasticity of demand and λ_i is a conjecture term about how firm i expects its rivals to react to its output changes. Aggregating equation (6.1) to the industry level and rearranging yields the familiar first order condition that :

$$\mu_j = \frac{H_j (1 + \alpha_j)}{\eta_j} + \frac{\sum_{i=1}^n MS_i (MC_i - AC_i)}{P_j} \quad (6.2)$$

where μ_j is the average price cost margin of the firms in industry j , $H_j (= \sum MS_i^2)$ the Herfindahl index of concentration and $\alpha_j (= \sum MS_i^2 \lambda_i / H_j)$ is the industry mean weighted conjecture.

For most specifications of the firms conjecture responses equation (6.2) establishes a positive relationship between industrial concentration and the price-cost margin. For instance, if $\alpha_j = 0$ (Cournot behaviour) higher concentration implies higher margins. Additionally, if the expected reaction coefficient is not Cournot but lies in the range $(-1 < \alpha_j < (1/H_j) - 1)$ there still exists a positive relationship between margins and concentration.¹⁵

If marginal equal average costs then μ_j is fully determined by the Herfindahl index of concentration, the conjectural variation term and the price elasticity of demand. This is simply the

¹⁴ Cowling and Waterson(1976) demonstrate this relationship for the range of values of the Herfindahl index in oligopolistic equilibrium. The model is extended and reinterpreted in Clarke and Davies(1982).

¹⁵ This positive relationship has been interpreted in a number of ways : the two main competing views are either that it reflects monopoly power (the classical industrial organisation view) or alternatively the greater efficiency of larger firms Demsetz(1973). The relative merits and demerits of these positions have been considered in the Chapter 5. We should note that our central conclusion there was that the efficiency view can never be the total explanation of a positive margins-concentration relationship. The very real potential for collusive behaviour of firms mean that margins can differ intra-industry not only for efficiency reasons but also because of differential conjectural variation elasticities across firms. In the event we showed that there was a systematic relationship between apparent collusion and seller concentration. We can legitimately, therefore, favour the market power explanation in this chapter.

Cowling-Watson(1976) extension of the Lerner condition. However, because of the second term on the right hand side, μ_j can (potentially at least) differ due to, as Sawyer(1982) argues, factors relating to scale economies [see the argument in Dowrick(1990, p. 241) and Sawyer(1982, p. 297)].¹⁶ Since the model is, however, based on a short run pricing strategy marginal costs can potentially differ from average costs due to variation in the utilisation of capacity. The margin is lower in the presence of increasing returns to scale ($MC < AC$), and higher if there are decreasing returns ($MC > AC$). Hence, to conclude that concentration has a positive impact on seller margins it is potentially important to net out the effect of scale economies. In the empirical work, we control for this by allowing a role for an industry specific estimate of returns to scale.

This model is subject to the potential objection raised by Clarke and Davies(1982) that the equilibrium profit margin exhibits a relationship with concentration but is not caused by it. That is the current level of concentration is endogenous. This follows since the Herfindahl index, as a matter of algebra above, may be written as a reduced form function of product market demand and cost. Hence, the estimation of a structure-performance equation in which concentration is treated as exogenous may lead to erroneous inference (ie. since H_j and μ_j are jointly determined). We address this issue in the empirical work by using an appropriate instrumental variable methodology.

A further issue arises since equation (6.1) assumes an equilibrium relationship. A popular research area has, however, argued that because of adjustment costs in input demands, stock accumulation and thwarted expectations, it is necessary to impose some dynamic structure on the model. Hence, in our empirical work we exploit the panel nature of our data set and estimate a simple partial adjustment model.¹⁷

The Role for Labour Market Variables.

In the labour economics literature a robust result is that unionism reduces profits. (see the references footnoted before and the subsequent review of the literature) Theoretically however equation (6.1) assumes that those input prices which may be influenced by unions, notably wages, are exogenous. Other situations (Eg. union bargaining or efficiency wage models) treat factor pricing as an endogenous (or two stage) process : in this approach, firms profit maximising decisions are taken after the determination of these variables (see Dowrick(1990)). We therefore see a potential role for union bargaining power in the determination of profit margins, on both theoretical and empirical

¹⁶ In addition see also Harris(1988) derives a similar expression to equation 6.2 above but for the case of linearly homogeneous production functions.

¹⁷ This is further explored theoretically, inter alia, by Geroski and Masson(1987) and empirically by Levy(1987).

grounds.¹⁸

To illuminate further, it is possible that the exclusion of unionism could induce bias in the estimated concentration effect. If the size of the surplus (i.e. that determined in the first stage of the profit determination process) is eroded by union presence (Eg. in the form of higher wage gains), then it is misleading to look at the impact of concentration on realised (or post distribution) profits. Ideally, one would like to observe the relationship between concentration and pre-distribution profits - our contention is that we are closer to doing so if we net out the impact of union pressure. This idea is discussed in the context of a union monopoly model by Karier(1985) who argues that the impact of concentration on profitability is biased downwards if one neglects a role for unions - this is because previous empirical research had looked only at the impact of concentration on realised profits rather than on what he terms employer surplus (the sum of realised profits and union wage gains).

In a formal econometric sense, the sign of this bias is given by the product of the estimated coefficient on a union variable (U) and the covariance between concentration and unionism ($Cov(H, U)$). Hence a positive covariance¹⁹ and a negative union profit effect generate a negative bias in an equation which omits measures of union power. the extent to which the concentration coefficient is biased by the omission of union pressure is examined in the empirical work.

Additionally, we include the industry wide unemployment rate to model structural decline. Firms operating in industries that are in decline are likely, at least in the first instance, to be forced into more rivalrous behaviour : in terms of equation (6.2) this would suggest a lower value of the α_j , and thus a lower margin. However, whilst the onset of slump conditions may at first lead to an erosion of the degree of monopoly, as the effect of the slump persists then firms will have an incentive to collude in the face of common adversity. As Cowling(1983) illustrates this gives rise to a particular dynamic time path of the degree of monopoly in response to adverse demand shocks. [see Cowling(1983) for extensions and qualifications to this particular argument]. Also, it is possible that this increased competition may raise the elasticity of demand η , again lowering the margin. Of course, an industrial unemployment variable will at least (partially) capture aggregate fluctuations²⁰ and this

¹⁸ It is straight forward enough to write down a formal model in which union power depresses margins. Machin(1988) presents a model, based on strongly wage employment bargaining (see Brown and Ashenfelter(1986)), in which unions and firms bargain over a share of the potential surplus (in our notation μ). In this model, the union profit margin ($= (1 - \alpha) \mu$) is lower than the non union margin μ , where $\alpha (<1)$ is union relative bargaining strength. Of course, in this Nash framework the "size of the pie" is unchanged by unionisation : if μ is altered by the presence of unions, the solution is far less unclear. Nevertheless, the prediction that unions matter for profit determination remains the case (see Dowrick(1989,1990)). For an exposition based on intra - firm class conflict see Kalecki(1971).

¹⁹ In our sample of industries the correlation coefficient between our measure of concentration and unionism is +0.29

²⁰ Bils(1987) and Domowitz *et. al.* (1986a, 1986b) use the aggregate unemployment rate as a measure of cyclical activity in their studies of the intertemporal behaviour of margins.

may confound a structural cross section interpretation that we wish to make. We discuss this further below.

6.4. A Modelling Strategy.

For our purposes, and following the previous discussion, the non-linear theoretical model expressed in equation (6.2) can be treated as a log linear function of the form :

$$\ln(\text{PROF}_{jt}) = \ln(X_{jt})\gamma + \ln(Z_{jt})\theta + \xi_{jt} \quad (6.3)$$

where PROF_{jt} is the profit margin of industry j in time period t , X is a vector of Industrial Organisation determinants of the margin (capturing *inter alia* factors identified as important in the Cournot model), Z is a vector of labour market characteristics (for example trade unionism) and ξ_{jt} is a white noise disturbance factor.²¹

The choice of the profit margin is important. The industry margin is usually defined as $(\pi + \text{FC}) / R$ where π and FC are defined earlier and R is the product of price and output. Dowrick(1990) confronts the issue of the appropriate definition of the margin by experimenting with a number of alternative formulations. He finds that the definition matters and that establishing a positive relationship between concentration and profit margins is dependent on both the choice of profit margin, and on the time period under investigation. Conyon and Machin(1991) also examine this issue in some detail focusing directly on the appropriate empirical formulation of the margin. Below we examine this issue in some detail.

For the purpose here, namely the analysis of whether labour market variables play an important role in shaping the concentration-margins relationship, it is important to use a measure which establishes the positive relationship as predicted in Cournot theory. Therefore the measure that we elect to operate with as the dependent variable is the ratio of gross value added minus the operative wage bill to value added. The measures for which Dowrick(1990) finds a significant positive relationship are consistent with this since his preferred margin is defined as (net output - wage costs) / net output.²²

Our model is estimated from 1983 to 1986 retaining data from 1980 onwards for use as

²¹ The conjectural variation elasticity is, of course, unobservable and for our purposes here will be reflected in the error term.

²² The difference between this and our measure is that costs of non-industrial services are netted out of both numerator and denominator (ie. value added = net output + costs of non-industrial services). Below we discuss the results of using the alternative formulations of the margin, but it is pertinent that if we use the Dowrick(1990) formulation the results established below are substantively unchanged.

instruments.²³ The sample period was also dictated by the published data on our key union variable which at the time of writing was only available for 1985.²⁴ Given the large falls in unionisation in the early 1980s [see the evidence reported in Chapter 5] we are reluctant to use 1985 data before 1983 and hence this dictates the sample period. Some summary data on key variables is reported in Table 6.1. The first point to note is that average profit margins have risen slowly but steadily between 1983 and 1986. This is consistent with the sample of firms we presented evidence for in Chapter 5.

The means of the industry characteristics included in X are also reported in Table 6.1.²⁵ Concentration (CONC) is the proportion of sales accounted for by the largest five enterprises in an industry (ie. not the Herfindahl index referred to in the model, which is unavailable for our data set). Note that the mean across manufacturing fell over the time period under investigation, again consistent with the evidence presented in the previous Chapter. To control for the degree of potential international competition we consider import and export intensity variables (IMPS and EXPS) both of which rose between 1983 and 1986.

We use two labour market variables : union coverage (COVER) to proxy union power, and the industry wide unemployment rate (UNEMP). The first, as mentioned previously, was only available for 1985 and hence is treated as a fixed effect but is instrumented in the empirical work that follows. The use of union coverage as a proxy for union power has been used, *inter alia*, by Cowling and Molho(1982) and Henley(1987). We derived the 3-digit union coverage data for male manual employees from the New Earnings Survey in 1985. This was a specially included question in the NES panel for this year designed to unearth the nature of collective bargaining in the U.K. by industry group. Our second variable [UNEMP], on average fell during the sample period (presumably reflecting compositional shifts in manufacturing employment) and we include this as a measure of industry-specific demand conditions.

The earlier theoretical discussion also highlighted the importance of an appropriately defined returns to scale measure. Traditionally, the computation of such measures has proved problematic and various proxies such as average plant size in the industry have been used. We entertain in this Chapter an alternative approach and estimate returns to scale for all industries in the ample from the following

²³ We are restricted in our time series component due to the change in definition of our 3-digit industries in the 1980 Standard Industrial Classification. Also, pooling of the data was easily accepted for all models : for example, the relevant F(12,360) for the model in column (1) of table 6.2 below was 0.23, as compared to a 5% critical value of 1.75.

²⁴ However, we do have more highly aggregated (two digit) time varying union density data : this is included in the instrument set in the empirical work.

²⁵ We do not claim this to be a definitive formulation of the X-vector traditionally used in industrial organisation studies : it is very much a stylised version, although one that is sufficient for our purposes of highlighting the importance of labour market factors in shaping margins. Other variables were considered but proved to be of little significant importance. These included annual sales growth, capital intensity and total employment.

unrestricted Cobb-Douglas production function over the period 1980 to 1986 :

$$\ln(Q_{jt}) = \beta_j \ln(K_{jt}) + \gamma_j \ln(L_{jt}) + \theta_t + v_{jt} \quad (6.4)$$

where Q is deflated value added, K is the capital stock, L is employment, t a time trend and v a white noise random error. In equation (6.4) industry specific estimates of returns to scale are given as $RTS_j = \beta_j + \gamma_j$ for industry j (j= 1,...90). The estimates of RTS turned out to be quite reasonable, ranging from 0.119 to 1.985, with a mean of 1.050. Hence, we use this measure, which due to degrees of freedom problems²⁶ is time invariant, as our measure of scale economies.²⁷

The equations are estimated using instrumental variable techniques so as to control for the potential endogeneity of the key variables under study. The panel nature of the data means that we can call on a large number of predetermined variables as instruments. For example, if X_t is endogenous we can use values of X before t (plus any outside variables) as instruments. That is, in period t we can use instruments dated t-1, t-2 etc. as legitimate instruments, in period t+1 we can use instruments dated t, t-1 back and so forth. So, as the panel becomes further advanced we can call on more instruments. We are careful to select our instrument set contingent on a test of instrument validity. Also, note that for parameter estimates to be consistent it is also important that our reported equations are free from serial correlation. We therefore present some appropriate tests. More details on the estimation procedure and the reported diagnostics are given in the Technical appendix to this Chapter.

6.5. The Empirical Impact of Unions on Industry Profit Margins.

Our estimated models are reported in Table 6.2. Columns (1) and (3) report our basic specifications, in (2) and (4) these are augmented by the labour market variables, and column (5) considers further the unemployment effect in the models. All models are estimated using instrumental variable techniques as described above and various diagnostic tests are presented.

Column (1) contains a stylised Industrial Organisation equation. The equation confirms that

²⁶ The equation was estimated from 630 observations (90 industries over 7 years) and includes 182 independent variables. To obtain time-varying measures based on 7 time-series observations per industry, is unfeasible.

²⁷ There does remain, however, a conceptual question mark concerning the use of this RTS measure. First the conjectural variation oligopoly pricing model we adopt is essentially a short run pricing model in which the capital stock remains fixed. But implicit in the estimation of the RTS variable is a production function in which the concept of the longer term is invoked since capital is allowed to vary. Second, the production function we adopt is un-Kaleckian in that it exhibits properties inherent in neo-classical orthodoxy. [Henley(1987) derives predictions about the functional distribution using a similar production function and his results, too, are prone to the same criticism] In defence of its use we would argue that we are trying to allow for potential differences between marginal and average costs in the spirit of Sawyer(1982). In the event we must stress that its use does not in any way alter the main thrust of this chapter. In unreported regressions the RTS variable was both excluded, and substituted by alternative proxies, and the positive impact of concentration and the negative impact of coverage on margins remained.

higher profits are earned by more highly concentrated industries and that facing increasing returns to scale lowers margins. Industries with higher import penetration and/or less of an ability to export have lower profit margins.²⁸ These results are consistent with other empirical work as outlined previously and is consistent with the model outlined in section 6.2.

Column (2) augments (1) by the union power variable, which is male manual coverage, and the industry unemployment rate. We allow for the endogenous nature of union coverage, instrumenting it with lagged values of union density (at the 2 digit level) and the proportion of male manual employees in the industry. The negative impact of unionisation is consistent with the U.S. evidence for this level of aggregation. Existing U.K. work also finds this,²⁹ but generally at a more disaggregated level and for particular data sources. (Eg. Machin(1991), and Machin and Stewart(1990))

The other labour market variable, the 2-digit unemployment rate, is also included in column (2). It is appropriately instrumented, using lagged values of the variable itself and total employment as instruments. The negative coefficient on UNEMP suggests that industries facing high unemployment rates have lower margins. We view this negative impact principally as a cross sectional demand related effect. This cross section interpretation is further strengthened in the dynamic models in columns (3) to (5) where the unemployment effect is less marked. The interpretation, and expected direct effect, of unemployment on profits is as we mentioned earlier partly ambiguous. A relatively competitive industry facing a monopoly union would maximise profit and there should be no direct effect on margins. If unemployment, rather than representing structural features, were a proxy for cyclical phenomena then it is possible to argue that margins might be pro or counter cyclical. However, there has been a mooted hypothesis that unions ability to extract an element of economic surplus is contingent on full, or near full, employment. This view is expressed, *inter alia*, by Dowrick(1985) and Coates and Topham(1988). We should note that Dowrick(1985) includes separately an industry wide unemployment rate, together with a union variable, and finds a negative unemployment effect. As such, we feel that it is more appropriate to think of this effect in terms a cross sectional structural decline way than a cyclical type phenomenon.

In columns (1) and (2) there is however evidence of serial correlation. This renders the instrument validity test inappropriate and the resulting coefficient estimates inconsistent. One potential explanation is that the reported equations are subject to dynamic misspecification. Thus in the remainder of table 6.2 we model the dynamic behaviour of margins as a partial adjustment mechanism include a lagged dependent variable. Aside from the econometric issues for including this term this

²⁸ The relevant cut-off points for the imports and exports dummies were found by grid searches at the 0.05 intervals.

²⁹ The exception being Cowling and Waterson's(1976) study using 1960's manufacturing data.

can be justified for a number of reasons including adjustment costs, habit persistence, delivery lags and so forth.³⁰

The specifications including lagged profit margins³¹ are all free from first and second order serial correlation, confirming in many respects that the problems of columns (1) and (2) can be thought of as dynamic misspecification. The importance of this is quite clear. Most U.K. studies that have considered the concentration-margins relationship in detail have typically failed to include any dynamic adjustment factor. These are normally predicated on the use of a single year's cross section.³²

In the dynamic models, we find an important role for concentration and the returns to scale measure³³ although in comparison with columns (1) and (2) the foreign trade variables prove less significant. The union power variable appears to significantly dampen down margins and indicates the ability to of unions to affect margins (and presumably achieve higher wage gains) is not simply a transitory phenomenon, but remains even after one allows for the persistence of profits by including the dynamic measure. Finally the unemployment result appears somewhat less strong but remains significant at the 10% level. Moreover, note that whilst the UNEMP effect is negative in column (4) (where aggregate fluctuations are controlled for by the inclusion of time dummies) when the time dummies are excluded as in Column (5) UNEMP loses its significance (ie. where demand related and aggregate effects are confounded). Both the weaker effect in column (4) and the fact that the unemployment effect disappears in column (5), add weight to the notion that UNEMP principally captures cross section demand effects.

Instrumenting the concentration variable, CONC, turns out to be not unimportant and a comparison with column (4) shows that a rise in the estimated coefficient from Ordinary Least Squares estimate of 0.040 (standard error = 0.017) to the estimate of 0.052 given in table 6.2. Whilst not dramatically different from one another, this does suggest that the issue of the endogeneity of CONC is not trivial and that some care needs to be taken over the choice of estimation techniques used in structure performance studies.

The substantial result that emerges from a comparison of column (3) with column (4), and

³⁰ See, *inter alia*, the development of these models in Levy(1987) and on a formal level Geroski and Masson(1987)

³¹ We specify this dynamic counterpart to equation 6.2 to account for possible dynamic mis-specification.

³² Other studies [eg Karier(1985)] have attempted to estimate the rise in margins due to concentration, and the share captured by unions. The focus here differs by considering the bias from omitting labour market factors.

³³ RTS captures differences in returns to scale across industries, but only under the assumption that firms operate on their production possibility frontier. Hence it does not allow for any capacity related effects. One, admittedly crude, way to see if this matters is to interact RTS with time dummies. Doing so made very little difference : in terms of the column (4) equation, the coefficients on the RTS interactions were not significantly different and other estimates were hardly affected (the coefficients (and standard errors on $\ln(\text{CONC})$, $\ln(\text{COVER})$ and $\ln([\pi+\text{FC}]/\text{VA})t-1$ were estimated to be 0.051 (0.021), -0.146 (0.074), and 0.649 (0.111).

indeed between columns (1) and (2) is that the omission of labour market factors seriously biases down the effect of concentration. Indeed the coefficient estimate rises by 86% when one moves from the specification in column (3) to that in column (4). This testifies to the importance of including labour market factors, especially unionisation, in studies of industrial concentration on profit margins.³⁴

Table 6.3 reports estimates of the implied longer term impact of the three key variables under investigation. Columns (a) and (d) refer to the specifications in column (3) and (4) of table 6.2. Despite the short time series element of the data we view this as a useful, but nevertheless tentative, exercise and at least two important points emerge. First, the long run impact of concentration derived from the dynamic models is similar to those derived in the static equations in table 6.2. Second, the longer term impact of concentration is greater than it is in the short run.

As a further diagnostic check of our models, Table 6.3 reports long run effects for models including $\ln[(\pi+FC)/VA]_{t-2}$ (in columns (b) and (e)) and including one period lags on all (time varying) right hand side variables (in columns (c) and (f)). The implied effects are very similar and highlight the positive concentration-margins relationship but, in addition, the importance of labour market variables and the way in which the relationship is understated when they are omitted.

Overall these results have some interesting implications. In the sample and time period under investigation, namely U.K. manufacturing from 1983 to 1986, it is important to take account of the structural nature of the determination of profit margins. Doing so meant that the oft cited positive structure-performance relationship is reproduced even when one allows for the important role for labour market variables. It is the case that when these effects are omitted from the estimating equation the reported coefficient on concentration is biased downwards and the coefficient in fact, falls by almost one-half.³⁵

These labour market characteristics play an important role in their own right, as for this period anyway, trade union power, proxied by union coverage, along with high industrial unemployment reduces profit margins. The limited time series under investigation, though, must naturally temper our discussion of these union effects over the longer period. Overall, our reported models suggest that both

³⁴ As our margin deflates by value added we also perform a number of other experiments. For example we also included the ratio of sales or material costs to value added as an additional explanatory regressor. Doing so made little impact on our estimating equation. In column (4), for example, the ratio of material costs to value added attracted a coefficient (and standard error) of 0.023 (0.013), and the other coefficient estimates were basically unaffected.

³⁵ Again we would stress the limited time period under investigation and the parsimony of our estimating equation. A more detailed investigation of the relationship between the rise in margins and changes in unionism would require (i) an extended time series with time varying union data (ii) an analysis of union productivity effects (iii) the role of macro-economic factors in shaping margins [eg. Bils(1987) and Domowitz et. al.(1986)] and (iv) an analysis of factors such as excess capacity effects on margins.

static and dynamic Industrial Organisation models of the determination of margins should allow a role for the effect of labour market activity. Whilst this has been the subject of some recent theoretical work (Eg. Dowrick(1989), and Dewatripont(1987)) it has been by passed in other empirical relevant (empirical) analyses. This section of the Chapter has, with its focus on the importance of the empirical importance of these issues, together with the recent studies by Dowrick(1990) and Machin(1991), acts as a step towards rectifying this.

As an addendum to the analysis so far presented, and also as a precursor to the following deliberation on the formulation of the empirical margin, we should present a diagnostic to the sensitivity of our results. As is clear from the analysis so far the key point of the Chapter is that the estimated impact of concentration on margins is biased downwards in the absence of any controls for unionism. This proves to be a robust result to changes in the specification of the dependent variable. In table 6.4 we report some additional results for definitions of the margin based on net output definitions. We present only the impact of concentration on the margin preferring to leave until below a fuller treatment of this issue. However this does demonstrate our main point that concentration is biased down in the absence of unionism. The results in table 6.4 are comparable to those of table 6.2. For clarity we present the results there in row one of table 6.4 to highlight our point.

As table 6.4 makes clear the central theme of this Chapter is preserved when the margin is alternatively formulated. As noted before in row 1 we get our previous result that movement from column (1) to (2) or (3) to (4) results in percentage increases in the estimated impact of concentration due to the absence of unionism of 64% and 86% respectively. Rows two and three are comparable to the Dowrick(1990) measures of the price cost margin. When only the operative wage bill is netted out of the numerator (in row two) we observe increases in the estimated impact of the concentration coefficient of 73% and 86% respectively as we move from a static to a dynamic model. Such a formulation preserves Kalecki's distinction between direct and overhead labour. In row three we net out both operative and salary wages from the numerator. The same pattern emerges : an increase of 60% and 90% as we move from the static to dynamic model. Thus, we find strong support for the kernel of this part of the Chapter that the estimated impact of concentration on margins is biased downwards in the absence of union power.

6.6. Market Structure and the Empirical Formulation of the Profit Margin.

Whilst the previous sections of this Chapter have highlighted the critical importance of including in the determination of profit margins a central role for labour market variables, in particular unionism, it is interesting to extend the analysis in one particular direction. In particular is the concentration effect on margins, and for that matter unionism, robust to changes in the empirical

specification of dependent variable. Further to this point, whilst we have established the resulting bias from excluding union variables we have yet to consider the source of union gains. Having established the importance of unionism we are now in a position to consider these important issues.

In this section we present evidence from the same panel of manufacturing industries as used before to test the sensitivity in the margins-concentration relationship to such disruptions in the formulation of the dependent variable. In particular we can show that the positive association between the profit margin and concentration is, in fact, contingent, on the way in which the margin is formulated. Further to this, we present an alternative empirical model that allows us to locate the sources of union gains.

Under the Cournot modelling strategy outlined earlier Industrial Organisation theory predicts that a positive association should emerge between margins and market structure. However, the recent U.K. empirical work, at the industry level, has sometimes failed to detect such a relationship. This is illustrated in the comment by Schmalensee(1989, p.175) who states, in his survey of this literature, that "...most studies of the United Kingdom have failed to find a positive linear relation between concentration and profitability." It is the contention of this section that this may be, at least partially, explicable in an erroneous specification of the margin itself. To test this hypothesis we present in this section a plethora of empirical models of profit determination which are differentiated by the empirical formulation of the margin.

6.7. Alternative Modelling Strategies of Profit Determination.

As we illustrated earlier Cournot models predict a positive relationship between the price-cost margin and market structure. The industry margin is usually defined as $(\pi + FC) / R$ where π is profits, FC is fixed costs, and R is the product of price and output. Two potentially important issues emerge from this definition of the margin for empirical purposes :

- (i) What constitutes a relevant fixed cost ?
- (ii) What is the appropriate empirical formulation of the denominator?

On the first issue, Kalecki(1971) advances the proposition that overhead labour is quasi-fixed so salary wages need to be netted out of the numerator in the formulation of the margin. On the second issue, Cowling(1982) argues that including material costs in the denominator of the margin understates the true nature of the degree of oligopoly power due to the importance of vertical integration. Once again, it suggests that this element should be netted out.

The second major question to be addressed here concerns the sources of union rent seeking activity. The leitmotif in explaining the source of union rent seeking activity in the literature is that it is related to product market structure. The argument is that high product market concentration

facilitates higher margins, hence if unions are to capture any part of a potential surplus this will be achieved by locating in these high concentrated industries. The corollary to this is that unions in relatively competitive firms or industries cannot capture rents to the same extent because of the inability of firms to pass on wage increase in terms of higher product prices.³⁶ Stewart(1989) also identifies market power as an important factor if unions are to enjoy greater scope in obtaining wage differentials.³⁷

To examine these issues we estimate the following fairly standard estimating equation explaining the determination of profit margins for our panel of 90 U.K. manufacturing industries over the time period 1983 to 1986 :

$$PM_{jt} = \beta_0 + \beta_1 CONC_{jt} + \beta_2 RTS_{jt} + \beta_3 IMPS_{jt} + \beta_4 EXPS_{jt} + \beta_5 UNEMP_{jt} + \beta_6 COVER_j + \beta_7 COVER * CONC_j + \varepsilon_j \quad (j = 1,2,\dots,90 ; t = 1983,\dots,1986) \quad (6.5)$$

where PM is the profit margin of industry j in year t, CONC is the five-firm seller concentration ratio, RTS is average returns to scale, IMPS and EXPS are import and export intensity, UNEMP is the industry unemployment rate, UNION is union coverage, and ε is a white noise random error. Variables which are time-varying have a jt sub-script, whilst time-invariant variables simply take a j subscript. The interaction term is included in the equation to take account of the findings of a number of U.S. authors [Eg. Freeman(1983) and Karier(1985,1988,1989)] that trade unions reduce price cost margins in more highly concentrated industries.³⁸ A negative point estimate would be evidence that rents are gleaned by unions in highly concentrated industries.

In a general interactive model of the form : $Y = \alpha_1 X + \alpha_2 X * Z + \alpha_3 Z + u$, (where Y is a dependent variable, X and Z are non-stochastic independent variables, and u is an i.i.d. error) it is clear that the average impact of X on Y is given simply as :

³⁶ Whilst this conclusion is validated, inter alia, by Freeman(1983), Karier(1985) and Salinger(1984), a multi faceted critique of the position is presented in Hirsch and Connolly(1987). One part of this is that unions do not capture monopoly rents but only the quasi rents derived from the firms investment strategies.

³⁷ Indeed Stewart(1989), using the Workplace Industrial Relations Survey, estimates that of the establishments in which unions are able to create a wage differential it emerges that only 5% of these face competitive product market conditions.

³⁸ However, see the counter argument by Heywood(1989) and the subsequent response by Karier(1989).

$$\left(\frac{\delta Y}{\delta X}\right)_{z=\bar{z}} = \alpha_1 + \alpha_2 \bar{Z},$$

where a bar denotes that the variable has been evaluated at its mean value. Hence in equation (5), the average impact of concentration can be denoted as :

$$\left(\frac{\delta PM}{\delta CONC}\right)_{COVER = \overline{COVER}} = \Psi = \beta_1 + \beta_7 \overline{COVER},$$

The issue in the literature has been that (for the U.K. especially) it has proved hard to estimate a significantly positive Ψ .³⁹ We argue that this is due to the definition of PM and provide estimates base on two general formulations of the margin. It becomes clear that a systematic relationship can emerge, dependent on the definition of the margin, which illustrates the conditions under which Ψ is estimated to be significant and positive.

The two formulations of the margin we use can be neatly stated as $M1 = (A-C)/A$ and $M2 = (A-C)/(A+B)$ where C is average variable costs, so that (A-C) is a relevant measure of profits plus fixed costs, and B is material costs. From the U.K. Census of production we can assign the following measures of the margin to our classes M1 and M2. :

$$M1 = \begin{cases} PM_1 = (\text{Value added} - \text{operative wage bill}) / \text{Value Added} \\ PM_2 = (\text{Value added} - \text{operative wage bill} - \text{salary bill}) / \text{Value Added}, \\ PM_3 = (\text{Net Output} - \text{operative wage bill}) / \text{Net Output}, \\ PM_4 = (\text{Net output} - \text{operative wage bill} - \text{salary bill}) / \text{Net Output} \end{cases}$$

$$M2 = \begin{cases} PM_5 = (\text{Value added} - \text{operative wage bill}) / \text{Sales}, \\ PM_6 = (\text{Value added} - \text{operative wage bill} - \text{salary bill}) / \text{Sales}, \\ PM_7 = (\text{Net output} - \text{operative wage bill}) / \text{Gross output}, \\ PM_8 = (\text{Net output} - \text{operative wage bill} - \text{salary bill}) / \text{Gross output}, \end{cases}$$

where OWB is the operative wage bill and SWB is the salary wage bill. By definition, sales = value added + other costs (material costs + costs of non-industrial services) and gross output = net output

³⁹ Note that the standard error for the average effect of concentration is calculated from the variance covariance matrix as the square root of the total of the variance of β_1 plus the variance of β_7 plus twice the cross product between them.

+ material costs.⁴⁰

The ambiguity in formulating the margin has cropped up from time to time in the structure-performance literature and certain authors have experimented with different measures. In the terminology used in this section of the Chapter, Hart and Morgan(1977) discuss the use of margins PM2 and PM6 ; similarly, Clarke, Davies and Waterson(1984) consider PM2 and PM6 : Dowrick(1990) uses variants of PM3, PM4, PM7 and PM8 in his study of the impact of wage pressure on margins. Martini(1989) uses PM4 in addition to a variant of PM8. However, the approach offered here, and one that distinguishes it from these previous studies, is the recognition that there exists, in effect, two general classes of margin. As we shall see in the next section, to establish a positive concentration-margins relationship one needs to use the former M1 class rather than the latter M2 formulation.

The data which we use in this section to examine this issue is the same industry data set used in previous sections. As such our previous comments on the evolution of our key variables remain valid and are presented in table 6.1.

6.8. Estimates Using Alternative formulations of the Margin.

Estimates of the interactive model described by equation (6.5) are reported in tables 6.5. In columns (1) to (4) of table 6.5 we present our results based on the classification of margins into the M1 class and in columns (5) to (8) we present comparable estimates for the latter M2 formulation. The eight alternative measures of the margin establish a clear pattern. Briefly considering table 6.5 and 6.6 together a positive and significant average concentration effect is isolated for the M1 margins (definitions PM1-PM4 illustrated in table 6.5 columns (1) through (4)), whilst no such relationship emerges for M2 margins (measures PM5-PM8 illustrated in table 6.5 columns (5) through (8)). Notice that Ψ at the mean value of the coverage variable, UNION.

Of the two key issues raised at the beginning of this section it is clear that it is the definition of the numerator which is more important in establishing a positive margins-concentration relationship. There is some difference when operative wages are deducted from the numerator (ie. the odd numbered margins) as compared to the total wage costs (even numbered margins). In particular, the impact of concentration on the seller margin is greater if the total wage cost is deducted. Whilst this is important in itself, lending some credence to Kalecki's distinction between overhead and direct labour types, the emergence is nowhere near as marked in magnitude as the difference between classes M1 and M2.

⁴⁰ The precise definitions are in the notes to the summary tables of the U.K. Census of Production 1986. Our distinction follows quite naturally from that.

The magnitude of the estimated concentration effect is important : for PM1 to PM4 in table 6.5 the percentage effect is large. For example in column (1) the average effect of concentration, CONC, is to raise the margin by 18.4 percentage points. If this is measured relative to the sample mean then the effect is 28%). We see by examining Ψ for all the estimates in table 6.5 that they are all positive and statistically significant.

For the class of margins PM5-PM8 the impact is much smaller and sometimes negative. We notice that in all of these cases the concentration effects are always insignificant, which is the result that lies behind Scmalensee's observation about the inability to observe a positive concentrations-margins relationship.

Turning to the qualitative nature of the estimated coefficients on the other independent variables we conclude that the choice of margin does not materially affect their expected sign. Profit margins are higher in industries with decreasing returns to scale, low import competition, high export intensity, lower industrial unemployment (reflecting less structural decline) and low union coverage. These results clearly mimic the results presented earlier in the Chapter.

Turning to the empirically important source of union rent seeking activity it turns out that being in a high concentrated industry clearly matters. The negative signed interaction term suggests that regardless of the empirical formulation of the margin profit margins are lower in highly concentrated industries facing increased union activity. This result corroborates the U.S. literature on this issue (Eg. Freeman(1983)). It is also consistent with the results in Lucifora(1991) where in studies of the U.K. and Italy wages rates are found, in general, to be higher among highly concentrated industries.

Clearly, a statistical explanation of why a number of studies have failed to isolate a positive correlation between the margin and concentration boils down to the differences in the definition of M1 and M2. Following the lead in Cowling(1982) we may write down a relationship between M1 and M2 as $M1 = M2(1 + (B/A))$, where B/A can be interpreted as reflecting the degree of vertical integration in the industry. (Eg. for PM1 B/A is simply material costs over value added). It seems clear from the data that the degree of vertical integration acts as a plausible explanation : in our sample, the industries characterised by relatively large differences between M1 and M2 are predominantly located in the 2-Digit Grouping Food, Drink and Tobacco.⁴¹ Indeed, U.S. findings suggest that this industry is highly vertically related (see Scherer(1980)). Hence, if the margin is to capture the degree of oligopoly power (ie the profit per real unit of economic activity) the appropriate measure would appear to be our M1 class of margins. That is those types of margins that do not get contaminated by inter industry

⁴¹ For instance, eight of the ten industries with the largest differences between margin PM1 and PM5 are in the Food, Drink and Tobacco industry. Indeed the six with the largest discrepancies are located in this 2-digit group.

variations in the degree of vertical integration.

In many ways advocating using the class M1 margin rectifies the empirical anomaly encountered by many U.K. industrial economists who have found it difficult to establish the positive relationship between margins and concentration predicted by Cournot theory. The theme that emerges is that for the latter margin (class M2) no positive relationship can be established, but for the former (class M1) a robust concentration-margins emerges. The difference between the two is that denominator of there seems to emerge a principle theme when examining the way that industrial economists when formulating the empirical margin using industry data can. As this section makes clear second, which does establish a positive relationship, does not contain material costs. Our offered explanation is that this particular margin is not contaminated by the problem of vertical integration of production between industries.

6.9. Implications and Conclusions.

This chapter has provided a range of estimates of the impact of trade union activity on the profit margins of a panel of U.K. manufacturing industries for the early 1980's. Whilst the time series element in the analysis is in many respects limited we nevertheless have illustrated a number of key points that are worth briefly reiterating. In the first part of the analysis we established that union power, reflected in the degree of coverage for collective bargaining, depressed the profit margin in the industry. Moreover, we showed robustly that the estimated impact of market power, captured in the concentration ratio, is downwardly bias in the absence of union considerations. This has some important implications for policy : studies ignoring the dimension of product and labour market interaction (ie. the importance of unionism) will consistently understate the true nature of monopoly power possessed by firms and within industries.

In addition to this we illustrated, by appealing to a plethora of alternatively formulated margins, that an important locus of union rents is to be found in highly concentrated industries. The previous result that there was a bias in the concentration effect in the absence of union power might imply such a conclusion would emerge. However, these two effects taken together imply that unions, empirically at least, by their collective efforts in bargaining secure a shift away from capital to labour. Given that our estimation equation was specified in dynamic form, but again stressing the short time series of our panel, suggest that these effects appear to persist.

We further demonstrated that to establish an empirical relationship between the margin and concentration was contingent on the formulation the dependent variable in structure performance studies (at least for the U.K.) Indeed, what we have done is identifies two classes of margin one of which appears to work in establishing a positive relationship between product market structure and one

that does not. In identifying this we have pulled together and explained why some studies have been able to establish a positive structure performance relationship and others that have not.

This study has augmented the recent literature on the effects of trade unions on profits in a number of key areas (for example union rent seeking in highly concentrated industries) and to the extent that we replicate the results found in the U.S. this is reassuring.

As a final point it is perhaps worth commenting on the wider interpretation and potential implications of these results. Because we have established a negative union-profit relationship this cannot be interpreted as evidence for policy makers to curtail the activities of unionism. First, the data period which we have investigated is necessarily short : essentially four years for British manufacturing in the mid-1980's. Indeed, if the analysis of Chapters 3 and 4 is anywhere near correct a reasonable interpretation of the analysis here is that it is the natural outcome of an inherently antagonistic relationship between capital and labour. Thus, depending where one stands regarding the relationship of capital to labour this will naturally colour the perceived interpretation of the evidence in this Chapter.

Table 6.1 : Data definition and variable means 1983-1986^{1,2,3}

	Name	1983	1984	1985	1986	1983-1986
Profit margin	$(\pi+F)/VA$	0.644	0.647	0.655	0.656	0.651
Concentration	CONC	0.431	0.418	0.414	0.415	0.420
Unemployment	UNEMP	0.114	0.089	0.074	0.073	0.088
Union coverage	COVER	a	a	a	a	a
Import Intensity	IMPS	0.303	0.321	0.344	0.338	0.327
Export intensity	EXPS	0.277	0.286	0.294	0.298	0.289
Real value added	Q	715.8	730.1	0.747	757.1	737.6
Capital stock	K	2901.4	2772.8	2671.6	2545.5	2772.8
Employment	L	55.1	54.7	53.8	52.7	54.1
Returns to Scale	RTS	a	a	a	a	1.051

Notes.

1. Definition of variables is as follows : $(\pi + FC)/VA$ - ratio of profits to value added, where \acute{a} is the difference between value added and the operative wage bill. CONC - Five firm seller concentration ratio by sales.; UNEMP - industry unemployment rate; COVER - proportion of male manual employees covered by collective bargaining arrangements in 1985; IMPS - ratio of imports to home demand; EXPS - ratio of exports to sales; Q - VA/annual producer price index (in millions of pounds); K -

2-digit capital stock data weighted to 3-digit using value added weights (in million pounds)); L - total employment (1000's); RTS -estimated average returns to scale in the industry. See text for details of construction.

2. Data Sources were derived as follows : π , VA, CONC, L -Report on the Census of Production Table 13 Summary Tables, PA1002, UNEMP - kindly provided by Sushil Wadhvani; COVER -1985 New Earnings Survey; IMPS, EXPS - Business Monitor Publication MQ12, HMSO; K - Blue Book; RTS - estimated from Q, K and L (refer to the text in Chapter 6 for details)

3. The term 'a' denotes that a variable is time invariant so that only the 1983-86 mean is reported.

Table 6.2 : Estimated Profit Margins Equations 1983-1986.

	(1)	(2)	(3)	(4)	(5)
Constant	-0.360 (0.037)	-0.115 (0.126)	-0.091 (0.057)	-0.048 (0.062)	-0.011 (0.053)
ln(CONC)	0.089 (0.025)	0.146 (0.029)	0.028 (0.016)	0.052 (0.021)	0.055 (0.021)
ln(RTS)	-0.053 (0.037)	-0.052 (0.042)	-0.034 (0.009)	-0.035 (0.011)	-0.036 (0.013)
IMPS>0.35	-0.089 (0.033)	-0.083 (0.034)	-0.031 (0.018)	-0.035 (0.020)	-0.036 (0.014)
EXPS>0.30	0.122 (0.038)	0.031 (0.045)	0.046 (0.021)	0.026 (0.018)	0.028 (0.017)
ln(UNEMP)	-	-0.164 (0.043)	-	-0.045 (0.026)	-0.028 (0.030)
ln(COVER)	-	-0.487 (0.146)	-	-0.147 (0.074)	-0.171 (0.079)
ln($\pi+F/VA$) _{t-1}	-	-	0.706 (0.133)	0.645 (0.111)	0.641 (0.112)
Time Dummies	Yes 16.07 (3)	Yes 2.35 (3)	Yes 2.25 (3)	Yes 2.49 (3)	No
γ	11.36 (17)	81.73 (59)	23.22 (17)	65.67 (59)	62.52 (59)
W	27.07 (4)	69.97 (6)	697.62 (5)	802.48 (7)	756.45 (7)
R1	5.63	5.24	-1.12	0.96	-0.89
R2	4.98	4.82	1.30	1.57	1.74

Notes.

1. The dependent Variable is defined as $[(\pi + FC)/VA]$
2. Heteroscedastic consistent standard errors are in parenthesis. These are one-step consistent standard errors as described in Arellano and Bond(1988a).
3. ln(CONC), ln(UNEMP), ln(COVER) are treated as endogenous. Instruments used are as follows : ln(CONC) - lags on CONC from t-1 back to a maximum of t-6; ln(UNEMP) - lags of t-1 in each period for ln(UNEMP) and all lags from t-1 back on ln(total industry employment); ln(COVER) : all lags from t-1 back on ln(proportion of manual employees in total employment); ln(COVER) : all lags from t-1 in each period on ln(Union density).
4. γ is a test of over identifying restrictions provided by the instruments. It is distributed as a Chi-square statistic, the degrees of freedom are in parenthesis
5. W is a Wald test of the significance of the included regressors (excluding the constant and time dummies), with degrees of freedom reported in parenthesis (see the technical appendix)
6. R1 and R2 are respectively tests for first order and second order serial correlation. Both are N(0,1) statistics, see the technical appendix.

Margin definition	(1)	(2)	(3)	(4)
(VA - OWB) / VA	0.089 (0.025)	0.146 (0.029)	0.028 (0.016)	0.052 (0.021)
Percentage increase		64%		86%
(NO - OWB) / NO	0.068 (0.020)	0.118 (0.023)	0.012 (0.007)	0.021 (0.011)
Percentage increase		73%		86%
(NO - TWB) / NO	0.103 (0.034)	0.165 (0.035)	0.021 (0.020)	0.040 (0.021)
Percentage increase		60%		90%

Notes :

1. Definition of the components of the margins are : VA=Value added, NO=Net output, OWB=operative wage bill, TWB=Total wage bill.
2. Table shows the point estimates on concentration variable for definition of the margin based on net output. These results are comparable to table 6.2, the results of which are reproduced in row one.

	Excluding UNEMP and COVER			Including UNEMP and COVER		
	(a)	(b)	(c)	(d)	(e)	(f)
CONC	0.094 (0.033)	0.108 (0.038)	0.094 (0.036)	0.145 (0.029)	0.149 (0.030)	0.146 (0.029)
UNEMP				-0.127 (0.056)	-0.127 (0.065)	-0.128 (0.056)
COVER				-0.414 (0.191)	-0.373 (0.209)	-0.388 (0.194)

Notes.

1. Columns (a) and (d) correspond to columns (3) and (4) of Table 6.2 respectively.
2. Columns (b) and (e) are derived from models including one and two period lags of $\ln(\pi+F/VA)$.
3. Columns (c) and (f) are derived from models including lags t-1 on all time varying right hand side variables.
4. Asymptotic standard errors are given in parenthesis.

Table 6.5 : Estimates of the impact of concentration on margins in 90 U.K. manufacturing industries 1983-1986.

	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8
Constant	0.746 (0.071)	0.354 (0.091)	0.825 (0.062)	0.530 (0.080)	0.331 (0.062)	0.180 (0.049)	0.465 (0.074)	0.132 (0.063)
CONC	0.606 (0.113)	0.811 (0.147)	0.503 (0.104)	0.666 (0.141)	0.133 (0.101)	0.210 (0.081)	0.138 (0.199)	0.216 (0.104)
RTS	-0.039 (0.016)	-0.086 (0.019)	-0.029 (0.013)	-0.067 (0.017)	-0.057 (0.017)	-0.073 (0.016)	-0.059 (0.019)	-0.076 (0.018)
IMPS	-0.045 (0.011)	-0.055 (0.014)	-0.035 (0.010)	-0.043 (0.012)	-0.012 (0.009)	-0.014 (0.008)	-0.014 (0.008)	-0.020 (0.010)
EXPS	0.040 (0.014)	0.013 (0.017)	0.019 (0.011)	-0.012 (0.014)	0.035 (0.011)	0.017 (0.009)	0.002 (0.013)	0.006 (0.011)
UNEMP	-0.017 (0.003)	-0.006 (0.003)	-0.015 (0.022)	-0.006 (0.003)	-0.008 (0.002)	-0.003 (0.002)	-0.010 (0.003)	-0.005 (0.002)
COVER	0.112 (0.091)	0.289 (0.107)	0.044 (0.082)	0.158 (0.099)	0.115 (0.078)	0.149 (0.060)	0.076 (0.093)	0.110 (0.077)
COVER* CONC	-0.651 (0.174)	-0.911 (0.220)	-0.520 (0.162)	-0.716 (0.212)	-0.249 (0.155)	-0.307 (0.124)	-0.270 (0.179)	-0.329 (0.154)
Mean of dep. var.	0.651	0.457	0.718	0.560	0.237	0.164	0.319	0.247
Time Dummies	Yes 9.32	Yes 0.35	Yes 9.09	Yes 0.09	Yes 7.03	Yes 1.19	Yes 6.45	Yes 1.61
ψ	0.184 (0.021)	0.220 (0.026)	0.166 (0.018)	0.201 (0.023)	-0.029 (0.019)	-0.011 (0.014)	-0.037 (0.023)	0.003 (0.019)
% effect	28.3	48.1	23.2	36.0	-11.9	6.9	-11.6	0.1

Notes.

1. Estimated from data 1983-86 with data from 1980 onwards used as instruments.
2. Heteroscedastic consistent standard errors are in parenthesis.
3. All models estimated by generalised Instrumental methods : CONC, UNEMP, COVER and COVER*CONC are treated as endogenous. Instruments used are as follows : CONC - lags on CONC from t-1 back to a maximum of t-6; UNEMP - lags of t-1 in each period for UNEMP and all lags from t-1 back on total industry employment; COVER : all lags from t-1 back on proportion of manual employees in total employment; COVER : all lags from t-1 in each period on Union density.
4. The % effect is defined as $(\Psi / \text{mean of the dependent variable}) \times 100$.
5. A Chi square Wald test with three degrees of freedom, χ^2 , on the significance of the time dummies is reported.

CHAPTER SEVEN

Profit Margins, Successive Oligopoly and Union Power.

7.1. Introduction.

As previous chapters have indicated there is a long tradition in Industrial Organisation analysis, as well as within the monopoly capital school, that pays particular attention to the importance of market structure for the ability of firms to raise profit margins and hence derive above normal profits.¹ This literature provides much evidence to suggest that a link between margins and product market structure exists, although there is disagreement concerning the appropriate formulation of variables (in particular the margin), the relevant unit of analysis (firm or industry), and the interpretation of the correlations that are derived (market power or efficiency). An oft forgotten element in this literature, but nevertheless important, is how bilateral or successive market power shapes the determination of price cost margins.² In our previous discussions we have implicitly been assuming that each industry in our analysis has no connections with any other industry. Or, which amounts to the same thing, that each industry sells in markets where it possesses market power but purchases inputs from competitive industries. In the preceding Chapter this made for relative ease in the empirical work but it is somewhat illogical to model the effects of monopolisation on pricing behaviour in this way. Where general monopoly exists in both selling and buying industries it seems at least intuitively plausible that price formation in the selling industry will be affected by the degree of monopoly power possessed by the buying industry.

Furthermore, we have also argued in the preceding Chapters that attention should be paid to the question of how trade unions affect profitability and what are the sources of union rents. This focus on the interaction of product and labour markets has been investigated far less and only of late has attention turned to the impact of unions on firm and industry profitability. In Chapters five and six we provided empirical evidence that demonstrated that labours bid for a share in profits was linked the market power enjoyed by firms and industries. But extending our point above, if we argue that product market monopolisation in related markets can affect the pricing decision of sellers, then to the extent that trade unions also affect the degree of monopoly in related markets, or are connected across industries, a potential role emerges for union power in successive markets to affect seller margins.

¹For surveys of this literature refer, *inter alia*, to Scherer(1990), Geroski(1988), and Schmalensee(1989) and Hay and Morris(1991).

²The investigations that have considered this issue in the Industrial Organisation literature are dominated principally by U.S. empirical research that make extensive use of countervailing power arguments. See, for example Lustgarten(1975) and the review of successive oligopoly in Schmalensee(1988).

Hence, the theme of this essay, which also distinguishes it from previous studies, is the emphasis not only on the importance of successive product market monopoly power but also on trade union power in successive industries. This latter aspect, the role of union militancy in related markets, has been completely ignored in the existing literature. Whilst the importance of buyer industry product market power on seller margins has been researched this obvious extension of how buyer industry union power affects seller margins has received no attention. The analysis presented in this Chapter exploits the U.K. input-output tables to examine the impact of successive union power and market structure on seller profit margins in the manufacturing sector for 1984 and 1985.

The analysis proceeds as follows. In section 7.2 we consider the relationship between profit margins and successively related market power. In section 7.3 we extend this to a consideration of the importance of trade union power in successively related industries. We review the existing empirical literature in section 7.4 and this is followed in 7.5 by a description of variable and data construction. Our modelling strategy is discussed in 7.6 with resulting estimated models presented in section 7.7. Finally, in section 7.8 we offer some implications and conclusions of our analysis.

7.2. Profit Margins and Successive Oligopoly Power.

In previous Chapters we illustrated that the ability of individual firms and industries to raise profit margins was systematically related to the degree of monopolisation in the industry. We also showed that empirically unions appear to have ameliorating effects on this process and are able to capture, at least in part, a share of these rents. As it stands such an analysis excludes an important dimension in the industrial process which may potentially require us to modify our previous conclusions. Does monopolisation in successive industries offset the effects of monopolisation in selling industries, and further to this, does union power in these related markets affect the seller price cost margin? In this section we consider the potential effects of a systematic increase of monopoly power in a successive industry returning below to the importance of union militancy in such industries.

In our analysis of this problem we will identify a fundamental dichotomy concerning the effects of increased monopolisation in a related industry. It is useful to identify this immediately. On the one side there is the position that increased concentration in a buying industry will depress margins of the seller industry. Such a view, as explained below, is predicated on the traditional bilateral monopoly / Oligopoly model used in Industrial Organisation theory, coupled with a belief in the existence of countervailing power. In contra distinction the adverse view is that successive Oligopoly results in cumulative market power rather than disintegrating monopoly power. This view is based on the notion that firms in oligopoly recognise the gains from mutual interdependence and as a result the process of monopolisation in a buying industry adds to the seller price cost margin. This dichotomy

is useful to maintain for a number of reasons. Uppermost amongst these is that in the existing empirical literature, with the exception of Waterson(1980), the importance of countervailing power has been widely stressed with little mention of the effects of cumulative market power. In the light of this it is important not to lose sight of this simple, but nevertheless useful, dichotomy in our analysis.

The traditional way that mutually related markets have been analyzed is within the structural framework of bilateral monopoly or oligopoly. As is well known the problem as it is usually posited does not give a unique solution of the price and quantity that will emerge where either one, or few, sellers face one, or few, buyers of the formers output. Indeed, Hicks(1935) argued that "Bilateral monopoly is a phrase which has been applied to the case of isolated exchange, or exchange between a group of buyers and a group of sellers each acting in combination... I think one may say that there is complete agreement that the problem is indeterminate."³ Essentially, the problem arises for the following reasons. A monopolist does not face a unique output supply function but selects a point on the buyers demand function that maximises profit. Likewise, a monopsonist does not face a unique input demand function but selects a point on the sellers supply function that maximises profit. In a situation of bilateral monopoly, the coexistence of monopolist and monopsonist, it is impossible for both seller and buyer to act contemporaneously as monopolist and monopsonist. And so as Henderson and Quandt(1980) state "The seller cannot exploit a demand function that dos not exist, and the buyer cannot exploit a demand function that does not exist. Something must give." In such situations it is usual to delimit the feasible market outcomes to cases where the seller dominates, which defines one extreme of the market price outcome, and the other case where the buyer dominates, which defines the other potential price and output solution. The indeterminacy is reflected in the fact that any price and output configuration between these limits is possible.⁴ In order that the market mechanism does not break down completely some solution or other must be found to this potential indeterminacy. One case has been mentioned already : either the monopolist or the monopsonist dominates and the other accepts its price or output conditions. Alternatively the firms can cooperate or engage in a bargaining round. Within the bargaining framework the market participants recognise their mutual interdependence and attempt to reach a mutually satisfactory agreement as to price and quantity. These models proceed in essentially two steps. First the firms agree to determine a quantity that maximise their joint profits and then determine the transfer price that distributes the joint profits amongst themselves. In these types of models, though, trying to solve the actual transfer price and assess the relative share of the

³ The general nature of the intractability problem of bilateral monopoly is further emphasised in Koutsoyiannis(1983) and Henderson and Quandt(1980).

⁴ The graphical analysis on which this conclusion is based is presented in Waterson(1984, p. 100) and for a mathematical treatment in Henderson and Quandt(1980, p.224.)

joint profits received by each proves to be quite difficult. In general, though, it can be shown that in the case where the market participants are bargaining the actual range of the transfer price is narrower than the case where either the monopolist or monopsonist is dominant. (see, for example, Henderson and Quandt(1980)) However, even in this case we still end up with an indeterminate solution which, in effect, is determined by the fall back position of each market participant, ie a minimum profit level below which trade does not occur, and the relative bargaining strengths of the seller and buyer.

It is on this latter point that the empirical research in this area has focused when assessing the importance of bilateral monopoly. It is assumed that the relative bargaining power of the buyer is positively associated with the degree of concentration in its market. So, increases in buyer concentration will adversely affect the price cost margin of the selling industry. Enterprises located in concentrated selling industries will be facing enterprises, in industries that consume their product, that are either more or less concentrated. If the structure of the buying industry is characterised by few firms then the ability of firms within the seller industry to charge high product prices is constrained. Hence if the marginal wage schedule is constant, increasing centralisation in consuming industries will result in a retardation of the price cost margin in the seller industry. This is the thesis advanced in Lustgarten(1975) : "In general, fewness of buyers indicates that the quantity taken by each purchaser has a significant influence on market price." to which he adds " ...where buyers are concentrated, the ability of oligopolistic sellers to keep price above marginal cost will be impaired, with reduced seller profitability as the likely consequence." In addition to this hypothesized negative effect of buyer concentration on seller margins we might expect fewness to facilitate collusion in consuming industries. To the extent that this is successful it will serve to reinforce the already hypothesised negative impact effect on seller margins. Lustgarten(1975) questions, though, the extent to which consuming industries will be able to achieve and maintain such collusion. In seller industries firms are likely to be selling a principle product, broadly conceptualised, to a particular market. On the other hand, consuming firms buy from many markets. If this scenario is valid the potential gains from collusion are greater for selling rather than buying industries.

This theory of countervailing power is not entirely new and has its antecedents in, for example, Galbraith(1952, 1954). The argument made by Galbraith, in fact, goes further than that suggested above by claiming that the growth of countervailing power in situations of bilateral oligopoly has important positive welfare implications. "...private economic power is held in check by the countervailing power of those who are subjected to it... The long trend towards concentration of industrial enterprise into the hands of relatively few firms has brought into existence not only strong sellers ... but also strong buyers ... the one is a response to the other." Such a position has two predictions : strong sellers face and bring into existence strong buyers and the influence of strong

buyers is to circumvent the excesses of seller market power. However, the force of this argument appears to be predicated on the rivalrous nature, implied in the thesis, of enterprises in consumer and seller industries. This, however, is only one dimension of the behaviour of firms in a world monopoly capital. Collusion between enterprises that are successively related is also a very real possibility. Indeed it is reasonably straight forward to construct a model, which illustrates the second point in our dichotomy between bilateral and successive power, where concentration within buyer industries has a positive impact on the sellers price cost margin.

To demonstrate this we can consider the model by Waterson(1980). His analysis provides an interesting juxtaposition to the countervailing market power thesis presented above. We present a Cournot model that highlights the principle feature of our stylized dichotomy, namely, that increases in successive product market power structure add to the margin in the seller industry. The model that we draw our inferences from is a simpler variant of that developed in Waterson(1980). Whilst we do not profess to add any major new theoretical insights to this model we feel that is worth commenting upon in detail for a number of reasons. Uppermost amongst these is our previous point that within the empirical literature that considers the issue of the impact of buyer concentration power on seller margins there has been a near universal acceptance of the view that increases in concentration in these related industries represents a variant of the countervailing market power thesis. In the light of this it does seem worthwhile to stress the importance of a model that demonstrates that buyer market power is cumulative as opposed to countervailing.

The Waterson(1980) analysis is an extension of a much earlier model that appeared in Cournot(1927). Cournot's original model posited a copper and zinc monopolist who sell to a perfectly competitive brass industry where other uses for zinc and copper were excluded. The brass industry was then able to fashion the inputs into brass. Cournot made the assumption that the copper monopolist maximise profit with respect to own price given its derived demand is from the brass industry. In addition, the copper monopolist assumed that a change in its price would have no impact on the price established in the zinc industry. In like fashion the zinc monopolist makes analogous assumptions. From this, Cournot establishes that the total margin in the brass industry is twice the size of the monopolist's margin if it had not been engaged in successive production.⁵ Hence, this provides an early example of cumulative market power.

The Waterson(1980) model is an extension of this case, and preserving the discussion of the brass and copper industries, proceeds by assuming that the copper monopolists integrates vertically with brass producers. Organising production within the ambit of one firm in this way implies the newly formed monopolist can choose a monopoly price for copper or a monopoly price for brass and

⁵ See Waterson(1976 p.87) for this result.

a cost price for copper.

The salient features of the Cournot model can be developed as follows. Assume we have the following profit functions for the brass and zinc industries where there are m purchasing firms in the brass industry and n selling firms in the zinc industry :

$$\pi_{B_i} = P_B(q_B)q_{B_i} - P_Z q_{B_i Z} - c_{B_i}(q_{B_i}) - F_{B_i} \quad (7.1)$$

$$\pi_{Z_j} = P_Z(q_Z)q_{Z_j} - c_{Z_j}(q_{Z_j}) - F_{Z_j} \quad (7.2)$$

where π denotes profits and P , c , and F are respectively product prices, variable costs and fixed costs for each individual firm. Subscripts z and B refer to the zinc industry and the brass industry and i and j to the individual firms therein. We posit that purchases by the brass industry from the zinc industry are bought on a one to one basis so that $q_{zi}=q_{Bi}$, although Waterson(1980) shows that the substantive results illustrated below are unchanged if the input z is used in constant proportions across the industry. Further the firms in the purchasing brass industry act as Cournot oligopolists towards one another and that the j firms in the zinc industry do likewise. In addition Cournot assumptions are made such that $\delta q_B/\delta q_{B_i}=1$, and since $q_{Z_i}=q_{B_i}$, $\delta q_{Z_i}/\delta q_{B_i}=1$. Further it is assumed in the model, by the brass industry, that a change in price in the brass industry has no effect on the selling price in the zinc industry (ie. $\delta P_Z/\delta P_B=0$). This is the critical assumption that effectively rules out monopsony power. A change in the buyers price for it's output does not affect the price of its input's. The analogous assumption on the part of the zinc industry is that $\delta P_B/\delta P_Z=1$. If the zinc industry raises the product price of its output then this is reflected fully in the price of the product charged by the consuming brass industry.

Treating own quantity as the relevant control variable then the first order condition in the brass industry can be expressed as :

$$\frac{\delta \pi_{B_i}}{\delta q_{B_i}} = P_B + q_{B_i} \frac{\delta P_B}{\delta q_B} \frac{\delta q_B}{\delta q_{B_i}} - P_Z - q_{Z_i} \frac{\delta P_Z}{\delta q_B} \frac{\delta P_B}{\delta q_{B_i}} - c'(\cdot)_{B_i} = 0 \quad (7.3)$$

Under the assumptions made above about the zinc industries price response to price changes we can re-express this equation as :

$$P_B - P_Z - c'(\cdot)_{B_i} = -q_{B_i} \frac{\delta P_B}{\delta q_B} \quad (7.4)$$

To derive the relevant industry level price cost margin equation for the consuming brass industry we multiply equation (7.4) through by q_i ($=q_{B_i}$) and sum over the m firms in the industry, and then divide by $P_B q_B$ which yields :

$$\frac{\sum_{i=1}^n P_B q_i - \sum_{i=1}^n P_Z q_i - \sum_{i=1}^n c'(\cdot)_{B_i} q_i}{P_B q_B} = - \frac{\delta P_B}{\delta q_B} \frac{q_B}{P_B} \frac{\sum q_{B_i}^2}{q_B^2} = \frac{H_B}{\eta_B} \quad (7.5)$$

where H_B is the brass industry's Herfindahl index of concentration and η_B is the absolute value of the price elasticity of demand in the brass industry. Assuming that the marginal cost function is coincident with average variable costs then the left hand side becomes the average industry price cost margin which we can write as :

$$\left(\frac{\pi + F}{R} \right)_B = \frac{H_B}{\eta_B} \quad (7.6)$$

Equation (7.6) is simply the price cost margin as is usually derived in Cournot oligopolistic markets, which in this case is unaffected by the brass industry's purchases from other industries beside the zinc industry.

Turning now to the determinants of the selling zinc industry's price cost margin we concentrate on equation (7.2). The first order condition with respect to own output is :

$$\frac{\delta \pi_{z_j}}{\delta q_{z_j}} = P_Z + q_{z_j} \frac{\delta P_Z}{\delta q_{z_j}} - c'(\cdot)_{z_j} = 0 \quad (7.7)$$

which can be rearranged as follows :

$$P_Z - c'(\cdot)_{z_j} = -q_{z_j} \frac{\delta P_Z}{\delta P_B} \frac{\delta P_B}{\delta q_B} \frac{\delta q_B}{\delta q_Z} \frac{\delta q_Z}{\delta q_{z_j}} \quad (7.8)$$

Making the Cournot assumptions that $q_Z = q_{B_i}$, $\delta q_Z / \delta q_{z_j} = 1$ and incorporating the previous Cournot assumptions then equation (7.8) can be rearranged to give :

$$P_z - c'(\cdot)_{zj} = -q_{Bj} \frac{\delta P_B}{\delta q_B} \quad (7.9)$$

Multiplying through by $q_{Bj}(=q_{zj})$ and summing across the n firms, and then dividing by $P_z q_z$ yields the average price cost margin for the selling zinc industry :

$$\left(\frac{\pi + F}{R}\right)_z = -H_z \frac{\delta P_B}{\delta q_B} \frac{q_B}{P_z} = \frac{H_z}{\eta_B} \frac{P_B}{P_z} \quad (7.10)$$

Equation (7.10) states that the zinc industries price cost margin is an increasing function of it's own Herfindahl index, H_z , inversely related to the absolute value of the price elasticity in the brass industry, and positively associated with the ratio of the product price in B to that in z. This last term makes the equation difficult to interpret at first sight. However, the key to understanding the model is to recognise that the demand for the zinc industries product by industry B is given by its actual net marginal revenue product curve which can be derived from equation (7.5) as :

$$P_z = \left(1 - \left[\frac{H_B}{\eta_B}\right]\right) - c'(\cdot)_B \quad (7.11)$$

Waterson(1976) shows that if the marginal cost of production is constant and that the brass industry faces a constant price elasticity of demand⁶ then we can use this to write the inverse elasticity of demand in the zinc industry as :

$$\frac{1}{\eta_z} = \frac{P_B(1 - (H_B/\eta_B))}{P_z \eta_B} \quad (7.12)$$

which after some manipulation yields an expression for the selling industry's (zinc) price cost margin

⁶ See Waterson(1976) pages 118 to 119 for this result. Indeed the plausibility and usefulness of these assumptions are attested to in Deaton(1975) with regard to the constant elasticity assumption and Johnson(1960) with regard to the constant marginal cost assumption.

as :

$$\left(\frac{\pi + F}{R}\right)_z = \frac{H_z}{\eta_z(1 - (H_B/\eta_B))} = \frac{H_z}{(\eta_B - H_B)} \frac{\eta_B}{\eta_z} \quad (7.13)$$

The interpretation of equation (7.13) is of some importance. It says that the margin of the selling industry, zinc, depends positively on its own Herfindahl index and inversely on own price elasticity of demand. But in contra distinction to the buying industry the seller margin, Z, also depends on an index of concentration in the consuming industry. The important point to observe is that the selling industry margin depends positively on changes in concentration in the consuming or buying industry. Thus, in contrast to the bilateral oligopoly case where increases in buyer concentration were associated with countervailing power this model predicts that increases in concentration in the consuming industry imply cumulative market power.⁷ An increase in the Herfindahl index in the brass industry will add to the margin in the selling industry. For Waterson(1980) this result appears paradoxical, because it contradicts the intuitive result expressed in the previous literature that argues that increases in buyer concentration facilitate increased bargaining power, and hence should lower the return on sales in the seller industry. This 'paradoxical' result can be explained as follows. The impact on margins of a change in own concentration can be demonstrated to have a greater effect than the impact of buyer concentration. Both the difference between final price and costs and the share of that profit area increase when both the buyer and seller concentration increase. As Waterson(1976) says : "The point is that when [buyer concentration] rises, so that the number of firms in that industry falls, then output is necessarily cut back, thus final price and so the total price cost margin to the chain of industries rises.....it is a debatable question as to whether its share of the total margin increases because the total price cost margin is likely to increase proportionately more than the margin for [the seller]."

One feature of the Waterson model is worth commenting upon. Essentially the analysis presumes a symmetry in the nature of market power ie. the same measure of power is assumed looking forward into the market for the buying industry, as looking back into its relationship with the selling industry. Potentially, these two types of market power are quite distinct. For example Lustgarten(1975) argues that the potential gains from collusion in any particular market are likely to be higher for

⁷ This is easily seen by differentiating equation (7.13) with respect to the consumer industry Herfindahl index.

$$\frac{\partial \left(\frac{\pi + F}{R}\right)_z}{\partial H_B} = H_z (\eta_B - H_B)^{-2} \left(\frac{\eta_B}{\eta_z}\right) > 0$$

selling rather than buying firms. However, as an empirical matter, which we develop below, it is difficult to disentangle these two effects. Indeed the existing literature treats buyer power as the same as the market power possessed in the selling industry, accepting the practical difficulty in identifying each.

The discussion of this section, then, has outlined a fundamental point that buyer concentration can have a positive impact on seller margins.⁸ This contrasts to the earlier literature that has favoured viewing buyer concentration as a proxy for relative bargaining strength. The corollary of the debate is that buyer concentration in successive oligopoly can have a cumulative rather than countervailing effect as posited under bilateral oligopoly. Importantly, so far the Waterson model has not explicitly allowed a role for labour market factors in successive industries.

7.3. Trade Union Power in Successively Related Industries.

In the previous section we argued that there existed a role for buyer concentration to enter the determination of margins in the seller industry. It is also remembered that in previous Chapters we made the argument that union power in one industry can potentially affect the margin in that industry by altering the marginal cost function faced by individual firms [see, Clark(1984) Cowling(1982)]. An interesting corollary, which we explore here, is whether union power in related buyer markets can influence the profitability of the seller industry.

Why should there be any relationship at all between union power in buying industries and a seller industry? The answer to this rests in the potential commonality of interests that exists between the two unions acting in combination in the buyer and seller industries. If the maxim offered by the Webb's(1894), conceiving a union as an "association of wage-earners for the purpose of maintaining or improving the conditions of their employment", is still valid then there is a potential mutual gain for workers acting in combination with each other across related sectors.

Union power can take many dimensions but one of the most overt, and potentially more successful avenues for labour gain, lies in the strike action or strike threat. In this case it is easy to establish that there is a direct effect of a union in a buying sector on the performance of a firm in a selling sector. But, whilst this route will not be the main focus by which unions can make inroads into a seller firm's profit margins in the empirical analysis to follow, it does shed some light on the potential effect of unions located in successively related industries. A situation which has resulted in

⁸ The importance of successive production was considered only once by Kalecki(1938) but in a different context to that discussed here. The model he developed was designed to show that the ratio of materials to value added and the degree of monopoly were not independent which then allowed Kalecki to demonstrate the temporal constancy of factor shares. However, his model did show, by numerical example, that changes in the degree of monopoly at one stage of production can influence the degree of monopoly in an upstream industry.

the breakdown of the industrial relations machinery in the buying industry can have a direct effect on the performance of a selling industry if it is possible to elicit secondary strike action by the unions in that selling industry. Here it is obvious that the mutual commonality between the unions can have potentially adverse affect on the margins in the selling industry. But it must be stressed that it rests on the unions coordinating, and being prepared to act cooperatively in their actions : which in part will depend on the degree of connectedness between buyer and seller industries. However, the recent political and legal climate in the U.K. suggests that it will be difficult to achieve such a commonality. The two Employment Acts of 1980 and 1982, and the Trade Union Act 1984, severely restricts the rights of unions to act in common across firms and so it is unlikely, unless an employer operates in more than one industry and that there is a degree of multi unionism, that successively related union strike action will occur.⁹

However, there is potential scope for unions located in a buying industry to affect the margin in the selling industry via the collective bargaining machinery operated by Whitley councils or other ad hoc bargaining arrangements. Kalecki's(1971) model assumed that the union pressure in raising wage rates occurred within the firm and that subject to the pessimistic expectations made by firms about their rivals price reactions this would succeed in depressing the firm's margin. But Cowling(1982) responded by arguing that if the wage gain was rapidly transmitted over the industry and the Oligopoly group designed a strategy to offset this effect (Eg. by multi - employer agreements) then the Kalecki effect is nullified.¹⁰ We now explore whether collective bargaining in successive firms and industries can affect the margin in the seller firm or industry and examine the likely responses initiated by employers.

It is potentially admissible that a trade union located in a buying industry can affect the wage outcome in a seller market and via this route have an affect on the margin in that sector. By appealing to a variant of the spillover hypothesis¹¹ we can establish that it is likely that there is a connectedness between the buyer and seller sector that suggests an important role for unions, through collective bargaining, to influence outcomes in the selling sector.

The central theme of the spillover mechanism, in this context, is that the level of money wages

⁹ The 1980 Act gave employers the right to restrain indiscriminate secondary action and the 1982 Act further enabled employers to restrain secondary action intended to establish or maintain labour only contract. In addition employers can now restrain industrial action which is not about employment related dispute between workers and employers. The Trade Union Act 1984 entitled employers to restrain industrial action unless this organised by properly conducted secret ballot. The climate, therefore, an opportunity for overt secondary action is clearly curtailed under present employment legislation.

¹⁰ We made this argument in Chapter four but here it provides the basis for examining the effect of union bargaining in a downstream industry on the seller industry's margin.

¹¹ For an exposition of spillover hypothesis and its potential role in explaining wage inflation see Addison and Burton(1979) and Hirsch and Addison(1986)

in the selling sector is to be determined by a reference comparison group in the buying sector. Market participants in the selling sector collectively bargain over money wages by comparison to the bargaining outcomes in terms of the wages achieved in the reference buying sector. Thus, wage changes are visualised as being transmitted across the two sectors by a simple adjustment function according to this spillover rule. In addition to the collective bargaining that would normally occur in each sector this mechanism implies that part of the push for wages in the selling sector is associated to the wage demands that have occurred in the buying sector and this dictates the degree of connectedness of the unions between sectors.¹²

The behavioural assumptions upon which the spillover hypothesis is predicated are of some importance. Why, for example, is it important for unions located in the selling sector to be concerned about the outcomes achieved by buying sector unions? One natural candidate is the degree of relative deprivation perceived by the selling industry union. The particular reference group chosen by the seller union will dictate the magnitude of relative deprivation experienced by the selling industry union. If the relationship between the selling and buying industry union are disrupted then the union in the selling industry will feel relatively deprived and hence make an attempt at restoring pre-existing parity.¹³ So the argument illustrates that wage increases in a related buying industry can potentially become generalised to the selling sector. The actual extent of the spillover will depend on the nature of relative deprivation, the desire to restore previous parity and the degree of connectedness of the sectors.¹⁴ In addition the dynamic of the spillover effect between sectors will be influenced by the existence of either wage rounds or pattern bargaining. The periodicity, and length of the round, will enable unions to observe actual outcomes in the reference groups before own sector bargaining takes place. It is not necessary that such bargaining rounds be formal in nature : all that is required is that a tacit structure in bargaining arrangements be adhered to.¹⁵

¹² This simple idea can be expressed as a spillover equation in the form : $W_i = \sum_r \varphi_{ir} W_r$ where W_i is the spillover induced money wage in the selling sector i , W_r is the money wage in the buying sector r where r can be $r=1,2,\dots,n$ which is the reference group for the unions in each of the i selling firm unions. The term φ is the spillover reaction coefficient which defines the degree of pattern following by the selling sector of the reference group in the buying sector. In addition it captures the degree of connectedness between sectors. If a union operates in two sectors then an increase in the wage in the buying sector will then affect the selling sector wage and hence margin also.

¹³ The argument here rests on the notion that unions in different sectors want to maintain some sense of wage parity with the target reference union and as such individual unions act in their own narrow interests to avoid perceived discrepancies that might occur. Alternatively, the same spillover effects can be observed if unions act co-operatively across sectors, rather than as individual unions, to achieve a general higher wages in both sectors.

¹⁴ In terms of the previously defined spillover equation these factors are captured in the reaction coefficient φ . A high value of φ reflects a determination by selling industry unions to recapture pre-existing equivalence.

¹⁵ Indeed, Burton and Addison(1977) find that although there is evidence for imitative wage claim behaviour in the U.K. the existence of an homogeneous single wage round is doubtful.

Having made the case for inter union connectedness across sectors we now address the question of the pricing consequences of such collective bargaining activity. Returning to Kalecki's(1971) original formulation of the problem an initial rise in wages in the buying sector, brought about by union collective bargaining, was thought to depress the degree of monopoly in that sector due to the pessimistic expectations [see Cowling and Molho(1982)] held by capital of the price responses of other firms. To the extent that collective bargaining in the buying sector is also accompanied by wage pressure in the selling sector, and the firms in selling sector hold similar pessimistic expectations about the reactions of their rivals, then the effect of collective bargaining in the buying sector is also to depress margins in the selling sector. But this argument needs to be qualified in the light of specific institutional bargaining structures that exist and the potential strategy responses by enterprises in each sector. If an individual firm in the buying sector faced a union bargain that was plant by plant or restricted to that firm only then given that the pricing equation of the capitalist enterprise is conditioned by that of its rivals then a less than proportional price rise to the wage increase is plausible. Similarly, if the wage increase is effectively transmitted to the selling sector and the firm in the selling sector holds similar pessimistic expectations about how its rivals will react then the margin in the selling industry, too, is lower than it would otherwise have been in the absence of spillover effects. Thus the existence of a reference group in the buying sector coupled with plant by plant bargaining in the selling sector will result in a lower margin in that sector than would be observed if the buying industry union had no influence.¹⁶

However, organised capital is unlikely to be indifferent to this type union behaviour, and transmission mechanism, either within or across sectors. Where bargaining occurs for the industry, or sector, as a whole or there are significant intra-industry spill over effects, then the impact of union action on the margin becomes severely curtailed. In tightly organised concentrated sectors we can expect a high degree of collusion not only over price fixing but also over wage fixing. It is simply the analogous case focusing on labour market coordination as opposed to product market coordination. The mechanism by which wage fixing can occur can be overt or tacit. Joint employer organisations are the most clear expression of overt collusion in wage fixing strategies where the bargaining structure embraces more than a single firm (eg. where bargains are national in scope.) However, single employer agreements can achieve the same goal. This is possible when the principle or dominant employing firms operate a strategy for wages which other firms within the sector takes as datum and tacitly follow. This line of reasoning not only follows for intra industry wage fixing policy, which suggests a certain difficulty for unions to make inroads into that sectors margin, but also across

¹⁶ If a union operates in both buying and selling sector then an increase in wage in the buying union will also apply to the selling sector and potentially affect the margin this way.

sectors. The existence of Joint Industrial Councils also provides a reference frame for which employers associations in a selling industry to observe wage outcomes in a buying sector and accommodate these into the wage fixing strategy to be adopted by industrial capital in the selling industry. Indeed, such a position is quite likely if the unions in selling sector make explicit that part of a wage claim is made by reference to the claims made in related sectors.

The perceived importance and structure of employers associations have undergone radical change in their history. In 1936 there were two hundred and seventy national federations of employers compared to a figure of one hundred and seventy two in 1988. Further, Coates and Topham(1988) estimate that only 20% of private sector workers are covered by multi-employer agreements such as Joint Industrial Councils by 1988 and point to a further declining role of employers associations in the wider collective bargaining function. The tendency is for firms to withdraw from the old structures and to bargain directly with unions through specialised industrial relations departments.

However, the declining importance of national bargaining does not of necessity imply declining collusion by firms over wage fixing. The growth in single employer agreements that has occurred in part reflects a growing monopolisation of markets. The intense merger activity of the late 1960s and again in the early 1980s, with the consequent growth in the giant corporation, and multi plant firm, means that multi employer agreements have been substituted for single employer national agreements. Indeed, the development of the single employer national agreement allows firms to operate a central wages strategy that unless this is accompanied by similar centralisation in union structures this will potentially leave organised labour in a worse position to bargain over wages.

The theme appears to be then that firms will tend to set up employers associations and multi-employer agreements in response to union wage pressure as a strategy to ensure that collusion in oligopoly can be generally sustained. The general monopolisation of markets and the subsequent emergence of the single employer agreement operated by dominant firms simply allows overt collusion over wage strategy to be replaced or supplanted by tacit agreement. The dominant employers in a sector set wages and assume follower behaviour by smaller scale enterprise in the industry. In a world of monopoly capital this suggests that the problem of maintaining the degree of monopoly when faced by hostile union claims for wages can in fact be achieved [for example, see the argument advocated by Cowling and Molho(1982) which suggests that union wage pressure will be offset by product price increases under such an institutional structure]. Whilst the actual institutional bargaining structure may change as market structure evolves the central point remains that employers can, at least for the most part, present a united front concerning wage strategy when faced by the common adversity of union action. Our conclusions are substantively unchanged in a world where there is a strong connection between unions across sectors.

We are now in a position to turn to the existing literature that has considered the issue of successive market power and its effect on seller margins. As has already been noted this body of evidence focuses solely on the effect of buyer power in terms of product market buyer power.

7.4. Previous Empirical Studies.

Few studies have addressed empirically the issue of successive market power and the determination of margins. Importantly, none have considered the impact of trade unions within this general structure and how trade union organisation in successive industries impacts on the margins of seller industries. The relative paucity of empirical work is attested to by Schmalensee(1988) : "It seems fair to conclude that no robust relation has yet emerged from studies of buyer concentration".

Two earlier studies provided the initial research into the issue of product market power. Brooks(1973) and Lustgarten(1975), both U.S. investigations, find that measures of buyer concentration power significantly depress performance in seller industries. In these studies, as in all of the subsequent research, it is assumed that the purchasing concentration ratio is the same as the selling concentration ratio for that industry. Their measure of buyer concentration can be symbolised as :

$$BCR_i = \sum_{j=1}^n \psi_{ij} CR4_j \quad (7.14)$$

where BCR_i is the buyer concentration in the i th industry, $CR4_j$ is the (four firm) concentration ratio in the j th industry and ψ_{ij} is the proportion of the i th industry output sold to the j th industry as indicated in the 1963 U.S. input output tables. In the case of the study by Brooks(1973) economic performance is measured as the seller rate of return on capital, and in the Lustgarten formulation the dependent variable is the seller price cost margin. The Brooks(1973) tests the hypothesis of countervailing market power and finds evidence in its favour. The study finds a partial correlation between seller rate of return and buyer concentration of -0.204, and that in a regression of the seller rate of return on seller concentration and buyer concentration, the latter is found to have a negative and significant impact on seller margins, whilst the former is significantly positive. Two potential problems with the Brook's(1973) investigation can be mentioned. First, the basic unit of observation employed in the analysis was the two digit industry division. This left the author with a sample of only twenty observations on which to perform his analysis. Such a small sample does call into question the precision and robustness of the resulting estimated coefficients. Second, the study failed to exclude those industries that had miscellaneous in their title. Again, this would have compounded the first problem of small sample bias if they had been excluded, but in addition it suggests that the industries included are not well defined economic units and hence casts further doubt on the robustness of the

results.

The Lustgarten(1975) model, too, is a test of the countervailing power hypothesis ie. consistent with the text book bilateral monopoly model where increases in bargaining strength of buyers depress the price that sellers charge. The measure of buyer is power that he employs is identical to equation 7.14 above although he also adduces arguments for, and measures three other facets of buyer power namely 'relative sector dispersion of buyers', 'average annual purchases of buyers' and 'relative buyer firm size'. The Lustgarten(1975) investigation uses a sample of 327 (from a potential 478) industries from the U.S. Input-Output and Census of Manufactures Survey. The study corroborates the Brooks(1973) findings and buyer concentration proves to have a significant negative impact on the seller price cost margin. The partial correlation coefficient between the margin and buyer concentration is relatively weak, -0.075 . Indeed, Lustgarten(1975) finds that if he partitions his sample by a high / low concentration split, on the hypothesis that buyer power only matters if buyers can extract rents from the high concentrated selling industries, then a critical buyer concentration ratio appears to emerge. For each of these samples the seller margin is regressed on the buyer concentration measure, along with some controls, but not the seller concentration ratio which in part must explain the fall in explanatory power of the regressions in each of the sub samples. For values of seller concentration below 40% there is an insignificant effect of buyer concentration on seller margins, whilst the negative effect is reinforced in relatively highly concentrated industries. However, these results might change if seller concentration was included in the regression.

The sensitivity of the Lustgarten result is raised by Guth, Schwartz, and Whitcomb(1976) who argue that Lustgarten does not define and measure the BCR appropriately. They compute BCR's for products where meaningful data exist, and correct for supposed spurious correlation between buyer concentration and seller concentration in a test of the countervailing power hypothesis. Guth et. al. employ the same data source as Lustgarten. The authors correction left a sample of 53 manufacturing industries and they found that the buyer concentration ratio was often the "wrong" sign, ie. was positive but insignificant. However, in a reply to the authors Lustgarten(1976) questions the sample selection criteria favoured by Guth et. al.

The specification of the seller margin-buyer concentration relationship is further considered by La France(1979) in a test of bilateral monopoly exploiting the data set constructed by Lustgarten. After replicating the broad Lustgarten results LaFrance includes an interaction term between buyer and seller concentration to test the joint influence of buyer and seller concentration. It is found that in the sample of 327 industries the buyer concentration ratio has a significantly positive impact on seller margins, and that the interaction term is significantly negative. This is interpreted as evidence in favour of countervailing market power implying that the negative influence of BCR on seller margins increase

with seller concentration. However, the important change in the sign of the direct effect of buyer concentration is not discussed.

Bradburd(1982) extends the investigation of successive market power by including a weighted buyer price cost margin term. His sample results in 85 industries from a subset of 496 from the 1972 U.S. Input-Output tables. Importantly in the Bradburd study the buyer concentration ratio does not perform well. When it is defined as a dummy variable of one when concentration exceeds 48% (zero otherwise) he finds that buyer concentration impacts negatively on seller margins. The weighted buyer price cost margin is found to negatively (and significantly) impact on seller margins.

Ravenscraft(1983), in the only line of business study to date, includes a buyer concentration measure to test the countervailing market power hypothesis. The inclusion of this regressor in the estimating equation is only as a control variable among twenty three other regressors and hence does not receive much discussion. He finds that the effect of buyer concentration is significantly positive in a sample of 3186 line of business units for 1975 and comments that the result is contrary to the countervailing market power hypothesis. However, there is little substantive comment to explain the observed positive effect.

The only U.K. study to date, conducted by Waterson(1980), tests the hypothesis that buyer power is cumulative as predicted by the Cournot model outlined in section 7.2 above. The data set used is derived from the 1963 and 1968 Census of Production supplemented with information from the input output tables to ascertain the degree of industry by industry degree of connectedness to calculate the buyer concentration ratio. The selection criteria results in a sample of fifty-eight manufacturing industries. The seller price cost margin is regressed on the seller Herfindahl measure of concentration and an estimate the buyer Herfindahl concentration ratio. Importantly, Waterson(1980) finds strong support for the Cournot hypothesis that buyer concentration adds to the seller margin and is in contra distinction to the countervailing market power hypothesis. In addition, he includes a quasi Lustgarten measure of buyer concentration as a regressor in his equation which attracts a negative and significant sign. Given that there is a strong correlation between these two measures used in Waterson's paper he expresses concern that they have opposing effects on the seller margin. One possible explanation for this is that there might be a non linear relationship between buyer concentration and the seller margin. The empirical results in Waterson(1980) do not consider such sensitivity of the functional form.

The previous discussion highlights a number of empirical conclusions. First, the impact of buyer concentration on seller margins remains an open question within the existing empirical evidence supporting both the countervailing market power hypothesis and the cumulative effect of buyer concentration on margins. Second, there is a relative dearth of evidence for the U.K.. Third, all studies

that have considered the importance of buyer power in related industries have omitted to consider the impact of union power in successive markets. This might not be too surprising since interest in the nature of product and labour market interaction is a relatively recent phenomenon.

7.5. Variable and Data Construction.

The discussion of sections 7.2 and 7.3 stressed the importance of both product market concentration and union power in the buying industry for shaping seller margins. We now address the construction of the buyer market variables. The following three variables were computed as measures of the importance of buyer structure. Each variable has a common weight, ψ_{ij} , applied to all constructed variables of buyer market power. The weight is the proportion of sales in the producing industry going to the buying industry. If we define q_{ij} as the sales of the producing industry i going to a consuming industry j , and q_i as the total sales of the selling industry i , the common weight can be expressed as : $\psi_{ij} = (q_{ij}/q_i)$. This is essentially the weighting mechanism used by Lustgarten(1975). The essence of the weight is that it attaches more importance to a variable in the buying industry the more important is the buying industries purchases of sales from the producing industry. The following three variables were computed :

1. BCR : this is an estimate of the buyer concentration measure. It is the average five firm concentration ratio by sales of the consuming industries weighted by ψ_{ij} :

$$BCR_i = \sum_{j=1}^n \psi_{ij} CR5_j ; \quad (i = 1, \dots, n) \tag{7.15}$$

2. BPCM : this is the average degree of monopoly power in the consuming industry weighted again by ψ_{ij} . This is defined as gross trading profit to sales.

$$BPCM_i = \sum_{j=1}^n \psi_{ij} PROF_j ; \quad (i = 1, \dots, n) \tag{7.16}$$

3. BCOVER : this the average degree of union power in consuming industry, measured by collective bargain coverage, weighted by ψ_{ij} . In the following COVER refers to the degree to which workers are subject to collective bargaining arrangements.

$$BCOVER_i = \sum_{j=1}^n \psi_{ij} COVER_j ; \quad (j = 1, \dots, n) \quad (7.17)$$

We proceed by discussing the sample and collection of data and then the results that we obtain. The sample is a simple panel of U.K. manufacturing industries for the years 1984 and 1985. Because the construction of the successive market power variables requires knowledge of the interrelationship between different industries, the level of aggregation of the empirical study is that of three digit SIC Census of Production data supplemented by the industry by industry input output table for 1984. The choice of the sample period is dictated by two factors. First, published data on the key unionisation coverage variable is only published for 1985 under the new SIC(1980) schema. Second, the weight needed for the successive market power variables is available only for 1984 under SIC(1980). Hence we pool the two years data to enhance the precision of our estimates by increasing the degrees of freedom available.¹⁷ We further restrict the sample to those manufacturing industries that are well defined. Industries with "miscellaneous" in their title description, of which there were eight, were excluded from the analysis on the basis that they were not valid units of analysis. This selection criteria left us with a total of eighty two industries in each year so when pooled we have a sample of 164 on which to estimate our model.

The issue in constructing an index of power in successively related industries presupposes a knowledge of inter industry trade flows. A suitable match between sellers and buyers is available from the 1984 U.K. Input-Output tables. The tables treat each industry as a consumer of inputs from other related industries, and as a producer of output sold to other industries for use in (successive) production. Estimates of buyer structure, profit margins and union coverage for each producing \ seller industry are calculated by summarising the salient industry statistics for all its consuming industries. As previously noted the buyer power statistic turns out to be a weighted average of the salient characteristics (profit margins, concentration, and union coverage) in the consuming industries. The weight is the proportion of sales in the producing industry going to the consuming industry. The buyer industry statistics are obtained from a variety of sources, although the principal reference points are the New Earnings Survey (for union coverage) and the annual Census of Production (for concentration).

7.6. Modelling Strategy.

Following the theoretical discussion in sections 7.2 and 7.3, we treat the determination of

¹⁷ This procedure means that we have to treat both the unionisation variable and the measures of successive market power in the empirical section as fixed effects.

manufacturing profit margins as a linear function of the form :

$$PM_i = \beta_0 + \beta_1 \text{CONC}_i + \beta_2 \text{ADV}_i + \beta_3 \text{COVER}_i + \beta_4 \text{BCR}_i + \beta_5 \text{BCOVER}_i + \beta_6 \text{BPCM}_i + \beta_7 \bar{X}_i \quad (7.18)$$

where PM_i is the selling industry profit margin for industry i . CONC is the five firm seller concentration ratio derived from the Census of Production, ADV is an estimate of the advertising to sales ratio in industry i , COVER is male manual coverage, X is a vector of relevant control variables, and ϵ is an assumed white noise disturbance term. BCR , BCOVER , and BPCM are respectively the variables buying concentration ratio, buyer industry coverage and buyer industry price cost margin as defined from the previous section.

The dependent variable in this study is defined as the ratio of net output minus the operative wage bill to net output.¹⁸ The measure of product market concentration that we use is the five firm concentration ratio by sales. This differs from the theoretically predicted Herfindahl index of Cournot theory but its use can be defended. Although it is possible to derive proxy Herfindahl indices for seller industries they cannot, with any degree of accuracy, be constructed for consuming industries outside manufacturing. For consistency of interpretation between buyer and seller industries we elect to use the five firm concentration ratio.¹⁹

We also include in our regression model a proxy for the advertising to sales ratio. This is defined as the ratio other costs of non-industrial services received²⁰ to sales. The principle reason for its inclusion is to capture the degree of inertia in seller product demand. According to Kalecki(1971, p.50) the second major positive influence on the degree of monopoly will be "... the development of sales promotion through advertising." by replacing price competition with competition in advertising. We expect this variable to have a positive effect on the profit margin in the seller industry.

A number of auxiliary controls are included. We include absolute size, estimated as the natural

¹⁸ This variable whilst not strictly the usual margin has been used in a number of previous studies as such. For example, see Hart and Morgan(1974), Clarke, Davies and Waterson(1984), Dowrick(1990) and Conyon and Machin(1991b) and for a discussion of the merits of various empirical formulations of the margin Conyon and Machin(1991a). See also the justification of this measure in Chapter 6.

¹⁹ In addition, Kalecki(1971) argues that the prime causes of a change in the degree of monopoly are "first and foremost the process of concentration in industry." There is no restriction here on the type of concentration measure that has to be favoured. Given Kalecki's general antipathy towards equilibrium economics, from which the Cournot equilibrium model predicted the Herfindahl index, we feel that the five firm concentration ratio is justifiable. Although the model being tested here does originate within the Cournot framework the wider implications of the effect of concentration and buyer concentration on seller margins ought not be lost sight of.

²⁰ Such a measure is not without precedent. It has been used, inter alia, by Dowrick(1990) and Henley(1987) and Conyon(1988). We are forced into using this measure because since 1968 the U.K. census has failed to report actual advertising statistics.

logarithm of total employment, which we would expect to be positive. As a control for capital intensity, we include the ratio of net capital expenditure to sales. In the absence of ready data on a capital stock measure this approach seems expedient. In addition, we report models that take account of the openness of industry to foreign enterprise activity by including two trade variables. These are the import and export intensity measures from the Census. If enterprises in the domestic market are unconnected with the foreign trade inflows and outflows, and they compete then imports (exports) are expected to have a negative (positive) impact on seller margins. Unfortunately, the Census measures fail to measure intra firm trade across national barriers hence this might be an imperfect proxy.

We also include our three indicators of successive market power discussed in the previous section. Buyer concentration and consuming industry price cost margins are expected, following the theoretical discussion to have a positive impact on seller margins if the prediction that successive product market power is cumulative and not countervailing. However, if we observe a negative effect of buyer concentration on margins this is evidence for the opposing position that increases in buyer concentration represents countervailing bilateral monopoly power.

The predicted effect of union power in successive downstream industries [BCOVER] should be negative. This would be evidence for a spillover effect of collective bargaining effects across sectors. But this must be qualified in the light of our discussion in section 7.3. An insignificant effect would be evidence that the wage fixing strategies of organised capital is actually ameliorating these inter sector union effects allowing prices in the selling sector to rise and circumventing union power.

The means and basic correlations of the key variables used in this study are presented in table 7.1. The mean of seller concentration is 42.6% with the mean of the buyer concentration ratio being lower at 33.6%. This is consistent with Brooks(1973). Similarly the mean of the coverage measure is 61.5% whereas the mean of coverage in the buying industry is 52.5%. Turning to the correlation matrix we notice that there is a strong correlation between the seller profit margin, the seller concentration ratio and the advertising to sales ratio. It is negatively related to the seller union coverage measure. Examining the key buyer power variables and their relationship with the seller margin we confirm immediately that the buyer concentration ratio is positively related, as is the buyer price cost margin, whilst the buyer union power measure exhibits a negative relationship with the seller margin. This provides partial evidence for the cumulative effect of buyer concentration on the seller margin. Also it suggests that increases in the buyer industry union coverage implies a lower margin in the seller industry. However, until we examine the multi variate regressions below we cannot conclusively come to this result.

We briefly note two other interesting correlations. The buyer concentration ratio is positively related to the seller concentration ratio. In previous studies, Eg. Lustgarten(1975), this has been

assumed to imply partial evidence for the countervailing power hypothesis that high seller concentration encourages buyers to grow large to circumvent the power of sellers.²¹ But this cannot be a complete test since it is also consistent with a general monopolisation of all markets. What is important is to further consider whether the effects of increases in buyer concentration has a negative effect on seller margins which would provide evidence for such a view. In addition, we notice that there is a positive correlation between buyer and seller union power. This suggests that strong unions in the seller industry, in terms of their bargaining power, tend to be faced by strong unions in the purchasing industries. We now turn to the multi variate estimates and examine our key hypotheses.

7.7. Estimated Models of Buyer Power on Seller Profitability.

Our ordinary least squares results, examining the impact of buyer concentration, along with the effects of trade union collective agreements in buyer industries, are presented in tables 7.2 and 7.3. In table 7.4 we explore the same phenomena using instrumental variable techniques.

Columns (1) to (3) in table 7.2 can be described as a standard Industrial Organisation margins equation augmented by the presence of trade union activity. We first consider these benchmark equations by which to compare our later results. The importance of including a measure of trade union power in a margins equation was the subject of the previous chapter. In columns (4) and (5) we incorporate measures of buyer concentration into the determination of the seller margin.

Inspection of column (1) reveals a clear picture. First, and confirming our prior expectations, we notice that seller margins are higher in more concentrated industries and are also higher in industries that are more advertising intensive. Since both concentration [CONC] and advertising are positive and significant at the 5% level this strong evidence in support of Kalecki's degree of monopoly theory. Indeed, the point estimate on concentration suggests an elasticity of the margin with respect to seller concentration of 0.05. This indicates that an increase in concentration of 10% would raise margins by 0.5%. Although quantitatively small in magnitude the overall effect is, nevertheless, significant. Examining the other included variables we notice that the investment to sales ratio [KAP] and the size proxy [SIZE] attract negative and significant coefficients. The other additional control variables included in the regression are imports in home demand [IMP] and the exports to sales ratio [EXP]. It is often argued that such variables be included to account for international trade pressure experienced by the domestic manufacturing sector. As such the degree of import penetration is expected to depress margins, and the ability to export to raise margins. However, we express

²¹ Not all studies have found that the buyer and seller concentration are positively correlated. Brooks(1973) in a test of countervailing power, whilst he finds that the buyer concentration ratio negatively effects the seller profit margin, also finds that the correlation between the buyer and seller concentration ratio is negative. This apparent ambiguity in the results is, however, not discussed.

reservations about such an interpretation of these variables. In a world of transnational monopoly capitalism we would expect inter country trade flows to be coordinated by transnational firms or that inter country trade flows are intra-firm flows. The thrust of this is that these variables do not adequately account for international competition faced by the firm. Their inclusion can be justified in the grounds that there may be bias in our seller concentration measure since it only measures the concentration of domestic sales. This withstanding the joint inclusion of the import and export variables are justified on the basis of a likelihood ratio test [LR=10.42 (2)]. We observe from column (1) that exports are positive and imports turn out to be negative but fail to be significant.

In column (2) we include the effect of trade collective bargaining on seller margins. We notice immediately that it attracts a negative and significant sign at the one percent level suggesting that profit margins in the selling industry in 1984/5 are eroded by the presence of strong union in the seller industry. Perhaps more importantly, however, is the issue of the bias on the concentration effect that excluding this measure induces. Formally, this is given as the product of the covariance between concentration and union power, and the expected direct effect that unionism would have on the seller margin.²² In our sample the simple correlation coefficient is 0.185, therefore we would expect a downward bias, and indeed this is what we observe. Examining the point estimates on CONC in (2) and (3) we see that it rises to 0.147 from 0.095. These results are broadly consistent with the results found in Chapter 6 with the seller concentration being a positive influence on margins and the union measure depressing them.²³

Column (3) decomposes the effect of trade union collective bargaining into its constituent effects on the seller margin. The objective of such a decomposition is to ascertain whether one particular type of collective bargaining arrangement has a different effect from another. For example it has been argued that to affect profits trades unions require national agreements coupled with supplementary bargaining rights to make inroads into the surplus [see Henley(1984) and my comments in chapter 8]. The model in column 3 illustrates that all three components of collective bargaining structure in British manufacturing have a significant depressing effect on margins. Quantitatively it turns out that national only agreements has the largest effect. The smallest effect comes, not unsurprisingly, through the supplementary only agreements variable. The data for this period supports the view that all three components of collective bargaining are negatively associated with seller margins.

²² This is simply a case of omitted regressor bias. The expected value of β_1 , in this case the coefficient on concentration, is given as $E(\beta_1) = \beta_1 + \beta_2(X'X)^{-1}(X_2'X_2)^{-1}$ where β_2 is the coefficient on the excluded variable (here unionism) and the remaining term is the covariance between the included and excluded regressor.

²³ Moreover, it is consistent with other recent British and U.S. studies that have also derived this effect. See the references cited in Chapter 6.

The models in presented in columns (1) to (3) were examined for heteroscedasticity using a Breush Pagan test. Because of evidence of slight heteroscedasticity, the reported standard errors are White(1980) consistent ie. those that remove arbitrary heteroscedasticity in the variance covariance matrix. We note that the models explain between 40% and 52% of the variation in the price cost margin, which is broadly consistent with the models presented by Dowrick(1990) in similarly specified regression models for a similar time period.²⁴

Column (4) augments our basic margins equation (which now also includes seller trade union agreements) by a measure of buyer concentration [BCR]. Although positive the estimated coefficient fails to be significant at the 10% level. However, the positive sign does point towards some evidence that the effect of buyer concentration on seller margins suggests cumulating rather than countervailing market power. One possible reason for the not quite significant effect of BCR is that it may have a non-linear effect on seller margins [see Geroski(1981)]. According to the critical concentration ratio hypothesis [see Weiss(1974)] there is a latent critical level at which point the effect of a seller concentration on margins becomes marked. And so, too, it can also be the case with the buyer concentration ratio. To examine this potential effect we include a squared buyer concentration term although we recognise that an exhaustive treatment would require an examination of the data using linear spline techniques. [See Geroski(1981), or Stewart and Wallis(1981)]. In the event a "U shaped" quadratic effect of buyer concentration on seller margins was unearthed. At low levels of buyer concentration a negative effect of on seller margins is observed. This significant result suggests that market power in buyer industries is negatively associated with the seller margin. However, at higher levels of buyer concentration a positive effect is recorded and this is consistent with market power in buyer industries adding to the seller margin. The overall average effect of the quadratic term is positive (a value of 0.006 evaluated at the mean of buyer concentration). This is evidence that for the period under investigation buyer concentration in the consuming industry has an overall positive effect on seller margins. As such our results are consistent with the Cournot model developed earlier and with the evidence presented in Waterson(1980).

In table 7.3 we explore further the effects of buyer power in consuming industries by examining the effect of buyer industry trade union collective agreements on seller margins. In column (1) of table 7.3 we observe that the inclusion of the buyer coverage variable has a significant depressing effect on seller margins. Its inclusion, however, has not markedly altered the qualitative results on any of our other key regressors; namely seller concentration, advertising and unionism. This result suggests that if union coverage in buying industries increases this is associated with a fall in the

²⁴In unreported regressions a time dummy for 1985 was included to take account for any problems that might have arisen in pooling the data over the two years. But in the event this turned out to be insignificant in all models.

seller margin. One mechanism that is consistent with the observed data is the existence of a spillover effect in wage determination in the labour market. Suppose, as argued earlier, that there is a given level of trade union coverage and rent seeking behaviour in the selling industry. Further to this suppose there is an increase in wages in the buying industry due to the rent seeking activity of trade unions in those consuming industries. If an element of trade union wage demands in the selling industry are made by reference to outcomes in the buying industry then selling industry trade unions will feel relatively deprived [see Hirsch and Addison(1986)]. This provides an incentive for further rent seeking by trade unions in the selling industry than otherwise would be the case if it was not for the effects of buyer industry coverage. An increase in buyer industry trade union coverage might then be expected to have a negative effect on seller margins, and this is indeed what the evidence points to.²⁵ In column (2) we include the effects of national and supplementary, national only and supplementary only selling industry effects on seller margins. As before the quantitatively largest impact occurs from the national only agreement in the selling industry. The effect of decomposing this union effect is not to change the point estimate on the buyer coverage variable.

In columns (3) and (4) we introduce the joint effect of buyer coverage and buyer trade unionism on seller margins. In (3) BCR is introduced as a linear function. Unlike the case when it was included on its own BCR is now positive and significant at the 10% level, corroborating the hypothesis that market power is cumulative. In column (4) we again introduce buyer concentration in a quadratic way an the same U shaped effect as before is observed. The average effect is similarly positive. In both these regressions the effect of buyer coverage on seller margins remain negative and significant.

In column (5) we include three measures of successive market power. The buyer concentration effect is still significantly positive and buyer coverage is negative and significant confirming the important role of successive market factors in determining seller margins. We also include in this regression an estimate of the price cost margin in the buying industry. This was included in the Bradburd(1982) study as a proxy for the elasticity of demand for the buying industry products [Bradburd(1982 p. 409)].²⁶ Since it also reflects the degree of monopoly power in buying industries, each conditioned by concentration, the degree of implicit collusion and the price elasticity of demand, we would expect it to have a positive effect on seller margins to the extent that market power was

²⁵ The established link between seller margins and buyer industry coverage is probably more complex than suggested here. The degree to which unions can coordinate wage demands across industries will depend, *inter alia*, on the type and size of unions in the buying and selling industries; a factor which we have not controlled for here. Larger general unions, of which there are more since the union merger waves in the early 1980's, will tend to reduce the information costs associated with fostering coordination across sectors. However, what the new result here does show is that buyer trade union coverage is important in determining seller margins.

²⁶ He argued that since the derived demand elasticity for an input increases with the elasticity of demand for the good in whose production it is employed one would expect the weighted average price cost margin in the buying industries to have a positive impact on seller margins.

cumulative. In column (5) our results illustrate that the buyer profit margin has a positive and significant impact on seller margins.

These results then provide strong support for two aspects of the theoretical discussion presented in earlier sections. First, the data support the cumulative market power hypothesis whilst no evidence is found for countervailing market power effects as suggested by Galbraith(1952) or Lustgarten(1975). Of itself these results are quite interesting since they corroborate for the 1980's an effect earlier presented in Waterson(1980) for the 1960's. However, they also directly confront the issue of countervailing versus cumulative market power effects of buyer concentration. In the U.S. where these positive effects have been found, eg. Ravenscraft(1983) and LaFrance(1979), they have been passed over as aberrations in tests for countervailing power. However, they are quite consistent with the Cournot model that we have used as a theoretical justification. Second, we have found that not only is concentration in buying industries important but so also is the degree of union power in these industries. Thus, as a wider research methodology it suggests that an agenda that views product and labour market interaction questions as important should cast its net wider and examine further how product and labour markets in successively related industries affects performance in the selling industry.

A potential problem with the results so far presented is that they may be subject to simultaneous equation bias. This particular econometric issue is thought to plague empirical studies of industrial organisation profit determination (eg. Sawyer(1982), Dowrick(1990)). The issue revolves around the assertion that a theoretical case can be made such that some of the explanatory regressors are contemporaneously influenced by the dependent variable. This is thought to be the case especially with unionism, and measures of seller concentration. We tested the orthogonality assumption by an augmented Hausmann test.²⁷

The Hausmann test provided evidence that the union coverage measure is indeed endogenous when tested alone. The instruments used were industry level union density, over time and average hours worked and the proportion of manual workers in full time employment. In addition there was weak evidence that concentration was endogenous. The instruments used were lagged concentration and two year lagged concentration. Jointly, both variables, seller concentration and seller union coverage, were found to be endogenous. We report the more efficient instrumental variable results in table 7.4 for our basic model.

In comparison to the results reported in Table 7.2 and 7.3 we find that the key variables in table 7.4 remain unaltered. Seller concentration [CONC] and advertising intensity [ADV] remain

²⁷ A single regression equation of the explanatory regressors that are thought to be endogenous is performed on a set of exogenous or predetermined variables. The test statistic is a t test on the residuals retrieved from this regression when included in the original equation, or an F test if a sub class of regressors.

significantly positive. The concentration effect, compared to the OLS results, is quantitative larger [a rise of 36.76% comparing table 7.4 column (1) with table 7.2 column (2)]. Seller coverage [COVER], too, retains its significant negative effect. The import and export variables perform less well being generally insignificant. Column (2) indicates that instrumenting is not unimportant since buyer concentration is now positive and significant when included without buyer coverage (this compares to column (4) of table 7.2). We can conclude that buyer concentration has a significant positive effect on the seller price cost margin, evidence against the view that monopoly power in the consuming industry has countervailing on their upstream suppliers.²⁸ Column (4) examines the possibility again of a non-linear buyer concentration effect. Again the U shaped quadratic, significant for both variables, is recorded. Finally in column (5) we include three successive market power variables. The results indicate that monopoly power in the buying industry augments the seller margin rather than depress it. On the other hand trade union coverage, significantly depresses the margin. Together these results point to the importance of successive market power in the determination of margins and compliments the previous chapter.

7.8. Implications and Conclusions.

This study has raised a number of key issues in the widening debate concerning the interaction of product and labour markets. On the product market side the literature on successive market interrelationships was shown to emphasise the role of buyer concentration as a bargaining device in counterbalancing the power of seller industries. However, we have shown by reference to the Waterson(1980) model that the effect of concentration in successive markets can equally have a positive effect on the seller margin. This suggests a fundamental distinction : is buyer industry concentration countervailing or cumulative?

Turning to the labour market side, despite the recent interest in the importance of unionism in shaping the profitability of both firms and in industries, the question of how unionism in related sectors affects the seller margin has not been addressed. To the extent that collective bargaining in downstream industries has important spillover effects for the producing sector this suggests an important role for unionism in related sectors to shape producing industry margins.

This Chapter has subjected these notions to empirical scrutiny. It uses two representative data sources, the U.K. Census of Production and the Input-Output tables, to examine the relationship between buyer concentration and the seller margin and also the degree of buyer union power and the

²⁸ There may be an issue of endogeneity here although we have assumed that both buyer and seller concentration are essentially predetermined. If buyer and seller concentration are theoretically positively correlated then buyer concentration may be simply proxying seller concentration. However, the actual correlation coefficient is weak (0.09) and in the absence of a full structural model the problem of identifying the two variables suggests that this problem may not be too serious.

seller margin. It attempts to determine firstly whether these components are important in shaping seller margins, and second their qualitative impact. Several interesting findings emerge from the analysis. Highly concentrated industries tend to be faced by more highly concentrated buyer industries. However, this does not imply countervailing power since the regression analysis indicated that buyer concentration adds to the seller profit margin rather than detract from it. As such we find strong support for the cumulative effect of buyer concentration on seller margins. On the labour market side we find support for the hypothesis that buyer coverage spillover effects are important in the determination of the producing industry margin. Buyer coverage is found to depress margins in the analysis indicating that not only is union power in seller industry important but so too is the degree of union power in downstream industries. Taken together the effect of product and labour market variables in the purchasing sector provide an interesting juxtaposition against which to assess the conclusions of Chapter 6. In Chapter 6 we addressed the empirical importance of unionism in shaping own industry margins. The analysis of this Chapter suggests that not only are own industry effects empirically important but so are the effects of unionism and concentration in purchasing sectors.

Table 7.1 : Means and standard deviation of key variables.

Variable definition	Variable mean	Standard deviation
PCM Profit Margin	0.7033	0.092
CONC Concentration	0.4261	0.223
ADV Sales Effort	0.0612	0.028
KAP Investment	0.2758	0.498
SIZE Industry Size	3.3196	1.157
IMP Imports	0.3433	0.249
EXP Exports	0.2907	0.237
COVER Coverage	0.6156	0.153
BPCM Buyer Margin	0.0501	0.038
BCR Buyer Concentration	0.3367	0.136
BCOVER Buyer Coverage	0.5252	0.152

Correlation Matrix of key variables.

PCM	1.00								
CONC	0.33	1.00							
ADV	0.28	0.04	1.00						
IMP	-0.07	0.09	-0.07	1.00					
EXP	0.08	0.16	-0.05	0.75	1.00				
COVER	-0.14	0.18	-0.12	-0.33	-0.25	1.00			
BCR	0.06	0.09	-0.08	0.41	0.55	-0.02	1.00		
BCOV	-0.09	-0.04	0.13	0.05	0.14	0.04	0.39	1.00	
BPCM	0.11	-0.05	0.26	-0.32	-0.36	-0.07	-0.45	0.32	1.00

Notes.

1. Variable definitions : PCM is seller industry price cost margin, defined as the ratio of net output minus the operative wage bill to net output. CONC is the five firm seller concentration ratio. IMP is the level of imports in home demand. EXP is the exports to sales ratio. COVER is the proportion of manual males covered by collective bargaining agreements. BPCM, BCR, and BCOV are indexes of power in the buying industry. BPCM is the buyer price cost margin, BCOV is a weighted union coverage measure in the buying industries, BCR is the buyer concentration ratio. For details of construction see section 7.5.

2. Data sources : PCM, CONC, ADV, KAP : Report on the Census of Production Summary Tables, PA1002, HMSO; EXP, IMP : Business Monitor Publication MQ12, HMSO; COVER : 1985 New Earnings Survey.

Table 7.2 : Margins determination and the impact of buyer concentration 1984-1985.

	(1)	(2)	(3)	(4)	(5)
Constant	0.7261 (0.0401)	0.8163 (0.0390)	0.8017 (0.0403)	0.8091 (0.0377)	0.8891 (0.0456)
CONC :	0.0945 (0.0241)	0.1466 (0.0250)	0.1278 (0.0269)	0.1453 (0.0264)	0.1295 (0.0233)
Concentration					
SIZE :	-0.03167 (0.0074)	-0.01934 (0.0070)	-0.0204 (0.0071)	-0.0206 (0.0071)	-0.0217 (0.0067)
Size					
ADV :	1.0606 (0.2294)	0.9251 (0.2027)	0.9001 (0.1959)	0.9365 (0.1855)	0.9475 (0.2123)
Advertising					
KAP :	-0.1329 (0.0174)	-0.1328 (0.0159)	-0.1325 (0.0158)	-0.1339 (0.0153)	-0.1342 (0.0159)
Investment					
IMP :	-0.0309 (0.0340)	-0.0454 (0.0323)	-0.0403 (0.0308)	-0.0480 (0.0328)	-0.0283 (0.0350)
Imports					
EXP :	0.0841 (0.0348)	0.0571 (0.0343)	0.0560 (0.0331)	0.0381 (0.0361)	0.0195 (0.0420)
Exports					
COVER :		-0.2149 (0.0361)		-0.2199 (0.0480)	-0.2300 (0.0365)
Coverage					
NS : National and Supp. Agreements			-0.1813 (0.0464)		
NO : National only agreements			-0.2331 (0.0398)		
SO : Supplementary only agreements			-0.1176 (0.0627)		
BCR : Buyer Concentration				0.0630 (0.0454)	-0.3972 (0.1647)
BCR ² : Square buyer Concentration					0.6808 (0.2146)
Adjusted R ²	0.4253	0.5099	0.5216	0.5128	0.5377
F statistic	21.107	25.233	20.703	22.451	22.067
Log of Likelihood	207.88	221.44	224.32	222.42	227.22
Breush Pagan	9.319 (6)	4.633 (7)	6.820 (9)	4.275 (8)	7.391 (9)
Number of Observations	164	164	164	164	164

Notes :

1. All models estimated by Ordinary Least Squares.
2. Variable definitions : dependent variable in each regression is the seller price cost margin : net output minus operative wage bill to net output; CONC : seller five firm concentration ratio; SIZE : log of total employment; ADV is an advertising intensity proxy defined as the ratio of other costs of non-industrial services received to sales; KAP : investment to sales ratio; COVER : proportion of male manual employees covered by collective agreements; NS : National and supplementary agreements; NO : national only agreements; SO : supplementary only agreements; IMP : imports in home demand; EXP exports to sales ratio; BCR, BCOVER, BPCM : indexes of buyer industry power, see note in table 7.1. Sources : as in table 7.1.
3. Breush Pagan is a test for Heteroscedasticity. Asymptotic White(1980) standard errors reported in parenthesis.

Table 7.3 : Margins determination (OLS) and the impact of buyer concentration and buyer trade unionism 1984-1985.

	(1)	(2)	(3)	(4)	(5)
Constant	0.8512 (0.0418)	0.8498 (0.0449)	0.8543 (0.0418)	0.9458 (0.0472)	0.8205 (0.0400)
CONC : <i>Concentration</i>	0.1382 (0.0232)	0.1255 (0.0254)	0.1314 (0.0218)	0.1129 (0.0200)	0.1276 (0.0206)
SIZE : <i>Size</i>	-0.0209 (0.0071)	-0.0221 (0.0071)	-0.0243 (0.0067)	-0.0259 (0.0067)	-0.0224 (0.0064)
ADV : <i>Advertising</i>	0.9921 (0.1977)	0.9303 (0.1972)	1.0484 (0.2135)	1.0704 (0.2166)	0.9626 (0.2162)
KAP : <i>Investment</i>	-0.1345 (0.0156)	-0.1347 (0.0154)	-0.1376 (0.0158)	-0.1382 (0.0152)	-0.1349 (0.0140)
IMP : <i>Imports</i>	-0.0507 (0.0307)	-0.0489 (0.0291)	-0.0583 (0.0314)	-0.0377 (0.0327)	-0.0472 (0.0320)
EXP : <i>Exports</i>	0.0719 (0.0315)	0.0672 (0.0306)	0.0421 (0.0335)	0.0211 (0.0355)	0.0487 (0.0343)
COVER : <i>Coverage</i>	-0.2026 (0.0367)		-0.2061 (0.0376)	-0.2159 (0.0372)	-0.1878 (0.0372)
NS : <i>National and Supp. Agreements</i>		-0.1529 (0.0496)			
NO : <i>National only agreements</i>		-0.2519 (0.0390)			
SO : <i>Supplementary only agreements</i>		-0.1367 (0.0622)			
BCR : <i>Buyer Concentration</i>			0.1243 (0.0498)	-0.3725 (0.1563)	0.2139 (0.0487)
BCR ² : <i>Square buyer Concentration</i>				0.7428 (0.2368)	
BCOVER : <i>Buyer coverage</i>	-0.0756 (0.0354)	-0.0792 (0.0386)	-0.1138 (0.0351)	-0.1239 (0.0364)	-0.1931 (0.0397)
BPCM : <i>Buyer price cost margin</i>					0.5692 (0.1481)
Adjusted R ²	0.5219	0.5318	0.5385	0.5689	0.5631
F statistic	23.248	19.517	22.141	22.513	22.006
Log of Likelihood	223.97	226.69	227.37	233.45	232.35
Breusch Pagan	8.945 (8)	10.923 (7)	6.703 (9)	18.676 (10)	9.504 (10)
Number of Observations	164	164	164	164	164

Notes :

1. All models estimated by Ordinary Least Squares.
2. Variable definitions : dependent variable in each regression is the seller price cost margin : net output minus operative wage bill to net output; CONC : seller five firm concentration ratio; SIZE : log of total employment; ADV is an advertising intensity proxy defined as the ratio of other costs of non-industrial services received to sales; KAP : investment to sales ratio; COVER : proportion of male manual employees covered by collective agreements; NS : National and supplementary agreements; NO : national only agreements; SO : supplementary only agreements; IMP : imports in home demand; EXP exports to sales ratio; BCR, BCOVER, BPCM : indexes of buyer industry power, see note in table 7.1. Sources : as in table 7.1.
3. Breusch Pagan is a test for Heteroscedasticity. Asymptotic White(1980) standard errors reported in parenthesis.

Table 7.4 : Margins determination (I.V.) and the impact of buyer concentration and buyer trade unionism 1984-1985.

	(1)	(2)	(3)	(4)	(5)
Constant	0.9512 (0.0565)	0.9340 (0.0543)	0.9453 (0.0522)	1.0244 (0.0556)	0.9196 (0.0529)
CONC : <i>Concentration</i>	0.2318 (0.0356)	0.2248 (0.0336)	0.1989 (0.0358)	0.1593 (0.0281)	0.1921 (0.0305)
SIZE : <i>Size</i>	-0.0001 (0.0099)	-0.0029 (0.0094)	-0.0091 (0.0090)	-0.0149 (0.0083)	-0.0086 (0.0085)
ADV : <i>Advertising</i>	0.7155 (0.2095)	0.7435 (0.2208)	0.8650 (0.2097)	0.9372 (0.2062)	0.8143 (0.2072)
KAP : <i>Investment</i>	-0.1321 (0.0174)	-0.1338 (0.0171)	-0.1366 (0.0163)	-0.1377 (0.0156)	-0.1351 (0.0156)
IMP : <i>Imports</i>	-0.0669 (0.0402)	-0.0698 (0.0398)	-0.0746 (0.0355)	-0.0472 (0.0365)	-0.0657 (0.0366)
EXP : <i>Exports</i>	0.0142 (0.0424)	0.0116 (0.0470)	0.0085 (0.0407)	0.0101 (0.0422)	0.0073 (0.0425)
COVER : <i>Coverage</i>	-0.5452 (0.0913)	-0.5355 (0.0813)	-0.4657 (0.0925)	-0.4098 (0.0704)	-0.4429 (0.0809)
BCR : <i>Buyer Concentration</i>		0.0939 (0.0545)	0.1346 (0.0531)	-0.4171 (0.1591)	0.1958 (0.0522)
BCR ² : <i>Square buyer Concentration</i>				0.8216 (0.2198)	
BCOVER : <i>Buyer coverage</i>			-0.0864 (0.0410)	-0.1051 (0.0415)	-0.1419 (0.0501)
BPCM : <i>Buyer price cost margin</i>					0.3887 (0.1775)
Log of Likelihood	196.46	200.02	212.48	226.57	217.93
LR1	74.027	81.146	106.06	134.25	159.45
Breusch Pagan	12.863 (7)	16.182 (8)	17.995 (9)	25.768 (10)	20.372 (10)
Number of Observations	164	164	164	164	164

Notes :

1. All models estimated by Instrumental Variables.
2. LR1 is a likelihood ratio test of inclusion of all regressors.
3. Variable definitions : dependent variable in each regression is the seller price cost margin : net output minus operative wage bill to net output; CONC : seller five firm concentration ratio; SIZE : log of total employment; ADV is an advertising intensity proxy defined as the ratio of other costs of non-industrial services received to sales; KAP : investment to sales ratio; COVER : proportion of male manual employees covered by collective agreements; NS : National and supplementary agreements; NO : national only agreements; SO : supplementary only agreements; IMP : imports in home demand; EXP exports to sales ratio; BCR, BCOVER, BPCM : indexes of buyer industry power, see note in table 7.1. Sources : as in table 7.1. Concentration and unionism treated as endogenous and instrumented by $CONC_{t-1}$, $CONC_{t-2}$. Union density and number of hours worked by manual workers per week.
4. Breusch Pagan is a test for Heteroscedasticity. Asymptotic White(1980) standard errors reported in parenthesis.

CHAPTER EIGHT

Trade Union Power, Concentration and the Functional Distribution of Income.

8.1. Introduction.

The theory of the distribution of an industry's product between profits and wages currently occupies a peripheral place in economic inquiry.¹ In large part this reflects an overwhelming concern by orthodox neo-classical economists with examining the allocative properties of stylised competitive economic structures. However, the distribution question has not been completely ignored and has been examined by economists from a more radical tradition. This heritage, which examines the links between market structure and income distribution, can be traced back to Robinson(1933) and Kalecki(1938). More recently the research agenda has been extended and widened by Cowling(1982,1990) and Henley(1987,1990).² Having said this, though, there still remains a relative dearth of recent empirical evidence, especially so for the U.K., examining the link between structure, unionism, and labour's share. It seems timely, therefore, to reexamine these issues a point that motivates this essay.

This chapter focuses on two specific, but potentially important, aspects of the determination of the functional distribution of income. First, we examine both the theoretical and empirical relationship between labour's share of an industry product and the degree of seller concentration. Second, we consider the effect of labour market factors, particularly trade union power, in shaping wage share. Whilst these questions are not entirely new this paper provides some interesting new evidence on the relative importance of seller concentration and unionism in determining labour's share.

This chapter makes a number of points. First, it argues that over an extended time period we can expect the increasing monopolisation of product markets to have a permanent negative effect on production worker wage share. On the other hand, we argue that union power, as means of ameliorating this monopoly tendency, is particularly weak. Whilst we might observe a positive

¹ For example Henley(1990, chapter 2) argues that the determinants of the functional distribution of income seems to have disappeared from the agenda of academic economists in recent years. He then goes on to provide an interesting and useful comparison between neoclassical distribution theory and the Kaleckian radical alternative.

² Theoretical models that examine the important link between the market structure and the distribution of income in the macro-economy originate with Kalecki(1938,1971). The issue is further extended in the paper by Cowling and Molho(1982). Much of the empirical research that examines the link between structure and income distribution (sometimes including a role for trade unions) originates in the U.S. - see Henley(1990) -. There is a relative dearth of published evidence for the U.K. with the exception being Cowling and Molho's(1982) papers examining the issue using 1960's and 1970's manufacturing data.

relationship between production worker wage share, and union bargaining power over the short period, or at certain times in the business cycle, or when the economy is close to capacity working, over the longer period the ability of unions to raise labour's income share is curtailed. Indeed, this appears to be what recent wage share cross section results are showing. Our basic explanation for this is that fundamental distribution shifts to labour are not compatible with capitalist accumulation. In consequence capitalist enterprises will take action to restore the distributional balance in favour of capital. In short, we are suggesting that capitalist power to lower wage share is structural and permanent, whereas union power to increase wage share is fragile. The model that we discuss is an extension of Kalecki's original 1938 model which can be used to examine the role of firms and unions in shaping income distribution within oligopolistic environments.

We therefore concern ourselves with the issue of trade union power in the labour market and seller concentration, or product market power, on the functional distribution of income. The notion that both of these factors will be important determinants of the share of factor incomes has been recognised for some time. Kalecki(1971) shows that relatively concentrated firms, in oligopoly environments, can result in a lower share of wages in value added than relatively unconcentrated product markets. Furthermore Kalecki argued that if firms hold pessimistic expectations about the response of their rivals in product and factor markets then trade union power, acting as a catalyst for class struggle, can raise the share of value added accruing to labour. Importantly, Kalecki's(1971) analysis points to at least two important factors that shape the evolution of the functional distribution. First, product market power is a vehicle by which firms achieve dominance in the arena of exchange and raise the share of value added in its favour. Second, and in sharp contrast, the behaviour of firms creates an antagonism between capital and labour which prompts trades unions into using their *potential* power in the labour market to press for higher wages and potentially a higher wage share.

There are a number of novel features about the current analysis of the determination of wage share. We use two different data sources to examine the impact of market structure and union power on wage share. The first data set uses a panel of industries in British Manufacturing over the period 1975-1986 to examine the relative empirical importance of seller concentration and union power in shaping wage share. But importantly, the use of a panel data set over such an extended time period allows us to focus directly upon a controversy that has arisen in the literature - namely is the effect of union power on wage share a transitory or permanent phenomena? Our second data set is a cross section of manufacturing industries for 1985. The purpose of using this second data source is that we are able to examine the effects of various dimensions of union power on wage share. In particular we consider the effects of collective bargaining agreements, whether bargaining occurs nationally or at the enterprise level, union density and the level of strike intensity on wage share. We are then able

to provide a fairly comprehensive account of the effects of unionism on the determination of income distribution.

The chapter is organised as follows. In section 8.2 we consider the theoretical relationship between wage share and seller concentration. We summarise the Cowling and Molho(1982) model, which is a formalisation of Kalecki's income distribution theory. This provides the basis for our empirical work. In section 8.3 we consider the effects of trade union power in determining labour's share in the light of the recent bargaining literature. This is followed by a review of the existing empirical literature in section 8.4. We then continue by outlining our modelling strategy and considering the data set in section 8.5. Our results are presented in section 8.6 and we offer some concluding comments in section 8.7.

To briefly anticipate our main empirical results we find that there is a remarkably robust negative relationship between wage share and seller concentration, a result that corroborates Kalecki's central hypothesis. On the other hand, in the panel industry equations we find that when the effects of time and industry specific factors are taken into account, the effect of union bargaining power on labour's share is demonstrably weak. Indeed, the cross section equation results for 1985 reveal a similar picture. Whilst in some cases we can establish a positive union effect on production wage share the effect is not robust or true in all instances. This contrasts with the recent U.S. empirical literature but is line with earlier results U.K. studies.

8.2. The economics of wage share.

8.2.1 Kalecki : the degree of monopoly and wage share.

Historically the formal link between the degree of industry monopoly and the determination of labour's share is to be found in Kalecki(1938,1954). This model draws on his earlier work on the formation of costs and prices. It is further extended to account for the class distribution of income in a posthumous essay in Kalecki(1971). In sharp contrast to neo-classical marginal productivity theories of distribution Kalecki(1938,1954) emphasises the role of industrial structure in shaping labour's share. By eschewing notions of marginal productivity, and presenting an alternative distribution paradigm, Kalecki establishes a superior methodological approach to labour share formation by emphasising the role of industrial pricing, oligopoly and trade unionism.³ Kalecki's(1938) analysis begins by showing the link between the ratio of industry proceeds to prime costs and the relative share of wages in value

³ Recently Henley(1990, Chapter 2) has documented the main limitations of the neo-classical paradigm. These include (i) the nature of competition embodied within theories of neo-classical distribution. (ii) the elusive nature of capital and the (non) existence of an aggregate production function [cf. Robinson(1954)] (iii) the Cambridge -U.K.- reswitching debate and (iv) that neo-classical theory is reduced to an *ex post* outcome of an analysis of production theory rather than a legitimate concern of academic inquiry in itself.

added of that industry. It starts by making use of an accounting identity. Since value added, Y , is equal to the value of products less materials, M , or equal to the sum of profit income, π , overhead costs, F , and the wages bill, W , it follows immediately that : $(\pi+F)=(k-1)(W+M)$ where k is the ratio of proceeds to prime costs. In another essay Kalecki(1943,1954) shows that k itself is determined by the industry degree of monopoly. It follows that that the relative share in wages in industry value added, W/Y , may be expressed as :

$$\left(\frac{W}{Y}\right) = \frac{W}{W + (k - 1)(W + M)}$$

But dividing the numerator and denominator by the industry wages bill, and defining the ratio of materials costs to wages bill, j , ($j = M/W$) it follows that labour's share is given as :

$$\left(\frac{W}{Y}\right) = \frac{1}{1 + (k - 1)(j + 1)}$$

So the relative share of wages in industry value added is determined by k , the industry degree of monopoly, and the ratio of the materials bill to the wages bill⁴. This formed the basis for kalecki's subsequent empirical study of changes in factor shares.

As a theory of distribution many neo-classical authors criticised the degree of monopoly theory for its alleged tautological character since it was derived from a rearrangement of an identity and hence had scant behavioural content. This criticism though, which engendered a long running debate between Kaleckians and their antagonists, is misplaced.⁵ The essence in understanding the degree of monopoly distribution theory is that whilst the structure of the theory comes from a national income identity the a component within the determination of wage share is the degree of monopoly itself. The degree of monopoly though, is influenced, in a testable way, by a number of factors including concentration, sales effort of firms and (potentially) trade unions. See Kalecki(1938,1954, and 1971). But as Henley(1990) correctly observes about the tautology position : "this view seriously misunderstands Kalecki's ideas and condemns the intuition behind them rather than recognising the limitations of his algebra."

The formal theoretical resolution of the link between structure, the degree of monopoly and labour's share, which eluded Kalecki and lead to the dismissal of his theories in some quarters, is

⁴ Of course this defines the factor distribution of one industry. By appropriately weighting both k and j to account for differences in industrial composition across industries, Kalecki is able to show that this theorem holds for manufacturing and for the economy as a whole.

⁵ For a comprehensive account of the debate concerning the "tautology" that Kalecki established in his distribution theory and the subsequent attempts at its resolution see Sawyer(1985), Henley(1990) and Riach(1971).

found in Cowling and Molho(1982) as an extension of the earlier paper by Cowling and Waterson(1976). But the important point to make is that the empirical tradition in industrial organisation, since Bain(1951), has examined just that exact linkage between price cost margins and industrial structure in a world of oligopoly.

8.2.2. Cowling and Molho : the degree of monopoly, concentration and wage share.

Our task now is to demonstrate the existence of a relationship between labour's share of the industry product and relatively concentrated markets⁶. Standard conjectural variation oligopoly models, as formulated by Cowling and Waterson(1976), suggest that profit margins are positively associated with the level of concentration and so to is the share of profits. The corollary to this is that wage share will tend to fall as seller concentration increases. This idea can be captured by appealing to a standard homogenous product Cournot oligopoly model. Assume that each firm i maximises the profit function $\pi_i = ((P_j(Q_j) - AC_i(q_i))q_i) - FC_i$ where π_i is profits, $P_j(\cdot)$ is price in industry j which is a negative function of industry output $Q_j (= \Sigma q_i)$, AC_i is average variable costs which are a function of own output q_i and FC_i is own firm fixed or overhead costs. Furthermore, we assume that marginal and average costs are constant and that the number of firms in the industry is fixed. It can easily be shown [see for example, Cowling and Molho(1982)] that the first order equilibrium condition for this model, once aggregated to the level of the industry, can be expressed as :

$$\left(\frac{\pi + FC}{R} \right)_j = \frac{\alpha}{\eta} + \frac{(1 - \alpha) H}{\eta} \quad (8.1)$$

where the left hand side of equation (8.1) is the industry degree of oligopoly or monopoly, α is the degree of industry collusion⁷, H_j is the Herfindahl index of concentration, and η is the industry price elasticity of demand. The model predicts that the ratio of profits plus overhead costs to total industry revenue is determined by the Herfindahl index of concentration, the price elasticity of demand and the degree of collusion. If we follow Kalecki(1971) and assume that marginal production costs comprise solely of raw materials and direct wage costs then FC will be made up of rent, depreciation and salaried labour. Recognising that the value of the product of an industry is made up of profits, overhead costs and the wage bill of direct labour, and then multiplying equation (8.1) by the ratio of industry sales revenue (R) to value added (Y) then we can derive an expression for labour

⁶ The following exposition draws heavily on the paper by Cowling and Molho(1982) as a basis for empirical examination of the supposed negative relationship between concentration and wage share.

⁷ The degree of industry collusion represents each firms expectation concerning the output response by rivals to its own output decisions and is expressed as : $\alpha = (\delta q_i / \delta q_j)(q_j / q_i)$ where the value of α can vary between the Cournot case of zero and the full collusion case on unity. For a more detailed explanation see Cowling and Molho(1982).

share as :

$$\left(\frac{W}{Y}\right)_j = -\left(\frac{\alpha}{\eta} + \frac{(1-\alpha)H}{\eta}\right) \frac{R}{Y} \quad (8.2)$$

So, equation (8.2) illustrates that labour share is negatively related to seller concentration because the degree of oligopoly is itself expected to increase as the Herfindahl index rises.⁸ However, this is not the only model of oligopolistic behaviour that is able to demonstrate a negative relationship between wage share and product market power. But it is different from neo-classical models in ascribing an important role to market structure in shaping wage share [see footnote 3]

The negative relationship between wage share and concentration has also been demonstrated by Henley(1987,1990) in what appears to be a very neo-classical framework. He shows that by assuming linearly homogenous two factor production technology, and Cournot oligopolistic behaviour, then a positive relationship exists between wage share and the number of firms in the industry. To derive this result Henley(1987) has to make use of the neo-classical assumption that all factors of production are continuously variable and that the product of an industry is always exhausted by appealing to Eulers theorem. The assumption of linearly homogenous production technology, however, is inconsistent with a Kaleckian view of the world. The key assumption made by Kalecki(1971) was the existence, and persistence, of excess capacity. Because of this equation (8.2) forms the basis of our estimation equations to be used in the empirical analysis.

8.3. Union bargaining power and labours share.

The effect of trade union power on wage share, though, is much more difficult to discern. If we are considering a structure where there is no formal bargaining between employers and union, then the effect of unions in the basic oligopoly model we have outlined is simply to raise the money wage rate. On the strong assumption that producers do not change the prices of their product following the

⁸ A slightly different relationship between labour's share and the degree of monopoly emerges than in Kalecki's original formulation. In this Kaleckian theory of wage share, the degree of monopoly is equal to $(\pi + FC)/R$ which is expected to rise with concentration. The other component explaining labours share, R/Y , though is expected to fall, so at first sight it appears that an increasing degree of monopoly has an indeterminate effect on production worker wage share. However, it is easy to show that as long as the ratio of the wages bill, W , to materials bill, M , does not rise as fast as the increase in the degree of monopoly, μ , then the algebra of this model implies that an increase in the degree of monopoly will result in a lower wage share. This is easily seen since production worker income share can be expressed as a function of the degree of monopoly, μ , and the materials-wage bill, M/W , in the following way :

$$\left(\frac{W}{Y}\right) = \frac{1}{1 + \left(\frac{1}{1-\mu}\right) \left(1 + \frac{M}{W}\right)}$$

Recalling the evidence presented in Chapter 2 we concluded that we can realistically assume that the ratio of materials to wage bill is relatively constant over time whilst there is a tendency for the degree of monopoly to in fact rise.

wage increase, and that there is no change in labour productivity then wage share can increase.

In general, there is a legitimate question mark over what effect, if any effect exists at all, trade union power has on the distribution of income. Cowling(1982,1990) argues that where competitive labour markets prevail the share of income accruing to labour will be lower the higher the degree of seller concentration. However, the question then remains will union demands for higher wages, and union effects on labour productivity, nullify or reverse this tendency? Kalecki(1971) argues that a successful claim by trade unions for an increase in wages will alter the distribution of income in favour of labour. This comes about since firms hold pessimistic expectations about the response of their rival capitalists in the product and labour market and hence do not pass on wage increases in terms of product prices. This in turns lowers the degree of monopoly and alters the balance of income distribution towards labour and away from capital.

However, Cowling(1982) points out that such an argument is not sufficient to guarantee that labour will succeed in altering the functional distribution of income in a world of Monopoly Capitalism. Kalecki's(1971) argument rests on the premise that a firm will not raise own product price to exactly offset its own increase in the wages of direct labour because to do so runs the risk of other firms in the industry capturing the sales of the original firm. This is consistent with the firm believing that it faces a Sweezian kinked demand curve for its product and explains why it is disinclined to pass on wage increases for fear of a more than proportionate fall in own product demand. However, the potential for collusive behaviour by firms should not be restricted simply to the product market. In highly concentrated industries we can also expect a high degree of collusion in the process of wage formation in the labour market. If wages are determined by centralised collective bargaining arrangements between employers and firms within the industry then multi-employer agreements, or tacit wage leadership, can allow wage increases to be passed on to degree one as price increases [see Cowling(1982) and Cowling and Molho(1982)]. This mechanism can explain the apparent paradox by which we can observe unions securing higher wages but which is still quite consistent with the share of wages remaining constant. Only under circumstances where firms hold incorrect or pessimistic expectations about the response by other firms in product or labour markets will union pressure, under the scheme of things we have presented here, result in a shift in the distribution of income.

What is clear then is that the form of collective bargaining adopted by firms and workers is critical to shaping labour's share. The Kaleckian hypothesis can be summarised by the notion that wage gains will be successful in increasing labour's share in so far as this is not reflected in product price increases and where wage increases are restricted to one firm where spillover effects are minimal or firms face Sweezian average revenue functions. Applying the argument by Stigler(1964), that the behaviour of firms should be deduced from profit maximising principles, suggests that firms will want

to adopt collusive wage setting agreements, ie. they have a preferred bargaining structure, to avoid the degree of monopoly being eroded by trade unions actions. In Britain, since the Donovan Commission(1968) report, it is clear that a two tier structure of industrial relations exist. Bargaining occurs either plant by plant or within the enterprise, or at a national level -or some mixture of the two. Which structure firms or union will prefer is ambiguous. If wage bargaining occurs at the national level only this imposes a degree of certainty on the wage outcome, as far as firms are concerned, and hence on potential price changes that might ensue so firms may prefer this type of bargaining structure. However, it is also the case that decentralised supplementary only bargaining gives firms autonomy in keeping wages lower than otherwise might be the case by removing the degree of association between different unions, and. In short they can "divide and rule". Trade unions, on the other hand, may well prefer a mixture of both national and supplementary agreement bargaining. The national component giving a guaranteed chance at a base wage and the supplementary the chance to augment the base with firm and plant specific deals.⁹

In addition to considering the effects of unionism on wage share it is also important to consider the impact of unionism on labour productivity. Empirical evidence for the United States has established a positive union productivity effect¹⁰. The British evidence is more mixed¹¹ but in a recent study Machin(1988) shows that on average the union effect on productivity, in a sample of British engineering firms, is neutral. In the context of unionism on wage share a positive union productivity effect would serve to neutralise any effects of unions on wages and consequently on wage share. Overall, the effect of union power on wage share in the context discussed here will be ambiguous depending on the union effects on wages and productivity, and the response by employers in terms of product price changes.

However, we have assumed here that what concerns trade unions are wage demands only. An alternative bargaining perspective, which focuses on trade union considerations of both employment and wages, does not necessarily yield the same conclusion that the share of wages will remain unaffected by union pressure. The efficient bargaining literature, where unions and firms bargain simultaneously over wages and employment [McDonald and Solow(1981)] illustrates that where a profit maximising firm confronts a union which maximises an objective function containing both employment and wages as arguments, then a Pareto efficient bargaining outcome can lie off the labour

⁹ These avenues were explored by Henley(1984) but as we argue in the review of the literature his result were far from conclusive. In the 1985 cross section empirical work for British manufacturing to follow we explore the relative importance of each of these types of collective bargaining systems on the distribution of income.

¹⁰ For example, see Brown and Medoff(1978) and Allen(1984).

¹¹ For example, see the review in Machin(1988)

demand curve. The locus of efficient outcomes between employment and wages (the contract curve) can be of any shape but what is important is that it can be vertical or even positively inclined. This implies that union power can be positively associated with higher wage share. Rather than the monopoly union picking a high wage (which is passed on as a price increase) and then allowing the firm to pick the lower optimal employment and output associated with the marginal revenue product of labour, the union can now bargain both employment and wages optimally and by inference the level of output.

So, on a theoretical level when the bargaining agenda includes wages and employment union power can indeed result in a higher share of value added accruing to production workers. However, rather than assume what factors are to be included in the bargaining agenda it is important to ask whether it is realistic, in a behavioural sense, to assume that employers will permit items to be included in the bargaining set that would be clearly detrimental to their own interests. It is reasonable to assume that employers will probably try and restrict actual bargaining to such fundamentals as wages in order to retain control over the level of employment and implicitly the production process [see Cowling(1990), Dowrick(1988), and Marglin(1974)]. What actually ends up in the bargaining set, therefore, will be conditioned not only by questions of efficiency and the optimal use of scarce resources but also the longer term objectives of the groups involved including the power of each to determine the parameters of the bargaining arena. This suggests that firms will continue to operate on the labour demand curve and that wage increases will also continue to be passed on in price increases and in consequence we would not expect to observe union power resulting in a redistribution from profit to labour income.

8.4. Existing empirical evidence.

The growing empirical evidence on the effects of union power on the functional distribution of income has produced some mixed results but the picture that appears to be emerging is that on balance unionism positively affects wage share. However, the result is far from being robustly established.

Much of the published work, which focuses directly on unionism, concentration and functional distribution, has originated in the United States. In table 8.1 we present a summary of some of the recent empirical research in this area. An early study by Morony and Allen(1969) examined the effect of regional seller concentration on production worker wage share for thirty seven US. manufacturing industries. In their cross section study they found no effect of concentration on wage share, although their results and methodology have been subsequently criticised by Cowling and Molho(1982). Results suggesting support for Kalecki's hypothesis are reported in Barbee(1974). He regressed labour's share

on the four firm concentration ratio and a capital intensity control for 400 four-digit U.S. manufacturing industries in 1963 and 1967. He found a strong negative and significant concentration effect. Brush and Crane(1984) suggest that there is no empirical evidence to support a relationship between either wage share and seller concentration or wage share and unionism in the United States. Their study used a sample of four digit industries for 1967, but as Henley(1986) points out there are a number of deficiencies in their data set which potentially undermine their results. Henley(1987) also examined a Kaleckian wage share model for a sample of seventy one three digit U.S. manufacturing industries for 1972. His results confirm that there is a relationship between both wage share and concentration and wage share and unionism. However, the relationship is more robust for the union effect than for concentration. Henley(1987) presents regression equations in both levels and logarithms. From his results it is clear that the concentration effect is more robust in the single equation levels equation rather than the logarithm specification.

The most recent U.S. study by Macpherson(1990) examines the effect of the Weiss-Pascoe four firm concentration ratio and unionism on wage share for a sample of three digit U.S. manufacturing industries. Two separate sample periods between 1973-1975 and 1983-1985 are examined. The central focus of the paper is the union effect on labour's share. It is not an explicit test of Kalecki's hypothesis of the effect of seller concentration on macro-distribution, but since he includes a concentration ratio, whilst surprisingly not referring to Kalecki, we can interpret his equations as an implicit test of a Kaleckian wage share model. His main conclusions suggest that a robust positive effect of unionism on wage share can be established, where a density of measure is employed as the union power proxy. There are a number limitations with the results that Macpherson(1990) presents which he fails to recognise. First, the concentration ratio in all of the logarithmic equations for both 1973-1975 and 1983-1985 fail to be significant at any acceptable level, although they are significant in his levels equations. Second, and the most important point, is that Macpherson(1990) uses two measures of employee compensation share, one being total employee compensation share and the other production worker wage share, as the dependent variables in all his equations. It is important to note that for the period 1983-1985 the impact of union density on *production worker wage share*, but not *total employee share*, in the logarithm equation is insignificant. His conclusion, then, that "the results reveal that a positive relationship exists between unionism and labor's share." is only partially correct in the light of his own data. The theoretical perspective that underscores his estimating equation is that there is potentially a relationship between *production*

worker wage share and unionism, a result which his data does not conclusively demonstrate.¹²

In the Kallenberg et. al (1984) study a time series estimation of wage share on concentration and trade union density suggests an overall positive effect on wage share, although a concentration effect could not be established. This was established for the U.S. printing industry between 1946 and 1978. Similarly Henley(1986) reports that for the U.S. automobile industry between 1940 and 1980 unionism positively affects wage share and he presents results suggesting a wage share elasticity with respect to union density in the range of 0.3 and 0.4.

A similar pattern of results emerges for cross section studies in Britain. Cowling and Molho(1982). Their model is a direct test of the Kalecki market structure hypothesis and uses production worker wage share as the legitimate dependent variable. Using a cross section sample of 118 minimum list heading industries for 1963 and 1973 they found a tentative, but clearly not robust, positive relationship between production worker wage share and various measures of unionism. The concentration effect was found to be negative and significant. Henley(1984) examines the determinants of labour's share of value added in a sample of manufacturing industries for the mid 1970's. His results do not provide strong support for a negative relationship between wage and the five firm seller concentration ratio. In four out of his seven regression equations the concentration effect, although correctly signed, is insignificant. He also examines the effect of alternative types of bargaining structure on wage share. He finds that when agreement coverage is national or national and supplementary in character then a positive relationship emerges between labour share of value added and unionism. Conyon(1988) establishes a positive (negative) effect of unionism (concentration) on production worker wage share for a sample of 59 3-digit manufacturing SIC industries in a short panel of industries over the period 1980-1984. He further examined whether there were any non-linear concentration effects on wage share. In general he supports the hypothesis of a negative relationship between wage and concentration. Overall these results still point to a relative paucity of empirical evidence on the effects of unionism and structure on wage share.

If it is the case that, in general, we do not expect unionism to be able to alter the functional distribution of income, how do we explain some of the mounting evidence that purports to demonstrate a positive relationship between wage share and unionism? Cowling(1990) argues that one potential explanation as to why we might observe a such a relationship, at least in the short term, is because an increase in wages will automatically increase wage share because time truncates the full response

¹² Indeed, Cowling(1990) points to Macpherson(1990) as an example of a case where a positive relationship between unions and wage share is established. This is only really the case if we consider labours share to mean total employee share and not production worker wage share. It is true that in the case of the Kaleckian wage share model since salary labour is treated as an overhead the determinants of salary share are not determined by the model. See Cowling and Molho(1982).

yet to be made by producers to the wage effect (ie prices have not had sufficient time to adjust). The studies we have cited here are particularly prone to this observation since they are, in the main, short term cross section studies and will only pick up a "snap shot" of a much more dynamic process. In order to bypass this particular problem we estimate a Kaleckian wage share model for a panel of British industries for the period 1975-1986 in the hope of evaluating more clearly those effects which are more structural.

8.5. Model specification and data description.

The empirical model that we adopt to examine the impact of seller concentration and union power on wage share is the familiar version of the Kaleckian income distribution model used, *inter alia*, by Cowling and Molho(1982) and Henley(1987). To examine the empirical relationship between labour's share of value added, concentration and unionism we separately use two data sets. The first is a panel of manufacturing industries for the U.K. between 1975 and 1986, the second is a cross section of 95 manufacturing industries in 1985. We have noted in the previous section that the Kaleckian wage share model has, in the past, most frequently been tested using only cross section data.

8.5.1. Model specification and data, 1975-1986.

Our first data set has a considerable time component ie. we have twelve years of data consisting of fifty four industries for each year. We can account for this in our estimating framework by using panel data techniques and estimate the following Fixed Effects model :

$$\left(\frac{W}{Y}\right)_{it} = \alpha_i + \beta_1 \text{CONC}_{it} + \beta_2 \text{KAP}_{it} + \beta_3 \text{GROW}_{it} + \beta_4 \text{COVER}_{it} + \gamma_t + \varepsilon_{it} \quad (8.3)$$

where the subscripts *i* and *t* refer to the *i*th industry (*i*=1 ...*N*, *N*=54) at time *t* (*t*=1 ...*T*, *T*=12). The term $(W/Y)_{it}$ is a measure of production worker wage share, *CONC* is a proxy for seller concentration, *KAP* a measure of industry capital requirements, *GROW* an industry demand growth characteristic, and *COVER* is a proxy for union power. The individual industry specific effects are captured by the inclusion of *N*-1 constants α_i , and time effects by *T*-1 constants γ_t . The disturbance term ε_{it} is an independent and identically distributed error effect capturing unexplained variation in the dependent variable.

This simple linear estimating equation can be thought of as a test of Kalecki's income distribution theory, or as Henley(1987,1990) points out, as a simple test of the general relationship between factor shares, product market structure and union power. However, a few comments on how the model is interpreted are necessary since as is well known the form of the estimating equation used does not correspond exactly with the theoretical income distribution model outlined by Cowling and

Molho(1982). They show that factor shares are conditioned by seller concentration, the price elasticity of demand and the degree of industry wide collusion. However, our linear estimating model does not include either of these last terms either because they are unobservable (as in the case of collusion) or because no adequate proxy exists for our data set (as is the case with the price elasticity of demand). In consequence, our empirical results should be interpreted in the light of potential regressor bias.

Following Kalecki(1971), and the subsequent developments by Cowling and Molho(1982), where there is a relatively competitive labour market our hypothesis is that wage share is lower the higher the degree of seller concentration. Since, highly concentrated industries tend also to be more capital intensive it possible to observe a negative relationship between wage share and product market structure if the latter is proxying capital structure in an industry. To net out this potential bias we include a control variable for the degree of industry capital intensity. On the demand side it is reasonable to presume that the extent of demand growth in the industry will affect income shares. Of course such a measure can have a number of interpretations but at its basic level it tells us how the changes in sales within the industry affect income accruing to labour.

The union power variable is of some considerable interest. If Kalecki's(1971) original hypothesis is correct we would expect that union power will mitigate the power of firms to increase prices, due to pessimistically held expectations of rivals, and hence positively affect wage share. Similarly, if the recent efficient bargaining literature is to be taken seriously, then if both wages and employment are in the bargaining set then it is quite conceivable that union power can also increase the share of wages in value added. However, if Cowling and Molho(1982) are nearer the mark, and some relevant and suitably long time period is chosen, then union power is itself circumvented by the collusive agreements of capitalists over wage fixing policies, or by tacit wage leadership. In this case we would expect there to be no significant union effect. However, we must be quite clear that this is also consistent with there being a positive effect of unionism in the short period because the dynamics of the problem have not yet had time to work through. So, in terms of the expected coefficients in the model as described by equation (8.3) we expect $\beta_1, \beta_2 < 0$ and β_3 and β_4 are indeterminate.

As an extension to the above model we consider here the sources of potential union gains in terms of wage share. A considerable amount of literature has now argued that where product markets are relatively competitive then the ability of unions to make inroads into profits is necessarily curtailed. [eg. Rapping(1967) and Stewart(1990)] Although, the Kaleckian income distribution model is not applicable to a world of competitive product markets it is reasonable to test the hypothesis that the share of wages in value added will be higher the higher is the degree of seller concentration. Indeed, this is what Cowling and Molho(1982) are alluding to when they argued : "The effects of concentration and union pressure are assumed to be interactive and thus a linear-in-logarithms

formulation is favoured." Instead of specifying the model in logarithms the alternative is simply to make the union power and concentration term interactive which is the procedure we adopt here. Thus, we can realistically extend equation (8.1) slightly and test the following augmented model :

$$\left(\frac{W}{Y}\right)_{it} = \alpha_i + \beta_1 \text{CONC}_{it} + \beta_2 \text{KAP}_{it} + \beta_3 \text{GROW}_{it} + \beta_4 \text{COVER}_{it} + \beta_5 \text{CONC}_{it} * \text{COVER}_{it} + \gamma_i + \varepsilon_{it} \tag{8.4}$$

where the coefficient on the interaction term, β_5 CONC*COVER is expected to be positive if union power raises wage share in highly concentrated industries.

A further extension to our model is also required since one objection often raised in the determination of profit margins literature is that product market structure is endogenous [see Clarke and Davies(1982), Curry and George(1983)]. Since the wage share equation can be derived from a margins equation then wage share and concentration can be considered endogenous for similar reasons. If this is the case then the estimation of a simple single equation as specified by equations (8.3) and (8.4) will result in simultaneous equation bias and hence erroneous statistical inference. To circumvent this problem, we specify a simple two equation system in which production worker wage share and concentration are treated as endogenous variables.

$$\left(\frac{W}{Y}\right)_{it} = \alpha_i + \beta_1 \text{CONC}_{it} + \beta_2 \text{KAP}_{it} + \beta_3 \text{GROW}_{it} + \beta_4 \text{COVER}_{it} + \gamma_i + \varepsilon_{it} \tag{8.5}$$

$$\text{CONC}_{it} = \delta_i + \lambda_1 \text{KAP}_{it} + \lambda_2 \text{SIZE}_{it} + \lambda_3 \text{PLANT}_{it} + \lambda_4 \text{MANUAL}_{it} + \zeta_i + \varepsilon_{2it} \tag{8.6}$$

Equation (8.5) is the same as before except that we now treat concentration, CONC, as endogenous. As Curry and George(1983) point out a complete theory of the determination of the level of market concentration has not been satisfactorily achieved. A number of factors are deemed to be important, following on from the pioneering work of Bain(1956), in determining industry structure In particular these include barriers to entry and the size of the market. Hence, in equation (8.6) we make the level of concentration at time period t be a function of industry capital requirements, KAP, the size of the market, SIZE, the average number of plants per enterprise, PLANT, and the average proportion of manual workers per enterprise, MANUAL. Our a priori reasoning suggests that the signs on the coefficients should be $\lambda_1, \lambda_3,$ and $\lambda_4 > 0$, and that $\lambda_2 < 0$. We do not claim that this equation is a definitive representation of the determinants of concentration, only that it goes some way to accounting for potential endogeneity problems. The terms δ_i and ζ_i are respectively fixed and time effects associated with the determination of the level of concentration which are treated as logically separate from those individual and time effects shaping wage share. If we arbitrarily assume that the error

structures ϵ_{1it} and ϵ_{2it} are independent then equations (8.5) and (8.6) can be estimated by Ordinary Least Squares or Least Squares Dummy Variables. However, we prefer to estimate the two equations by Two Stage Least Squares.

Our principle data sources are the British Census of Production (for the product market variables) and the New Earnings Survey (for the union power proxy). An immediate problem with using this British Census data is that there is a change of definition of the standard industrial classification in 1980. Ordinarily this structural break in the series has made it impossible to construct a meaningful time series of observations on industries through the 1970's and into the 1980's. Obviously this has curtailed the number of time periods available for any panel study using British manufacturing data¹³. However, Kong(1988) shows that it is possible to construct a matched sample of fifty four industries from the 1970's and the 1980's. The essence of the matched data set is to map into industry data compiled under the classification system SIC(1980) data from the earlier classification SIC(1968) by using two CSO publications which reconcile the two systems of classification. The match is then checked with the gross value added figures for 1979 which are published in the Census summary tables in 1979 and 1980. For the manufacturing sector Kong(1988) manages to successfully match fifty-four industries within a 5% degree of accuracy or better.

Thus, we exploit this data set which means we have fifty-four industries from 1975 through to 1986, a period of twelve years¹⁴. The usefulness of this lies in the fact the we can test the impact of concentration and union power on production worker wage share over a considerably longer time period than has been achieved by any study so far in the U.K..

The concentration measure that we use is the five firm concentration ratio by sales since the theoretically more appropriate Herfindahl index is not available in our data set. Industry capital requirements are measured by net capital expenditure divided by industry sales. The demand growth variable is simply defined as a one year growth in industry total sales and work done¹⁵.

The union power variable that we use is the proportion of male manual workers covered by either national, supplementary, or national and supplementary bargaining arrangements. Since this question is only asked in the years 1973, 1978 and 1985, for the years where data is missing then linearly interpolated values from those observations that we do have are used.

The definition of the dependent variable, wage share, that we use is of considerable importance

¹³ For example, Conyon and Machin(1991) are limited to a panel of industries from 1983 to 1986 to investigate the determination of profit margins.

¹⁴ I would like to extend my thanks to Kevin Denny at the Institute for Fiscal Studies for making this data set available to me.

¹⁵ The variable is defined as $GROW = (Sales_t - Sales_{t-1})/Sales_t$

if we are to present an adequate test of Kalecki's degree of monopoly theory. The theoretically important issue to be considered here is what element of labour constitutes an overhead cost and which is an element of marginal cost. Kalecki(1971) is quite clear on the point. Manual labour is hired in relation to actual production, hence the short run pricing decisions of firms are legitimately marked up on this type of labour. Overhead labour, comprising of managerial, salaried and technical staff are employed independently of the actual production run and are hence legitimately treated as an overhead element. In our empirical work we preserve Kalecki's distinction between overhead and direct labour and test the impact of seller concentration and unionism on production worker wage share. In table 8.2 we present the sample means and standard deviations of variables used, along with the definitions of the variables.

8.5.2. Model specification and data, 1985.

The empirical model which we estimate using the 95 3 digit SIC industries¹⁶ in the manufacturing sector for 1985 does not differ significantly from that one considered already. The following linear equation was estimated :

$$\left(\frac{W}{Y}\right) = \beta_1 + \beta_2 \text{CONC} + \beta_3 \text{AS} + \beta_4 \text{KAP} + \beta_5 \text{IMP} + \beta_6 \text{GROW} + \beta_7 \text{TRUNION} + \varepsilon_i \quad (8.7)$$

where W/Y is production worker wage share of value added, KAP is net capital expenditure divided by sales, $GROW$ is a three year change in total employment and ε_i is a white noise disturbance term. We include AS as the advertising to sales ratio¹⁷ which is available in this data set and not our panel. It is included since Kalecki suggested that increased selling effort is likely to positively affect the degree of monopoly hence we expect it to negatively affect wage share. In terms of the Cowling-Molho model it serves as a proxy for creating inertia in the price elasticity of demand. We also include a measure of imports in home demand, IMP since the available concentration ratio's from the *Census* data do not account for the degree of inter country trade flows. But as Cowling and Molho(1982) make quite clear it is only a relevant determinant of wage share to the extent that the concentration ratios would have been modified anyway. In fact it would only be relevant if we considered the flow of imports to be competitive rather than controlled by domestic producers. See Cowling and

¹⁶ We arrive at a sample of 95 industries from the potential 101 3 digit SIC industries by excluding all industries that have "miscellaneous" in their title description in Business Monitor PA 1002.1 table 13. These are catchall categories with no economic grounding and so are legitimately excluded from our analysis.

¹⁷ In fact the advertising to sales ratio is defined as the ratio of other non industrial services received to sales. Actual advertising data has not been available in the Census since 1968. Its use is justified on the grounds that included in other costs of non industrial services are payments to professionals which go towards increasing selling effort, see Henley(1984). It has also been used recently by Dowrick(1990) in his study of price cost margins.

Sugden(1987,1989) for the more realistic case. The final variable TRUNION are various indicators of trade union power. We have a number of indicators available to us including overall collective agreement coverage, coverage split into national only, national and supplementary only and supplementary only. We use these latter variables to test alternative bargaining structures on the functional distribution of income. In addition we have another measure of agreements, denoted AGT in the estimated models to follow, which considers the effect of agreement coverage of manual and non-manual male and female workers on wage share.¹⁸ In line with other research we also examine the impact of union density on wage share. We have also constructed two measures of strike activity to capture union militancy. The first is working days (lost) and the second is the number of stoppages. Hence one captures strike duration the other actual strike incidence. Each of these union power effects are considered in turn in the 1985 cross section to evaluate their effect on production worker wage share.

8.6. Some new results on the determination of labour's share.

In this section we provide empirical results on the determination of labour's share using the models detailed in section 8.5 above. First, in part 8.6.1. we consider the effects of union coverage and seller concentration on wage share in our panel of industries. In part 8.6.2. we consider various dimension of union activity, along with seller concentration in shaping wage share.

8.6.1. The determination of labour's share 1975-1986.

In table 8.3 we present a breakdown of the means and standard deviations by year of the three key variables used in this panel analysis. Namely, production worker wage share, seller concentration and union coverage. Overtime the variables exhibit clear noteworthy trends. First, production worker wage share has been declining steadily since its peak in 1980. This is exactly what we would expect in manufacturing over this period where there have been large falls in employment and we noted in chapter 2 significant gains in profit share. The year 1986 marks a sample period low for wage share. We also confirm that both the mean values of concentration and union collective coverage in each year is also declining. The fact that there is considerable variation in the means of these variables over time in itself lends weight to our previous argument that there is a need to examine the determination of

¹⁸ This variable is constructed from unpublished data from the Department of Employment' New Earnings Survey Panel dataset. Unlike the special question asked in 1973, 1978 and 1985 the NES Panel data set asks a question about agreement coverage on an annual basis. The advantage of this for our purposes is that we can use lagged values of it in our instrumental variable estimation techniques.

wage share either in a time series or within a panel of industries¹⁹.

Table 8.4 presents a simple correlation matrix using the whole sample period 1975-1986 for the key variables to be used in the following wage share equations. It is noteworthy that the simple correlation between wage share and concentration is negative (-0.269) and positive between unionism and wage share (0.178). This would be consistent with previous research (eg. Henley(1987)) and also with Kalecki's hypothesis that increasing unionism results in higher wage share. However, such simple correlations do not control for other factors and for this we need multivariate analysis.

In table 8.5 we present Ordinary Least Squares, and Least Squares Dummy Variable Estimates for the single equation wage share model described in the theoretical section. The models are specified in levels, and the dependent variable in all regressions is the share of production worker wages of industry value added. In addition to standard diagnostics, we present Likelihood Ratio tests for the inclusion of key sets of regressors, in particular the validity of including individual industry (or group) effects as well as time components. Estimates of the model described by equations (8.3) and (8.4) are presented in columns (1) to (3) without individual fixed or time effects and (4) and (5) with these potentially important effects controlled for.

Dealing first with columns (1) and (2) of table 8.5 a clear picture emerges. Our priors about the impact of product market structure on wage share are confirmed since seller concentration, captured by the five firm concentration ratio, is both negative and significant at the 5% level. Indeed this suggests a wage share elasticity with respect to concentration of approximately 0.21. In addition we confirm that the demand variable and capital intensity variable are also negative and significant. In column (1) the union power variable is positive and significant as would be expected by the Kaleckian hypothesis, and is quite consistent with the results produced by Henley(1984,1987,1990). Indeed, the implied elasticity of wage share with respect union coverage, on the basis of the OLS estimate, is 0.473. In column (2) we include an interaction term between concentration and unionism variables. As is clear from the table the inclusion of this variable is both significant and positively signed suggesting that gains in terms of wage share made by unions come in relatively highly concentrated industries. The fact that the union power variable, COVER, has no significance on its own suggests that there are no gains to be had unless union operate in high concentrated industries. In column 3 we introduce an important interaction between a time trend and union coverage. The fact that this variable is negative and significant implies that the effect of union coverage on labour's share of value added is diminishing through time. So the data from columns (1) to (3) is telling us that here

¹⁹ For example, a single year cross section might give different results depending which years one chose. Indeed the differing concentration effects found by Henley(1984) when using manufacturing data for the 1970' might be accounted for by this.

appears to be a strong negative effect of concentration on wage share in British manufacturing during the period 1975 to 1986. In addition, union power, in terms of collective bargaining power, ameliorates this tendency and this has a positive impact, although importantly this effect is diminishing through time.

However, we cannot readily confirm this since columns (1) to (3) exclude both time and fixed effects. Since we are not constrained by degrees of freedom we report in columns (4) and (5) the same models as in columns (1) and (2) but now include both time and fixed effects. The inclusion of both time and fixed effects are justified jointly on the basis of a likelihood ratio test. Immediately we confirm that the concentration effect retains its previous negative impact upon wage share. However the point estimate now implies a much smaller elasticity than was previously the case. Other variables, too, retain their qualitative effects. However, the major difference is the impact of the union power variable. In column (4) we see that the partial effect of coverage on wage share is insignificant within any acceptable confidence bounds. Similarly, this is the case in column (5) where the interaction term is included. This result is strong evidence in favour of the Cowling(1990) view that the previous evidence of the positive effect of unionism on wage share can be explained by the relatively short time periods under investigation. Although, we have here only twelve years data it does seem that when the effects of time and of industry specific characteristics are netted out then the ability of unions to ameliorate the tendency towards the centralisation of capital and hence lower wage share is severely limited.²⁰

In table 8.6 we present the results of the determination of labour's share estimated by two stage least squares. In columns (1) to (3) fixed and time effects are excluded, and in columns (3) to (6) they are included in the regression equations. First, we observe that both capital intensity and size of the industry are important in determining the level of concentration. The effect is to increase the quantitative effect of the coefficient in the wage share equation in column 2. Again, in both wage share equations in columns 2 and 3 concentration turns out to be negative and significant and union coverage positive and significant, as with the OLS estimates. When we include time and fixed effects in column 3 to 6 a similar picture to the OLS results emerges. Concentration retains a robustly negative effect on labour's share but the union coverage effect is much less well determined. Overall these results suggest that over an extended time period, as captured in our panel of matched industries, the concentration effect appears to be much more robust and permeant to the inclusion of time factors and industry specific effects than trade unionism. Indeed, over time it appears that the effect of

²⁰ Although we cannot rule out the fact that unions can make gains in via the individual industry specific factors. What we are concluding here is that overall union coverage appears to have little effect in addition to these unique industry characteristics.

unionism is becomes weakened.

8.6.2. The determination of labour's share in 1985.

In table 8.7 we present Ordinary Least Squares (OLS) estimates for the determination of labour's share in 1985 using the three digit SIC data base for manufacturing and examining the effect on wage share of different measures of unionism. In table 8.8 we take account of the potential endogeneity of both unionism and product market concentration and present Instrumental Variable (IV) estimates for our wage share equations. The model is specified in levels because our measure of changes in demand conditions, denoted GROW in the table, contains negative numbers hence the inappropriateness of a logarithmic specification.²¹ This is not surprising since we measure growth in this model by a three year change in employment, and as is well known during the early and mid-1980's British manufacturing suffered severe falls in overall employment levels. In columns (1) to (3) we present union estimates on wage share on the basis of collective agreements. In columns (4) to (6) we use union density and strike activity measured either as the number or duration of stoppages. In table 8.9 elasticity estimates of wage share with respect to both concentration and unionism are presented for OLS and IV estimation techniques.

First of all we should note the overall significance of the coefficients on our two product market structure variables, namely the concentration ratio and the advertising to sales ratio. Overall we note that in all specifications of the determination of wage share both seller concentration and the advertising to sales ratio are always significant. This is the case regardless of estimation technique since in tables 8.7 and 8.8, for columns (1) to (6) in both cases, concentration and advertising to sales are always significant.²² The implied elasticities of wage share with respect to concentration, for both OLS and IV estimation techniques, are presented in table 8.9. We see that for this case the implied elasticities when estimating by OLS range from approximately 0.15 to 0.22 depending on which union measure is included in the equation. These results contrasts to Henley(1986), who found that for British manufacturing in the 1970's, that the concentration effect on production worker wage share was ill determined. However, it is in line with the general results found in Cowling and Molho(1982) using data for British manufacturing in 1968 and 1973 and also for Conyon(1988) for British manufacturing between 1980 and 1984. These estimates are very close to those reported in Cowling and Molho(1982) for both their 1968 and 1973 logarithmic single equation estimates of the concentration ratio effect on wage share. In addition, the models presented here perform well in comparison with the results for the

²¹ The mean (standard error) of GROW for the 95 observations in 1985 is -0.1595 (0.2903).

²² In every single case, except for table 8.7 where the advertising to sales ratio is significant at only the 10% level, both concentration and advertising are significant at the 1% level.

U.S. using data for 1972 documented by Henley(1987). He found that : "The result for concentration is not as robust in terms of the levels of significance of its coefficients but nevertheless a negative association with labour share is established." Furthermore, the concentration effects presented here are quantitatively larger, and more significant, than those illustrated by Macpherson(1990) for U.S. manufacturing in either the 1970's or the mid-1980's. Indeed, we remarked earlier that Macpherson is unable to establish a well defined negative relation between the four firm concentration ratio and employee compensation. We can also note that our other structure variable of interest, the advertising to sales ratio, is also significant in all equations regardless of the choice of union variable, or method of estimation, used. Since there was evidence of slight heteroscedasticity all reported OLS results are given with t ratios based on White(1980) standard errors.

The Instrumental Variable results reveal an interesting feature about the effect of concentration on wage share. Since the current level of concentration is potentially endogenous (see Clarke and Davies(1982)) we have instrumented it with lagged values back to 1980 the result of which is that the estimated impact coefficient, compared to the OLS counterparts, is quantitatively greater in all equations.²³ Indeed, this means that the elasticity of wage share with respect to concentration, estimated by IV techniques, now range from approximately 0.16 to 0.25 as seen from table 8.9. Overall these new results for manufacturing in 1985 strongly confirm a central theme of Kalecki's degree of monopoly distribution theory, namely the strong association between product market structure and labour's share. Taken in conjunction with the earlier results presented in Cowling and Molho(1982) for the U.K. the estimates here suggest an important and robust role for concentration in shaping wage share. Indeed, the IV estimated coefficients imply that a rise in concentration of 10% would depress production worker wage share by between 1.6% and 2.5%.

We should also comment on the overall significance of our other control variables in explaining wage share. In general, they are well determined and significant where expected. The proxy for international trade, IMP, which measures the degree of import penetration, turns out to be highly insignificant. This result is wholly in line with that in Cowling and Molho(1982) and we would only expect it to be significant if the level of imports were competitively determined.

Turning to the effects of trade union power we should first recall that each column in table 8.7 and 8.8 is differentiated by the use alternative measures of unionism. These range from alternative measures of collective agreements through to strike intensity measured as the numbers of stoppages and duration by working days lost. Furthermore in table 8.9 the elasticities of wage share with respect to each of the alternative measures of union power implied by these coefficient estimates is presented.

²³ In the wage share equation with COVER as the union power variable, estimation by IV techniques, as compared to OLS, leads to an increase in the coefficient estimate of 15.12%

Column (1) of tables 8.7 and 8.8 reports the effect of overall coverage of collective agreements of male manual workers on wage share by OLS and IV methods. It attracts a positive coefficient which is significant at the 1% level suggesting that trade union power, captured by overall collective agreement coverage, is positively associated with increases in labour's share - at least for 1985. This is consistent with the evidence for the U.S. presented by Henley(1987,1990) and Macpherson(1990) and for the U.K. by Conyon(1988) and Cowling and Molho(1982).²⁴ The implied wage share-union elasticity for this OLS estimate, from table 8.9, is approximately 0.42. This is a quantitatively smaller effect than that derived in Cowling and Molho(1982) since it is approximately half the value for obtained from their 1973 regression estimate.

However, the use of overall collective agreements conceals an important element of the collective bargaining structure as it operates in the U.K.. The Donovan Commission(1968) identified the growth of a two tier bargaining system involving a national industry wide basic pay agreement coupled with the negotiation of pay agreements at the establishment or enterprise level by trade union branches. If we take any specific wage increase and consider its effect on labour's share we might expect a greater impact where bargaining occurs nationally and then local trade union branches can use this as a benchmark upon which supplementary wage demands can be built. The question of relative union power under alternative bargaining systems is important because a trade union may find it easier to negotiate a given wage increase, subject to productivity deals, under one particular bargaining scheme than another. If plant specific bargaining is symptomatic of increased union power, where there already exists some form of national agreement, then it may well lead to a distributional gain for labour. In column 2 of table 8.7 we examine the different effects of national, national and supplementary and supplementary only collective agreements on wage share. Immediately we note that where bargaining is either national, or national coupled with supplementary bargaining, then the effect on wage share in 1985 is positive and significant. If bargaining occurs at the supplementary level only, ie. is plant by plant or at the enterprise level alone, then there is no significant effect on wage share. This suggests that the recent trend away from national agreements, towards enterprise wage bargaining and the "decentralisation" of collective agreements, can only serve to worsen the position of labour in its distributional quest. The implied elasticities of wage share with respect to each component of collective bargaining suggest that the greater effect is where agreements are national in type, but that this elasticity is much smaller than the overall collective agreement effect seen in column (1). On the basis of this evidence we are able to conclude that the effect of union power, captured through

²⁴ Whilst overall Cowling and Molho(1982) conclude a non-robust positive relationship between unionism and wage share their measure of collective agreement coverage attracts a significant coefficient estimate of +0.858 (t ratio = 2.31) using 1973 data.

collective bargaining, is limited to the cases where bargaining is done nationally or where it is done nationally and supplemented with local agreements. The ability of unions to influence the degree of monopoly, or wage share, is weak when bargains are struck at the enterprise level alone. In short, the ability of unions to influence wage share is far from universal and contingent upon types of bargaining structures.

In column (3) we provide an alternative measure of union agreement effect on wage share. The previous two columns used published data available from the New Earnings Survey as part of a special question for 1985. The measure of collective agreement used in column (3) is derived from unpublished Department of Employment data on agreements and refers to whether an individual is covered directly or indirectly by a major collective bargain.²⁵ The variable is positive and significant and from table 8.8 we see that the estimated wage share-unionism elasticity is approximately 0.15. This figure is much smaller than that reported in column (1).

In column (4) we examine the impact of union density on wage share. Again this appears to be positive and significant and yields an elasticity estimate of approximately 0.59. This is similar to the results produced in the U.S. by Macpherson(1990). However in columns (5) and (6) this is replaced with strike activity measures; measures which are more closely associated with union militancy. In this case the effect of unionism is found to be insignificant. This is the case whether we estimate the model by OLS or IV methods. But, as in all the previous equations, both advertising intensity and concentration is negative and significant. Moreover, the implied elasticities that these union measures in the case of strikes are small compared to the agreements measures.

As with our results for the panel of industries from 1975 to 1986 we also estimated a wage share equation which tries to account for changes in union power over time. As previously noted our previously unpublished agreement measure is time varying hence we can construct a short panel of industries from 1982 to 1985 to examine whether union agreement effects are increasing or diminishing through time. Using our previous model the following results were obtained from an OLS regression of wage share.

$$\begin{aligned}
 W/Y = & 0.3875 - 0.162CONC - 0.806AS + 0.100KS + 0.002IMP + 0.321AGT82 + 0.290 AGT83 \\
 & (14.673) \quad (6.995) \quad (4.771) \quad (8.671) \quad (0.091) \quad (4.531) \quad (5.816) \\
 & + 0.260AGT84 + 0.200AGT85 \qquad \qquad n=380, R^2=0.404, \\
 & (6.187) \quad (4.708) \qquad \qquad \qquad \text{Breush Pagan} =56.6781 (11)
 \end{aligned}$$

²⁵ The data is derived from the New Earnings Survey Panel. Each year, since 1975, an enterprise is asked whether the pay and conditions of employment of a designated employee is affected by a major collective bargain either directly or indirectly. In consequence the agreement variable we have here refers to both male and female, manual and non-manual employees.

where AGT82 to AGT86 is the measure of agreement coverage in years 1982 to 1985. There is a clear picture emerging. It is still true that there is a robust and negative relationship between wage share concentration and advertising intensity. However, the reported coefficients on the union variable from 1982 to 1985 suggest that during the 1980's unions ability to increase wage was actually diminishing. This result is not surprising given the socio-political climate that unions were operating within during that time.

On the basis of these estimates we must conclude that the overall effect of trade union power on wage share in 1985 is not clear cut. Whilst measures of collective agreements do provide some evidence of wage share being positively associated with unionism this is also contingent on the type of collective agreement under investigation. When bargaining occurs at the supplementary level only, for example, we cannot establish any link between wage share and trade unionism. Similarly, no systematic link between unionism, measured as either stoppages or duration, and wage share can be established for 1985. The available evidence on the link between wage share and unionism then is much more in line with that presented by Cowling and Molho(1982) who concluded for the late 1960's and early 1970's that : "our results on unionism are not very robust, but the net effect of higher levels of concentration on wage share is unambiguously negative." It appears that for 1985, in a single year cross section, a broadly similar result can be concluded. But in addition the positive effects of unionism, where they can be established, also strongly suggest that the power of unions to affect wage share is falling through time.

There is of course an issue an issue of reconciling the results established in this chapter and those presented in chapter six. There we found that trade unionism, measured by collective agreements, depressed the mark-up or equivalently profits plus overhead share in a sample of manufacturing industries between 1983-1986. First, this is wholly consistent with the evidence here which illustrates that there is a positive association between production worker wage share and collective agreements in 1985. However, in this chapter, unlike chapter six, we explored other dimensions of trade union power namely working days lost and the number of stoppages. These indicated that the positive wage share union relationship was not as robust as previously thought. Second, we also illustrated in this chapter a diminishing effect of collective agreements on wage share during the 1980's. Third, the evidence in chapter six was based on a limited time period. We would expect trade unions to potentially increase wage share, conversely depress the mark up or profits plus overhead share, simply because the short time horizon in chapter six truncates the full pricing response to trade union action. The longer time period results presented here from 1975-1986 might circumvent such a problem and in this case we found little evidence of a positive union wage share effect.

8.7. Implications and conclusions.

This chapter has examined the determinants of production worker wage share for a sample of British manufacturing industries over the period 1975-1986 and for a single cross section year in 1985. We have also considered the role of union power in the 1980's in shaping wage share. The empirical novelty of the analysis is the use of a panel of industries, rather than just simply a single year cross section, and this has shed some new light on the relationship between unionism, concentration and labour share. In particular, the analysis finds that although a positive union effect on wage share can be established in the pooled data set, when time effects and industry specific characteristics are controlled for the union result vanishes. On the other hand, our measure of product market power, the five firm concentration ratio, is remarkably robust to the inclusion of time and industry effects, and even when these effects are included we find that there remains a negative and significant product market power effect.

In the cross section results a similar picture emerges. We can always establish a robust negative relationship between both the five firm concentration ratio, advertising intensity and wage share. However, this may be offset by union power but where we established a positive effect this result was not robust. We showed that whether or not a positive effect could be established depended upon the type of bargaining agreement and on the measure of trade union power. Overall in the light of this evidence about the union results there is still room for further research. Indeed the evidence for the 1980's points to a declining influence of trade unions in affecting the functional distribution of income.

This leads us to conclude that, as far as these two variables are concerned, the relationship between concentration and wage share is quite permanent and structural over time, but the ability of unions to increase wage share is weak and fragile. Whilst we would not deny that there are obviously times when unions can make inroads and raise wage share, and this will vary positively with the degree of capacity utilisation, there are also other times of crises where unions cannot alter the distribution of income. In the sample period we have considered, where it is generally recognised that the power of unions was initially at a peak and then has subsequently declined, it is not all that surprising that overall they have not been able to capture a higher share of value added.

Table 8.1 : Summary of key empirical evidence on the determination of wage share.

Study	Dependent Variable	Remarks	Period
Cowling and Molho(1982)	Operative wage bill divided by value added; Salary wage bill divided by value added.	Estimation of an exponential interactive model. CR5 and Herfindahl (H) index were negative and significant in 1968 and 1973. Four measures of union power tested (i) union membership (ii) stoppages divided by employment (iii) days lost divided by employment (iv) coverage of collective bargaining. Weak evidence for a positive effect of union power on wage share. Only measures (ii) and (iv) were significant in 1973. Estimation method : OLS	Separate cross section results for 1968 and 1973. Sample of 118 3-digit manufacturing industries for 1968. (66 and 100 for 1973). Adjusted R squared in the range 0.119-0.347 for reported models.
Henley(1987, 1990)	Production worker payroll and total employee compensation.	Support found for negative concentration effect and positive union effect on wage share. CR4 measure was negative and significant for most measures of wage share. It was sometimes weak for the wider wage share measure which included salaried labour. Union power measured by collective bargaining agreements and was always positive and significant for production worker wage share. Estimation method : OLS and GLS	US manufacturing 3-digit cross section 1972. Sample n=72. Adjusted R squared in range 0.329-0.620 for reported models
Conyon(1988)	Operative wage bill divided by value added.	Wage share model estimated for each year 1980 to 1984 and then the data is pooled. Finds a negative and significant effect of a CR5 concentration measure on wage share. Union coverage is proxied by collective agreements and is positive and significant. Estimation method : OLS and Least Squares Dummy Variables (LSDV)	Sample of 59 U.K. manufacturing industries over the period 1980-1984. Adjusted R squared in the range 0.375-0.72 for reported models.

Table 8.1 (continued) : Summary of key empirical evidence on the determination of wage share.

Study	Dependent Variable	Remarks	Period
Kallenberg, Wallace and Raffalovich(1984)	6 measures of wage share including production worker wage share and total employee compensation wage share.	Time series econometric study for U.S. printing industry 1946-1978. CR4 concentration ratio found to have an insignificant impact on production worker wage share in the sample. Union density and strike frequency has a positive and significant impact. Additional controls included to capture business and economic conditions. Models estimated by Generalised Least Squares methods.	U.S. printing and publishing industry 1946-1978. Adjusted R squared in the range 0.566 to 0.944 for reported models.
Macpherson(1990)	2 measures used : production worker compensation/ value added and total employee compensation/ value added	The Weiss-Pascoe adjusted CR4 ratio has a negative and significant impact for 1973-75 and 1983-1985. Union density has a negative and significant impact on production worker wage share for 1973-75 but is not significant 1983-85. Additional controls for worker characteristic are included.	Sample of 72 3-digit U.S. manufacturing industries for 1973-1975 and 1983-1985. Adjusted R squared in the range 0.452 to 0.738.

Table 8.2 : Sample Means and Standard Deviations of Variables for the Period 1975-1986.

Variable	Description	Mean	Standard Error.
WS	Production Worker Wage Share. Operative Wage Bill divided by Gross Value Added at Factor Cost.	37.312	12.298
CONC	Concentration Ratio. Sales accounted for by the five largest enterprises in the industry.	48.825	21.963
KAP	Industry capital requirements. Net capital expenditure divided by total sales and work done.	3.456	1.553
GROW	Growth in industry sales defined as sales in the current period minus sales in the previous period divided by current period sales.	7.737	11.081
COVER	Proportion of male manual workers covered by national, supplementary or national and supplementary agreements.	70.883	13.125
SIZE	Industry Size. Logarithm of gross value added in the industry.	6.161	1.349
PLANT	Logarithm of the number of plants in the industry	0.151	0.128
MANUAL	Proportion of manual workers divided by the number of enterprises.	-6.663	1.659

Table 8.3 : Means and standard deviations for key variables 1973-1986.			
Year	Production worker wage share	Concentration	Union Coverage
1975	39.3115 (11.428)	52.842 (21.924)	76.707 (12.243)
1976	37.6497 (11.072)	51.870 (21.717)	76.223 (11.920)
1977	37.6800 (11.687)	51.334 (21.325)	75.738 (11.736)
1978	36.8818 (11.094)	51.989 (21.625)	75.254 (11.697)
1979	37.6244 (11.302)	52.075 (21.346)	73.672 (11.529)
1980	39.4389 (13.896)	48.912 (22.524)	72.091 (11.549)
1981	38.2845 (12.325)	47.810 (22.229)	70.509 (11.756)
1982	37.9447 (12.836)	46.954 (22.663)	68.927 (12.141)
1983	36.3058 (13.098)	46.596 (21.931)	67.346 (12.686)
1984	36.0061 (12.431)	45.021 (21.988)	65.765 (13.373)
1985	35.6288 (13.859)	45.292 (22.188)	64.183 (14.180)
1986	35.0091 (12.497)	45.207 (21.946)	64.183 (14.180)

Notes.

1. Variable definitions : concentration - Five firm concentration ratio by sales; Union Coverage - proportion of male manual employees covered by collective bargaining agreements;
2. Principle data sources are the Census of Production Summary Tables, table 13, PA1002.1, HMSO : concentration, wage Share, and the New Earnings Surveys of 1973, 1978, 1985, union coverage.

Table 8.4 : Correlation matrix for key variables for the sample period 1975-1986						
	WS	CONC	KAP	GROW	COVER	CONC* COVER
WS	1.00000					
CONC	-0.26894	1.00000				
KAP	-0.16740	0.12130	1.00000			
GROW	-0.21260	0.04976	0.08217	1.00000		
COVER	0.17762	0.18853	0.12417	0.07469	1.00000	
CONC*COVER	-0.13765	0.92287	0.12848	0.06468	0.51256	1.00000

Notes.

1. Variable definitions : CONC - Five firm concentration ratio by sales; UNION - proportion of male manual employees covered by collective bargaining agreements; KAP - Net capital expenditure expressed as a ratio of industry sales; GROW - is the growth in industry sales defined as the one year difference in sales as a ratio to current sales. UNION*CONC - is an interaction term between UNION and CONC.

2. Principle data sources are the Census of Production Summary Tables, table 13, PA1002.1, HMSO, and the New Earnings Surveys of 1973, 1978, 1985.

Table 8.5

The determination of wage share : Ordinary Least Squares and Least Squares Dummy Variable Results for British Manufacturing 1975-1986. Dependent variable for all regression equations is production worker wage share.

	(1)	(2)	(3)	(4)	(5)
Constant	33.443 (2.6831)	53.509 (4.4416)	54.721 (4.4544)	35.1712 (2.2431)	41.747 (4.5021)
CONC	-0.1629 (0.0204)	-0.6046 (0.0907)	-0.5829 (0.0905)	-0.0486 (0.03117)	-0.2109 (0.1136)
KAP	-1.1743 (0.3207)	-1.0337 (0.3229)	-1.017 (0.3228)	-0.4333 (0.2693)	-0.4455 (0.2680)
GROW	-0.2284 (0.0854)	-0.2255 (0.0845)	-0.2592 (0.0945)	-0.1456 (0.0352)	-0.1450 (0.0351)
COVER	0.2489 (0.0335)	-0.0545 (0.0644)	-0.0312 (0.0636)	0.0315 (0.0437)	-0.0907 (0.0834)
CONC*COVER		0.0064 (0.00134)	0.00603 (0.0013)		0.00236 (0.00167)
TIME*COVER			-0.00547 (0.00192)		
Fixed and time effects.	No	No	No	Yes	Yes
Number of observations	648	648	648	648	648
Adjusted R squared	0.1891	0.2125	0.2214	0.8267	0.8274
Logarithm of the Likelihood.	-2475.16	-2465.14	-2460.98	-1940.06	-1938.11
LR1 test (d.f)	139.84(4)	159.88(5)	168.20(6)	139.84(4)	159.88(5)
LR2 test (d.f.)	n/a	n/a	n/a	59.82(4)	62.53(5)

Notes.

1. Variable definitions as in table 8.4, in addition TIME*COVER is an interaction between a time trend and union coverage.
2. White(1980) standard errors in parenthesis.
3. LR1 is a Likelihood Ratio test of the inclusion of the explanatory variables against a constant term. LR2 is a Likelihood Ratio test of the explanatory variables and individual group effects versus the group effects only. Degrees of freedom in parenthesis

**Table 8.6 : The determination of Labour Share in British Manufacturing 1975-1986.
Estimation of Models by Two Stage Least Squares.**

	Concentration (1)	Wage Share (2)	Wage Share (3)	Concentration (4)	Wage Share (5)	Wage Share (6)
Constant	90.7514 (2.5505)	35.4311 (2.5722)	118.145 (13.8166)	78.6863 (7.2085)	66.5482 (11.6783)	70.0178 (13.1409)
CONC		-0.2493 (0.0247)	-2.0561 (0.3036)		-0.6375 (0.2157)	-0.6947 (0.2398)
KAP	1.0282 (0.3622)	-1.2493 (0.2883)	-0.5109 (0.3389)	0.3897 (0.2348)	-0.2264 (0.4817)	-0.2317 (0.5095)
GROW		-0.2235 (0.0399)	-0.2131 (0.0447)		-0.1529 (0.0415)	-0.1531 (0.0439)
COVER		0.2741 (0.0345)	-0.9952 (0.2015)		0.0755 (0.0944)	0.0234 (0.1205)
CONC*COVER			0.02660 (0.0042)			0.00091 (0.0012)
SIZE	9.9008 (0.5048)			6.1502 (1.1625)		
PLANT	-19.0690 (4.2015)			-8.6483 (3.3367)		
MANUAL	15.5505 (0.3966)			10.1754 (1.0622)		
Observations	648	648	648	648	648	648
Fixed and Time Effects Included	No	No	No	Yes	Yes	Yes
Adjusted R squared	0.6852	0.1662	0.043			

Notes.

1. Variable definitions as in table 8.4, in addition TIME*COVER is an interaction between a time trend and union coverage.
2. White(1980) standard errors in parenthesis.

Table 8.7 : Determination of Labours share in British Manufacturing in 1985. Estimation method Ordinary Least Squares.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Constant</i>	0.3097 (6.457)	0.3311 (6.232)	0.3965 (12.388)	0.2653 (4.448)	0.4634 (15.106)	0.4657 (15.335)
<i>Concentration : CONC</i>	-0.1766 (4.559)	-0.1605 (3.995)	-0.1561 (4.020)	-0.1843 (4.850)	-0.1300 (3.253)	-0.1292 (3.191)
<i>Advertising : AS</i>	-0.7277 (2.499)	-0.7028 (2.492)	-0.6382 (2.318)	-0.9075 (3.429)	-0.8488 (2.490)	-0.8953 (2.782)
<i>Investment : KAP</i>	0.1542 (8.175)	0.1492 (8.064)	0.1261 (6.587)	0.1316 (6.388)	0.1213 (6.435)	0.1223 (6.440)
<i>Imports : IMP</i>	-0.0234 (0.587)	-0.0242 (0.610)	-0.0238 (0.586)	-0.0217 (0.451)	0.0559 (1.376)	-0.0543 (1.364)
<i>Growth : GROW</i>	0.0830 (3.706)	0.0773 (3.466)	0.0764 (3.169)	0.0760 (2.683)	0.0552 (1.567)	0.0601 (1.828)
<i>Coverage : COVER</i>	0.2412 (4.386)					
<i>National & supplementary : NS</i>		0.1883 (2.728)				
<i>National only : NO</i>		0.2846 (3.700)				
<i>Supplementary only : SO</i>		0.1293 (1.220)				
<i>Agreements : AGT</i>			0.2047 (4.664)			
<i>Density : DENS</i>				0.3705 (4.291)		
<i>Working days lost: WDL</i>					-0.0235 (0.872)	
<i>Stoppages : SPG</i>						0.0469 (0.610)
<i>Observations</i>	95	95	95	95	95	95
<i>Adjusted R²</i>	0.388	0.394	0.406	0.409	0.310	0.309
<i>Log-Likelihood</i>	103.04	104.51	104.44	104.74	97.36	97.241
<i>Breusch Pagan stat.</i>	8.009 (6)	10.954	10.167(6)	9.339 (6)	5.141 (6)	5.451

Notes.

1. Variable definitions are as follows : Dependent variable in all regressions is wage share : operative wage bill / gross value added; CONC five firm concentration ratio by sales; AS costs of other non-industrial services / sales; KAP : net capital expenditure / sales; IMP : ratio of imports to home demand; GROW : total employment in 1985 minus total employment in 1982 as a ratio to employment in 1985; COVER : proportion of male manual employees covered by collective bargaining arrangements; NS : proportion of male manual employees covered by national and supplementary collective bargaining arrangements; NO : proportion of male manual employees covered by national collective bargaining; SO : proportion of male manual employees covered by supplementary collective bargaining; AGT : proportion of all employees covered by collective bargaining agreements; DENS : Union density; WDL : days lost / employment; SPG : number of stoppages / employment;

2. Data sources : WS, CONC, GROW, KAP, Report on the Census of Production Summary Tables PA1002, HMSO; COVER, NS, NO, SO, 1985 New Earnings Survey; AGT Department of Employment (unpublished); IMP Business Monitor MQ12, HMSO; DENS - kindly provided by Steve Machin; WDL, SPG - DE Gazette.

Table 8.8 : Determination of Labours share in British Manufacturing in 1985. Estimation method Instrumental Variables.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Constant</i>	0.2149 (3.142)	0.3304 (5.982)	0.3932 (11.574)	0.0361 (0.322)	0.5215 (9.502)	0.4681 (15.335)
<i>Concentration : CONC</i>	-0.2080 (4.836)	-0.1665 (3.906)	-0.1622 (4.196)	-0.2379 (4.898)	-0.1589 (3.186)	-0.1351 (3.227)
<i>Advertising : AS</i>	-0.5840 (1.857)	-0.7001 (2.358)	-0.6164 (2.045)	-0.839 (2.626)	-1.5158 (2.443)	-0.8975 (2.741)
<i>Investment : KAP</i>	0.1704 (7.014)	0.1494 (6.617)	0.1259 (5.969)	0.1372 (5.884)	0.1499 (4.440)	0.1222 (5.219)
<i>Imports : IMP</i>	0.0011 (0.027)	-0.0229 (0.589)	-0.0207 (0.549)	-0.0240 (0.530)	0.0974 (1.786)	-0.0539 (1.311)
<i>Growth : GROW</i>	0.0917 (2.680)	0.0711 (2.349)	0.0766 (2.357)	0.0854 (2.377)	0.1232 (1.878)	0.0598 (1.644)
<i>Coverage : COVER</i>	0.3845 (4.202)					
<i>National & supplementary : NS</i>		0.1906 (2.374)				
<i>National only : NO</i>		0.2886 (3.177)				
<i>Supplementary only : SO</i>		0.1356 (1.323)				
<i>Agreements : AGT</i>			0.2182 (4.221)			
<i>Density : DENS</i>				0.7774 (4.064)		
<i>Working days lost: WDL</i>					0.1063 (1.065)	
<i>Stoppages : SPG</i>						-0.0454 (0.729)
<i>Observations</i>	95	95	95	95	95	95
<i>Adjusted R²</i>	0.358	0.395	0.405	0.2832	0.1338	0.308
<i>S.E. of regression</i>	0.0836	0.0803	0.0805	0.0884	0.9720	0.0868

Notes.

1. Variable definitions are as defined in table 8.7; Dependent variable in all regressions is wage share : operative wage bill / gross value added; All models are estimated by instrumental variable methods. Instruments available for 1985 are all predetermined variables plus endogenous variables available in 1980, 1981, 1982, 1983, and 1984. CONC, COVER, AGT, DENS and WDL are treated as endogenous using the instruments $CONC_{t-1}$, back to a maximum of $CONC_{t-5}$, AGT_{t-1} through to AGT_{t-3} .

2. Data sources : WS, CONC, GROW, KAP, Report on the Census of Production Summary Tables PA1002, HMSO; COVER, NS, NO, SO, 1985 New Earnings Survey; AGT Department of Employment (unpublished); IMP Business Monitor MQ12, HMSO; DENS - kindly provided by Steve Machin; WDL, SPG - DE Gazette.

Table 8.9 : Elasticities of wage share with respect to concentration and trade unionism.

Union power measure	OLS	OLS	IV	IV
	Elasticity estimate $\epsilon_{\text{unionism}}$	Elasticity estimate $\epsilon_{\text{concentration}}$	Elasticity estimate $\epsilon_{\text{unionism}}$	Elasticity estimate $\epsilon_{\text{concentration}}$
Overall coverage	0.4183	0.2109	0.6668	0.2484
National and supplementary	0.1146	0.1917	0.1159	0.1989
National only	0.1392	0.1917	0.1412	0.1989
Supplementary only	0.0823	0.1917	0.0864	0.1989
Agreements	0.1502	0.1864	0.1601	0.1938
Density	0.5952	0.2201	1.2488	0.2842
Working days lost	0.0071	0.1553	0.0322	0.1897
Stoppages	0.0068	0.1543	0.0066	0.1613

Notes.

1. OLS & IV : $\epsilon_{\text{unionism}}$ is defined as the absolute value of $(\delta\text{WS}/\delta\text{UNION}) \cdot (\text{WS}/\text{UNION})$ where (WS/UNION) are the mean values of wage share and the measure of unionism respectively.
2. OLS & IV : $\epsilon_{\text{concentration}}$ is defined as the absolute value of $(\delta\text{WS}/\delta\text{CONC}) \cdot (\text{WS}/\text{CONC})$ where (WS/CONC) are the mean values of wage share and concentration respectively.

CHAPTER NINE.

Concluding Comments.

In this thesis I have endeavoured to highlight some important themes pertinent to an understanding of contemporary monopoly capitalism. In particular, I have focused upon, and argued the case for, the importance of considering product and labour market interaction when analyzing contemporary industrial society. Especially, I have considered the role of trade unions in influencing key outcomes that occur when oligopoly is the norm during the monopoly stage of capitalism. Whilst the potential effects of union power are likely to vary from situation to situation and from time period to time period we have, at the least, provided a rationale as to why unions can potentially affect key variables under monopoly capitalism. To this end we presented quantitative evidence to examine various key hypotheses. Whilst the exercise undertaken in this thesis can in no way be considered exhaustive, since a fuller treatment would require for example an analysis of union effects on investment, technological change and on the process work intensity, we have unearthed some important union effects nevertheless. Our central conclusion must be that whilst union power certainly may have the *potential* to exert a considerable influence over dimensions of economic performance, generally we have argued that unions, in the way that we have considered them in this thesis, find it difficult in practice to influence the functional distribution. This distinction between the actual and potential effects of trade union power is one which is useful to preserve.

In Chapter 2 we illustrated that there has been a long term secular growth in the degree of monopoly in the U.K. over the period 1960-1987 which is wholly consistent with the hypothesis of the tendency of the surplus to rise as predicted by Baran and Sweezy(1966). Using a methodology introduced by Weisskopf(1979) we illustrated that the cyclical movements in the share of profits were in part explained by the emergence in excess capacity. The recent profits revival of the 1980's has come entirely at the expense of wage share, suggesting that unions were unable to influence the distribution of income over this period. The secular shift away from labour income, towards profit income that we unearthed further suggests difficulties by unions in influencing the distribution of income over the longer term. This secular distribution shift is consistent with the changes traditional indicators that show the potential strength of labour : aggregate union density down nine percentage points from 53% to 44% between 1979 and 1987 [Bailey and Kelly(1990)]; strike activity measured as the number of stoppages was down from 2345 between 1975-1979 to 895 between 1985-1989 [Metcalf(1990)]; and the share of production employment in total employment down from 0.334 in 1980 to 0.246 in 1990 [Gregg and Machin(1991)]. In part, then, the decline in wage share is associated with a demise in unionism. The decomposition of the rate of profit also indicated that, as with the U.S.

experience, the U.K. experiences a premature peak in the profit rate before the subsequent peak in the output rate.

In Chapter 3 we examined the role of the capitalist enterprise as the building block to understanding the nature of the outcomes that occur within monopoly capitalism. We contrasted two fundamental views of the firm. The efficiency view held that there was an essential symmetry between all economic agents and this implies that should disparities emerge then they do so for a good reason namely that they are efficient. In contrast the radical explanation of the firm, that we favoured, argued that the capitalist enterprise emerged as a locus of domination by one group of another. The persistence of hierarchy then had little to do with reasons of economic efficiency. The upshot of this is that the nature of the firm has important explanations for the ability of workers to determine their own working lives. So, we explored some of the obstacles that lead to declining economic (firm) democracy.

In Chapter 4 we restated some of the central themes of monopoly capitalism that related to the nature of firms and trade union in the exchange process. We argued that in spite of some of the recent criticisms of models of monopoly capital the underlying thrust of the model remained intact. We argued that a relationship exists between concentration and performance and that the criticism levied against this approach, *inter alia* by Clarke and Davies(1982), was not robust. However, we did illustrate other caveats to the approach that are worthy of mentioning in particular the role of the equilibrium methodology. The importance of unionism and the recent revival within the efficient bargaining literature was considered. We suggested that although efficient bargaining can imply a higher share of wages when employers and union bargain over both wages and jobs, in general our expectation is that employers are likely to restrict the bargaining agenda. This is analogous to the adoption of inefficient hierarchy when we considered the nature of intra-firm organisation in Chapter 3.

In chapter 5 we explored the nature of interdependent behaviour among firms. We presented an empirical test of the conjectural variation elasticity model in which the concept of the degree of apparent collusion was placed on centre stage. The predicted pattern of Cournot independent behaviour was overwhelmingly rejected, as was the homogeneity of output responses, in favour of a more complex and varied form of firm interdependence. From a sample of 182 manufacturing firms over an extended time period from 1960-1986 we conclusively established that some degree of imperfect apparent collusion was the norm under oligopoly. Indeed, our estimates pointed to considerable inter-firm variation in the degree of apparent collusion. We estimated that the degree of apparent collusion, on average, was about 0.11 and that this was indeed significant. Again, though, we must stress that this conceals important inter-firm variation. In an attempt to distinguish between market power and

efficiency views of the concentration relationship we performed a simple test to see if seller concentration was positively associated with the degree of collusion. If the Stigler(1964) hypothesis was valid then we would expect to observe a positive and significant concentration-collusion relationship. If firms become concentrated because of reasons of efficiency no such relationship should exist. In the event, a positive and significant relationship was unearthed between concentrated industries and the degree of collusion. The finding that collusion is positively associated with seller concentration lends strong support to the traditional focus in industrial economics on industry analysis. Whilst not wishing to over stress the importance of firm level micro analysis the result that the implied collusion parameter is positively related to concentration is of some significance. It suggests that industry level studies that infer market power from positive margins-concentration relationships can do so with considerable legitimacy. In addition, we also hypothesised that the degree of collusion would be affected by trade union activity. Our results suggested that the oligopolists tend to be more collusive when faced by strong trade unions.

Chapter 6 focused on two distinct issues : the role of unionism in the determination of the margin and the empirical formulation of the margin. Our principle conclusion is that trade union power, captured by the degree of collective bargaining, was an important determinant in the shaping of industry margins over the period 1983-1986. The importance of this result is that it confirms that unionism in manufacturing industry does engender successful rent seeking activity by unions. The result is more general than that found in Machin and Stewart(1990) since their study focused on a single year cross section. However, we must also note the important caveat that whilst we did exploit a panel of manufacturing data the time series element to it was quite short. In consequence, whether the full effects of oligopolistic pricing are captured in the data is questionable. As such this would require a longer time series investigation. We also unearthed an important source of bias when considering the determination of margins : namely excluding the effects of unionism, as in most previous studies, will bias downwards the effects of seller concentration on the margin.

In addition, we applied to a number of alternatively formulated margins to demonstrate that an important locus of union rents is to be found in highly concentrated industries. We also established that the establishment of an empirical positive association between concentration and the margin is contingent on the specification of the margin itself.

In Chapter 7 we widened the debate on the interaction between product and labour markets by examining the effects of buyer concentration and downstream unionism on seller profit margins. The importance of trades unions in a successive oligopoly environment have not been previously considered. We demonstrated that to the extent that there are important spillover effects suggests a role for unionism in downstream industries to shape seller margins. Using data from the input-output tables

and manufacturing production series for 1984-85 we examined the relationship between the buyer concentration and the seller margin as well the degree of buyer union power and the seller margin. We found that highly concentrated buyer industries tended to be faced by highly concentrated seller industries. However, this does not imply countervailing power since the regression analysis indicated that buyer concentration had a positive effect on the seller profit margin. As such we found strong support for the cumulative effect of buyer concentration on seller margins. On the labour market side we confirmed the hypothesis that buyer coverage spillover effects were important in determining the producer industry margin. We found that buyer coverage depressed margins, as did own industry coverage rates. As such these results provide an interesting corollary and extension to the effects of unionism established in Chapter 6.

Chapter 8 concerned itself with the determination of labours share in the U.K. manufacturing sector. Using two separate data sources, one being a panel of manufacturing industries for the period 1975 to 1986, the other a single year cross section for 1985 we examined the impact of both structure and unionism on wage share. Our empirical results indicated that there was an important role for seller concentration in shaping wage share. Indeed it was found that product market structure depressed production worker wage share significantly in all results. As for the role of unionism, we were able to establish a positive wage share-trade union effect in some cases but clearly the result was not as strong or robust as Kalecki predicted. Indeed, our results suggest, both from the panel estimates and from the cross section results, that a systematic positive effect on wage share is not the case in all instances.

The overall implications of the research offered in this thesis is that there is *potentially* a very important role to be played by trade unions in the shaping of key economic indicators. However, the research offered here has found mixed results pertaining to the actual effects of unions. In terms of the way we have elected to examine various issues, our empirical results, at times suggest, that it is difficult to maintain the view that unions have had a major effect. Indeed, chapters 2 and 8 suggest that unions have found it difficult to influence the sphere of distribution. Furthermore, in chapter 8 we offered evidence suggesting that there is a declining sphere of influence by unions on distribution. This is quite consistent with other emerging academic evidence. Gregg and Machin (1991), in a survey of 227 large firms found that in 57% of firms managers thought that unions had become weaker between 1985 and 1989. This was especially the case where union bargaining had previously been conducted predominantly at the industry level.

In the light of the evidence presented in this thesis a number of guiding principles ought to be adopted if trade unions are to achieve the objective of reshaping the economic landscape and turn the potential for achieving this into actuality. First, unions need to be involved in the *economic sphere*

of the capitalist enterprise and work, at least, for the beginnings of a process leading ultimately to economic democracy. Second, unions must work in the *political sphere* arguing the case for a proactive, dynamic and forward looking industrial strategy designed to reshape the industrial political economy.

Appendix.

Appendix to Chapter 2.

Construction of data for the decomposition of the profit rate.

π : volume of net pre-tax profits in the Industrial and Commercial Company (ICC) Sector at current prices. It was defined as $\pi = \text{GTP} + \text{RENT} - \text{CC}$, where GTP is gross trading profits of ICC companies net of stock appreciation; RENT is rent and non-trading income; CC is capital consumption in the ICC sector. Data source : UK National Accounts.

W : volume of wages (ie the wage bill) at current prices in the ICC sector. Source UK National Accounts.

Y : Actual net income / output in the ICC sector. This is simply the sum of W and π .

\bar{Z} : Potential net output at constant 1985 prices. An annual series for \bar{Z} in four steps. First, information on the percentage of firms working below capacity in the U.K manufacturing sector was obtained from the CBI industrial trends survey. This was the closest approximation to the ICC sector for which data on actual excess capacity was available. Second an initial series for capacity utilisation (CU) was constructed as $(100 - (\text{percentage of firms below capacity}/2))$. This measure is suggested by Driver(1986). Third, the measure of constant price income, \bar{Y} , was divided by CU to give an initial estimate of \bar{Z} . Fourth the final estimate for potential output was obtained by computing a centred four year moving average for each yearly value of \bar{Z} . The reason for adjusting the series was that it displayed an element of cyclical behaviour which is inconsistent with an estimate of potential output. The moving average smooths out these fluctuations that occur in the unadjusted series.

φ : the rate of capacity utilisation was defined as net real income divided by the potential output measure (ie $\varphi = \bar{Y} / \bar{Z}$).

$\hat{\varphi}$: optimal rate of capacity utilisation, ie the rate to which overhead labour is geared. The series φ does not exceed 90% and so this figure is chosen for the value of $\hat{\varphi}$. Although seemingly arbitrary it is a figure adopted by Weisskopf(1979), and encompasses the planned use of capacity for strategic purposes (eg. Dixit(1982))

L : Hours of total labour (direct and overhead) in the ICC sector. First I estimated the total employment in the ICC sector as private sector employees in employment minus employees in employment in the financial, banking and insurance sector. Next I multiplied this estimate of the volume of ICC employment by the average weekly hours worked by all full time adults in manufacturing. This was the nearest sector to ICC for which hours data are available. My yearly estimate was then simply this multiplied by 52.

L_o : Overhead labour hours. To generate this series male manual and non manual hours worked in

manufacturing were obtained (source AAS). Identifying manual workers with direct labour and non-manual workers with overhead labour, the ratio of direct to overhead labour hours was constructed, r_l . An estimate of Overhead Labour hours was then given as $L_o = L/(1+r_l)$

L_d : direct labour hours.

w_o : average money wage rate for overhead employees. This was constructed in a similar way to L_o .

The total wage bill of production workers and other employees was obtained from the British Census of Production data. Equating direct with production employees and overhead with other employees I constructed the ratio of direct to overhead wages as r_w . The overhead wage bill was then computed as $W_o = W(1+r_w)$. Finally, the overhead money wage was calculated as $w_o = W_o/L_o$.

Appendix to Chapter 3.

The structure of the principal and agent problem.

The purpose of this appendix is to illustrate in more general terms the essence of the Principal and Agent problem. In particular an examination of the moral hazard problem as viewed between an homogeneous group of capitalist stockholders (principal) and a manager (agent).

Assume that the share holders are risk neutral. Their objective function is determined by the expected value of the firm. That is receipts minus payments to factor services. Assume, for expositional ease, that this is equivalent to wage payments. The manager of the firm makes an unobservable decision within the interval $\{e_1, e_2\}$. This decision is the effort level made by the manager in the running of the enterprise and is not observed by the share holder. It is equivalent to the "hidden action" concept identified by Arrow. Given the level of some effort, e , the profit stream to the stockholder will also depend on a random event μ such that the profit to stockholders is a function: $\pi(e, \mu)$. We expect profit to be an increasing function of effort. The observable as far as the stockholder is concerned is the realised profit level and a sharing function, the wage, which depends solely a function of the unobserved variable μ . It can be written $w(\mu)$. The shareholder objective function is then:

$$E[\pi(e, \mu) - w(e, \mu)]$$

The objective function of the manager is simply the expectation of some conceived utility function. It is assumed that utility is an increasing function of monetary income, and a negative function of the effort level employed. It can be written $U(w, e)$. Assume risk aversion in income so that U is concave in w . The objective function of the manager is therefore:

$$E U[w(\pi(e, \mu)), e]$$

Where all expectations are taken with respect to μ . In the construct of the model it is assumed that stockholders design a contract $w(\cdot)$ and there exists a competitive supply of homogeneous managers with a reservation utility U_0 . This is the level of utility gained from outside opportunities. To induce managerial supply the stockholders must offer a contract such that the sharing rule exceeds the reservation base utility. Alternatively stated the stockholder must satisfy the participation constraint.¹

$$\max EU(w(\pi(e, \mu)), e) > U_0$$

If the stock holder is to induce a given level of effort, e^* , from the manager, a sharing rule is to be designed that satisfies the incentive compatibility constraint:

$$\operatorname{argmax}(e^*): EU(w(\pi(e, \mu)), e) \text{ for all } e.$$

The stock holders problem is to choose an optimum sharing rule, $w^*(\cdot)$, and to induce a level of effort, e^* , that the manager will exercise of her own volition, subject to satisfying the incentive compatibility

¹ The individual rationality constraint must bind.

and individual rationality constraints.

If we assume full information under which both the level of effort, e , and the stochastic disturbance, μ , are fully observed the solution to the principal and agent problem is relatively straight forward. Since effort is in this case, by assumption, perfectly observable any level of effort can be imposed which is consistent with the managerial participation constraint. Only the incentive compatibility constraint therefore matters under full information. Given the risk preferences of the manager and stockholder the solution to the problem is that the manager is in receipt of a constant wage, w , ie. full insurance.² Assume now the more realistic case of asymmetric information, where the only observable for the stockholder is the outcome in terms of the profit level. Assume that the manager is infinitely risk averse in income. This implies that she prefers a random wage w_1 with an associated effort level e_1 , (w_1, e_1) , to the random wage effort pair (w_2, e_2) , if and only if $w_1 > w_2$, or $w_1 = w_2$, and $e_1 < e_2$. This imposes on the problem that the manager is concerned with her minimum wage but in the event of an equivalence in the two states of the world there is a preference for the least effort option.

Simplifying, let the managerial utility function $U(w, e)$ be separable in income and effort: $U(w, e) = u(w) - a(e)$ where the model assumes $u' > 0$, $u'' < 0$, $a' > 0$, $a'' < 0$, $a(0) = 0$. Following Mirlees (1974) we utilise the parameterised distribution formulation of uncertainty which allows the outcome (profit) to be written as cumulative distribution function, $F(\pi; e)$ on some upper and lower level of profit $[\pi_1, \pi_2]$. The density function is $f(\pi; e) > 0$ and both functions are differentiable by assumption. Also we wish to impose the idea that profit is a stochastic increasing function of effort. That is the first order stochastic dominance relation in (π_1, π_2) is given by:

$$e_1 > e_2 \text{ implies } F(\pi; e_1) < F(\pi; e_2)$$

Further we assume that there are just two probability distribution functions one associated with the manager working hard to produce the outcome (profit) and the other where the manager is lazy. These are written $f_H(\pi; e)$ and $f_L(\pi; e)$ respectively. (H is hard L is lazy).

The problem for the share holder is to ascertain a wage structure $w(\cdot)$ and effort level, e , that maximises the objective function of the principal that is now written:

$$[\pi - w(\pi)] f_H(\pi) \delta \pi$$

indicating that the principal is not indifferent to the level of effort undertaken by the manager but wants her to work hard. This must be done subject to the constraints outlined earlier. First the agents participation constraint is formalised as:

² The proof of this is implicit in the following asymmetric case. We make the implicit assumption that the cost of taking care, hence running the enterprise efficiently, dominates that of being lazy. In consequence, this is not a viable solution to the moral hazard problem.

$$[u(w(\pi))]f^H(\pi)\delta\pi - a(e_H) > U_0$$

which states that the utility of the manager from working hard minus the cost of undertaking hard effort (e_H) must exceed, or equal, the fall back utility level. In addition the incentive compatibility constraint :

$$[u(w(\pi))]f^H(\pi)\delta\pi - a(e_H) > [u(w(\pi))]f^L(\pi)\delta\pi - a(e_L)$$

which says that the agent must find it individually rational to expend effort and work hard, (e_H), than not work hard, (e_L). Forming the Lagrangian:

$$L = [\pi - w(\pi)]f^H(\pi)\delta\pi + \delta_0\{[u(w(\pi))]f^H(\pi)\delta\pi - a(e) - U_0\} + \delta_1\{[u(w(\pi))]f^H(\pi)\delta\pi - a(e) - [u(w(\pi))]f^L(\pi)\delta\pi\}$$

To find the optimum wage contract differentiate with respect to the sharing rule:

$$-f^H(\pi) + \delta_0 u'(w(\pi))f^H(\pi) + \delta_1 u'(w(\pi))[f^H(\pi) - f^L(\pi)] = 0$$

The optimality condition is rearranged to give the expression:

$$1/u'(w(\pi)) = \delta_0 + \delta_1\{1 - [f^L(\pi) / f^H(\pi)]\}$$

Several points emerge from this condition. If the incentive compatibility does not bite, $\delta_1=0$, then the optimum wage contract is a constant and there is full insurance by the principal. Generally, both multipliers are strictly positive.

Because $u'(\cdot)$ is decreasing, $1/u'(\cdot)$ is increasing. The higher the relative probability that the effort was hard when profit was observed the higher will be the managers wage. The term $[f^L(\pi) / f^H(\pi)]$ is the likelihood ratio. The optimum wage for the manager is increasing if the likelihood ratio is decreasing. It follows that, on the assumption that higher profits are an apt signal for higher effort, the compensation for the manager is increasing with observed profits.

The purpose of this discussion has illustrated the importance of information constraints in the Principal-Agent problem. We have focused on the moral hazard problem between stock holders and managers although the analysis is quite general and pertains to any hierarchical structure.

Appendix to Chapter Four.

The robustness of Tit For Tat.

In this appendix we demonstrate the robustness of the Tit-For-Tat strategy, and hence its usefulness, in providing a rationale for the general stability of collusion among agents - in particular firms. The Prisoner's Dilemma (P.D.) structure (or game) has the following array of payoffs for any given strategy.

$$T > R > P > S \quad \text{and} \quad R > (T+S)/2$$

The opportunity cost of time reflecting current time preferences is captured in the discount parameter r such that $0 < r < 1$. A strategy is a known function of the game history, and a probability of the current play. Tit-For-Tat (TFT) is a strategy such that there is certain cooperation on the first move and then in subsequent plays of the game play the strategy that the other player played in the previous move. That is if S is the strategy and t refers to time:

$$S(t+i) = C \quad i=1,2,\dots \quad \text{iff} \quad S(t) = S(t-1) = S(t-2) = \dots = C$$

or

$$S(t+i) = D \quad i=1 \quad \text{iff} \quad S(t-1) = S(t-2) = \dots = C; S(t) = D$$

Axelrod(1984) characterises the value of a strategy A when interacting with any arbitrary strategy, B , as $\pi(A/B)$. A is said to invade B , ie has a superior cumulative score in repeated scenarios, than B interacting with its own strategy if:

$$\pi(A/B) > \pi(B/B) \quad \dots(1)$$

If there is no strategy satisfying (1) then B is said to be collectively stable. There are several important propositions that formalise stages one to three outlined earlier in section 4.8 of Chapter 4.. Two propositions seem of immediate interest concerning the optimality of TFT. By themselves, though, these do not explain the emergence of cooperation.

Proposition One:

"Providing the discount parameter, r , is suitably high, there exists no optimal strategy independent of the other players strategy."

Intuitively this seems plausible in a mixed motive format of the game. If player two continually defects, then the best strategy that player one can adopt in the certain knowledge that player two is indeed playing always defect, is to always to defect as well. If player two was to play a severe punishment strategy should a defection occur, that is defect forever in the event of a single defection by the opponent, then providing the future is valued highly enough such that player one is not enticed to defect in the first place, then TFT and cooperation are optimal. There is no unique

strategy independent of the opponent.

The second proposition states that TFT is collectively stable, ie cannot be invaded by other strategies in the sense that playing these would beat the cumulative score of playing TFT.

Proposition Two:

"TFT is collectively stable iff the time discount factor, r , is at least as great as the larger of: $(T-R)/(T-P)$ and $(T-R)/(R-S)$."

The proof of this is equivalent to asserting that all defect (ALLD) or alternating between cooperate and defect cannot yield a greater cumulative score than playing TFT. That is alternative strategies cannot invade TFT. The non-invasion of TFT by all defect implies: $\pi(ALLD/TFT) < \pi(TFT/TFT)$. All defect interacting with TFT yields the temptation payoff, T , in the first period and the punishment payoff, P , thereafter. This implies that $\pi(ALLD/TFT)$ is equal to $T + rP/(1-r)$. From the definition of the sum of a geometric progression it is clear that $\pi(TFT/TFT)$ is equal to $R/(1-r)$. It follows that TFT is collectively stable if and only iff:

$$(T + rP)/(1-r) < R/(1-r)$$

this implies that $r > (T-R)/(T-P)$. Similarly playing defect and cooperate yields the following inequalities:

$$(T + rS)/(1-r^2) < R/(1-r)$$

Which implies that $r > (T-R)/(R-S)$. This result clearly implies that providing that the discount parameter satisfies the inequalities in proposition two, Tit-For-Tat cannot be bettered by a strategy that invades by playing defection all of the time, or by playing alternate and defect. The import of this result is that if one knows that a player is a Tit for Tat player then the best response is to play TFT.

A major strategic weakness occurs in the model formulated by Axelrod, and alluded to in the text. The problem is seen if one considers a TFT player who plays the defect option for one period and then reverts to playing TFT thereafter. The result of this action is an unending sequence of cooperate and defect by each player who is using TFT. That is if player one defects, player two responds with a defect, but a series of defects is established as below.

Time	1	2	3	4	5	6
Player One	C	C	D	C	D	C
Player Two	C	C	C	D	C	D

This example heuristically demonstrates that in the face of random defection TFT is too lenient, since it is not best to punish for only one period. The non optimality of playing a single period

punishment with players who elect for a TFT strategy can be illustrated in the following manner.

Let the strategy function defined earlier be modified to illustrate that punishing for one period, in the light of random defection with an otherwise TFT player, is not optimal. To facilitate this we allow the potential punishment horizon to be extended to t time periods with the aim of illustrating that the punishment interval should exceed one period. The modified strategy rule is given as:

$$S(t+i) = C \quad i=1,2,\dots \quad \text{iff } S(t)=S(t-1)=S(t-2)=\dots=C$$

or

$$S(t+i) = D \quad i=1,2,\dots,t \quad \text{iff } S(t-1)=S(t-2)=\dots=C; S(t)=D$$

$$S(t+i) = C \quad i=t+1,t+2,\dots$$

This extra condition dictates that in the face of defection in the current time period $S(t)$, then defection, D , occurs for t time periods, and thereafter the cooperative solution, C , is followed.

If firm 2 randomly defects for one period, then it receives the welfare gain from temptation, T . From the modified strategy rule, which is interpreted as the certain expectation that firm 1 will punish for t time periods, it then becomes optimal for firm 1 to play this option. Since firm 2 knows the strategy rule, it will know that firm 1 is going to elect this strategy. By playing the punishment for t periods there is a welfare loss, since the best that can ever be achieved is cooperation, which has the discounted payoff value:

$$T(r + r^2 + r^3 + \dots + r^t) = T(r(1-r^t)/(1-r))$$

In Barro and Gordon(1983) this is termed enforcement. If enforcement dominates temptation the welfare loss from having to play the punishment strategy is greater than the initial temptation to cheat. Since both firms are assumed to know perfectly the punishment strategy and the payoff structure, cooperation between firms then becomes credible. However a one period punishment in the face of random defection does not satisfy the condition since we require that:

$$T(r(1-r^t)/(1-r)) > T$$

which implies :

$$(1-r^t)r/(1-r) > 1$$

A one period punishment strategy, $t=1$, implies a time discount factor $r > 1$ which is never true. As t tends to a large number, this implies the discount factor r tends to 0.5. It follows that with a sufficiently high discount parameter (close to unity), the punishment period can be reduced. This would then be the optimal response to a one period defection of a player who would otherwise play TFT. This formalises Axelrod's intuition that "...another problem is that TIT FOR TAT is too forgiving to those rules which are totally unresponsive, such as a completely random rule." (Axelrod, 1984 p. 177).

We can conclude by noting that whilst Tit for Tat has desirable properties concerning its robustness over time, it is in fact contingent on the strategies employed by other players in the game. We have noted a strategic weakness, in the form of a mechanical sequence of echoes in the of random defection illustrating the contingent nature of the TFT strategy. However the importance of this is of some question, since we are not concerned with a mechanical set of players who would never learn this play structure should it ever emerge. Chapter 4 suggests ways of overcoming this problem.

Appendix to chapter 5.

Bias in estimating the concentration effect on collusion in the Clarke Davies Waterson model.

Clarke Davies and Waterson(1984) derive an estimate of the degree of collusion for each industry α_j . For values of $\alpha_j > 0$ they propose a linear regression of the form $\alpha_j = b_0 + b_1 H_j + u_j$ where H_j is the Herfindahl index of concentration and u_j is an error term. Suppose that the underlying latent linear model determining collusion is given by : $\alpha_j^* = X_j' b + u_j$ where X is a matrix of variables including concentration that is thought to influence collusion α_j^* . However values for α_j^* are not observed for all industries since the estimated values of $\alpha < 0$ have been omitted from the regression. The observed variable of collusion is given by a threshold of the form :

$$\alpha_j = \begin{cases} \alpha_j^* = X_j' b + u_j & \text{if } \alpha_j^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

The model cannot be estimated by OLS as proposed by CDW since the error term u_j does not have zero mean. Since observations with α_j^* are omitted in their estimation procedure it implies that only observations for which $u_j > -X_j' b$ are included. Thus the disturbance of u_j is a truncated normal distribution with non-zero mean. To illustrate take expected values of α_j conditional on being in the sample ie.

$$\begin{aligned} E(\alpha_j / \text{in sample}) &= E(\alpha_j / \alpha_j^* > 0) \\ &= E(\alpha_j^* / \alpha_j^* > 0) \\ &= X_j' b + E(u_j / X_j' b + u_j > 0) \\ &= X_j' b + E(u_j / u_j > -X_j' b) \\ &= X_j' b \end{aligned}$$

Derivation of the empirical estimating model.

Recall from section 5.2 that the first order equilibrium condition for the conjectural variation oligopoly model can be written as :

$$\mu_{ij} = \left(\frac{P_j - MC_{ij}}{P_j} \right) = \frac{\alpha_{ij}}{\eta_j} + \frac{(1 - \alpha_{ij}) MS_{ij}}{\eta_j} \quad (A5.1)$$

$$\mu_{ij} = \left(\frac{P_j - MC_{ij}}{P_j} \right) = \frac{MS_{ij}}{\eta_j} + \frac{\alpha_{ij} (1 - MS_{ij})}{\eta_j} \quad (A5.2)$$

where μ , MS and η refer respectively to the price cost margin, market share and the absolute value of the price elasticity of demand and i and j subscripts respectively to firm and industry. With data on μ and MS, an implied linear estimating model of A5.2 can be written as :

$$\mu_{ij} = a_1 MS_{ij} + a_2 (1 - MS_{ij}) + \varepsilon_{ij} \quad (A53)$$

The error term ε_{ij} is included to capture the effects of omitted factors that might potentially influence the price cost margin (eg. union presence, other size related factors). The model predicts that $a_1=1/\eta_j$ (the inverse of the price elasticity of demand) and that $a_2=\alpha_{ij}/\eta_j$ (the ratio of the degree of implicit collusion to the price elasticity of demand). Suppose, however, that we have data on the absolute value of the price elasticity of demand. We could then weight both MS_{ij} and $(1 - MS_{ij})$ by dividing each by the absolute value of the price elasticity of demand. This suggests the following estimating equation :

$$\mu_{ij} = \beta_1 MS_{ij}^T + \beta_2 (1 - MS_{ij})^T + \varepsilon_{ij} \quad (A54)$$

Where the superscript T denotes that the variable has been weighted by the absolute value of price elasticity of demand. The degree of implicit collusion, α_{ij} , can then be directly retrieved since as $\beta_2=\alpha_{ij}$ as is clear from inspecting A5.2. The degree of implicit collusion would still have to be estimated, rather than directly calculated, due to the presence of the error term which captures the influence of omitted factors. Since when the market share term is weighted by the price elasticity the estimated coefficient β_2 can be interpreted as the degree of collusion we adopt this procedure in this chapter. Below we describe how the price elasticity of demand was calculated.

An alternative strategy would have been to retrieve α_{ij} from the estimated coefficients a_1 and a_2 since $\alpha_{ij}=a_2/a_1$. However, as Kwoka and Ravenscraft(1986) argue the estimated coefficient on the

market share term may capture the effects of scale economies and other size related advantages and not the inverse of the price elasticity of demand. Hence, an alternative rationale for adopting the procedure above.

Price elasticity of demand.

The empirical model suggested by equation A5.4 requires data on the industry price elasticity of demand. As is well recognised such data at the industry level is scarce. Typically, estimates of the price elasticity of demand do exist but for more narrowly defined product groups. However, in an attempt to allow a role for the industry price elasticity of demand and to interpret our conjectural elasticity terms more precisely we estimated a demand equation for each broad manufacturing industry classification that appears in the national accounts data. Each industry demand equation was estimated using quarterly data from 1974 to 1990. The following regression equation was estimated for each industry. : $\ln(Q_{it})=a_0 + a_1\ln(PR_{it}) + a_2\ln(Y_t) + \gamma_t + z_t + \varepsilon_{it}$ where Q_{it} is an index of real output in industry i at time t , PR_{it} is an index an index of prices in industry i at time t and Y_t is an index of real disposable income. The terms γ_t , z_t and ε_{it} are respectively a quarterly time dummy a time trend and a residual error factor. This last term captures all other factors on Q_{it} not accounted for by the model specification. This is the demand specification advocated by Pagoulatos and Sorensen(1986).

Whilst we have adopted a rather uncomplicated form of the demand equation our objective was to obtain estimates of the price elasticity of demand that were broadly comparable across industries. To meet this goal our estimation technique and model specification were kept constant in each of our industry regression equations. Since the model is specified in logarithms an estimate of the industry price elasticity of demand can be obtained directly by inspecting a_1 . The estimated absolute values of the price elasticity of demands for each manufacturing industry varied between 0.655 for mineral products to 1.43 for electrical and instrument engineering. These industry values were then matched into the firm level data set according to the matching scheme described below.

Variable definitions.

The primary source accessed is the Datastream databank of company accounts which holds information on quoted firms from 1968 onwards. We also draw on information from the Exstat database which also covers a similar sample of companies. Our objective was to derive a balanced panel of firms with a long a time series element as possible for each firm. We selected manufacturing firms who had at least 17 years of continuous records between 1970 and 1986. These firms are classified to 50 industrial groups in the Exstat database which we used as the basis to match in various industry-level variables.

The variables used in the analysis are :

π_t = Trading profits (Net profits derived from normal trading activities before tax and interest payments) ; Datastream item 135

$SALES_t$ = Total sales; Datastream item 104

$\mu_t = \pi_t / SALES_t$

Industry variables matched in using the procedure outlined below were

$INDSALES_j$ = Total sales and work done (Source : Table P1002a, Census of Production).

$MS_t = SALES_t / INDSALES_t$.

$CONC_j$ = 5 firm concentration ratio by sales (Source : Table P1002a, Census of Production).

Where a Datastream industry comprised two or more SIC industries, the SIC industry $CONC$ was weighted by industry sales. Since there was no data for 1974, $CONC$ and $INDSALES$ in this year were taken as the average of the 1973 and 1975.

$UNION_j$ = Industry union density across 15 2-digit industries. (Updated from Bain and Price (1983)).

$PRICE$ = Aggregate producer prices index base year = 1985 (Monthly Digest of Statistics, various years).

The industry-level variables were matched in using the following schema (which is similar to that given in Nickell and Kong (1989)).

Table A5.1 : Matching of industry to datastream firm data.

Code	Description	MLH(1968)	SIC(1980)
11	Industrial materials	order VII	32
12	Brick and roof tiles	461,469(2)	241,245,248
14	Building materials	469	243,244
15	Cement and concrete	469(2),464	242,243
16	Paint	274	255
17	Timber	471	461,463
19	Electricals (excluding radio and T.V.)	IX	34
20	Cold formed fastening	399	316
21	Founders and stampers	313,322,393	311,312
22	Industrial plant	333,339(3,4) 339(9),349(2,3)	328
23	Mechanical handling	336,337,339(1)	325
24	Pumps and valves	333,339(3,4), 339(9),349(2,3)	328
25	Steel and chemical plant	461,469(2)	241,245,248
26	Wires and ropes	362	341
27	Miscellaneous mechanical engineering	VII	32
28	Machine tools	332,390	322
29	Miscellaneous engineering contractors	333,339(3,4) 339(9)349(2,3)	328
30	Heating and ventilation	368	346
31	Instruments	323,354	224
32	Metallurgy	321,322,323	224
33	Special steels	311	221
34	Misc. metal forming	323	222,223
35	Electronics	363-369	34
36	Radio and T.V.	364,365(2),368	342,246
37	Floor covering	419	438
38	Furniture and bedding	472,473,474	467
39	Household appliances	368	346
40	Cutlery	XII	31
41	Motor components	381	351-353
42	Motor distributors	381	351-353
43	Motor vehicles	381	351-353
44	Security and alarm services	363-369	34
45	Breweries	231,232-239	424,426-429
46	Wines and spirits	231-239	424,426-429
49	General food manufacturing	211-229	411-423,428
50	Milling and flour	211-213	416,419
52	Newspaper and periodicals	485-486,489	475
53	Publishing and printing	485-486,489	475
54	Packaging and paper	481-484	471-472
59	Clothing	441-449	453

Table A5.1 (continued) : Matching of firm and industry data.

	Description	MLH(1968)	SIC(1980)
60	Cotton and synthetic	XIII*	43
61	Wool	XIII*	43
62	Miscellaneous textiles	XIII*	43
63	Tobacco	240	429
64	Footwear	450	451
65	Toys and games	494	494
66	Plastics and rubbers	492,496	483
67	Pharmaceuticals	272	257
68	General chemicals	271,276,278	251,256
69	Office equipment.	338,366	330

* Excluding MLH 411,422(1,2),429(1)

Appendix to Chapter 6.

Technical Appendix.

We present here some of the summary diagnostics that are presented more fully in Arellano and Bond(1988a,b). The purpose is simply to illustrate the structure of some of the tests used in the estimation of our dynamic models presented in this Chapter.

1. Estimation Technique.

Denote the model to be estimated as :

$$(A1) \quad y_j = X_j \beta + u_j$$

where j (= 1,2, J) is the number of cross sectional units and t (=1,2, T) the number of time wise cross sections. The two stage Instrumental Variables estimator used in this Chapter is of the form

$\beta_{IV} = (X'QX)^{-1}X'Qy$, where (in matrix notation) :

$$Q = W (W' \Omega W) W'$$

where W is the appropriate instrument matrix set and Ω is an estimated diagonal matrix with u_j^2 on the lead diagonal (notice that u_j^2 is the squared estimated residuals from a first stage I.V. regression.)

2. Test of Instrument Validity.

The available instruments are in period t , all values of X dated $t-1$ or earlier, plus any relevant outside instruments. A test of over identifying restrictions is given as (see Hansen(1982) or Arellano and Bond(1988b))

$$(A2) \quad \gamma = \hat{u}' Q \hat{u}$$

which is asymptotically distributed as a $\chi^2(k)$ statistic, where k is the number of over-identifying restrictions.

3. Tests of Serial Correlation.

The consistency of the β^{IV} estimator (for (A1) specified in levels) depends on the assumption that $E(u_j, u_{j-1}) = 0$. Test for first order serial correlation are based on the covariance between u and $u-1$ are thus presented (as described in Arellano and Bond(1988a,1988b). Briefly the test statistic is of the form :

$$(A3) \quad R_1 = \frac{(\hat{u}_{-1} \hat{u}_*)}{\sqrt{v^{1/2}}}$$

where $se(\cdot)$ denotes the standard error of the covariance matrix, and a^* denotes a trimmed series - here to match $t-1$. R_1 is a one degree of freedom test statistic for first order serial correlation, with an $N(0,1)$ distribution. An analogous test for second order serial correlation is obtained by replacing the subscripts -1 in (A3).

Appendix to Chapter 7.

Data Construction for indexes of buyer power.

Whilst it is reasonably straight forward, to construct indices of coverage, profit margins and concentration for the manufacturing sector an estimate the degree of consuming industry power requires knowledge on all sectors to which a producing industry sells its output. This includes the component of final demand.

The input output tables classify industry activity into 101 groups of which 80 are manufacturing (numbers 9 to 87). Industries 1 to 8 cover agriculture, forestry and the utilities. Industries 88 onwards cover construction, retail and distribution, banking and finance, and service sectors. A well defined mapping allows variables to be assigned from the Standard Industrial Classification (SIC) at the level of activity to the input output classification.

The construction of the buyer concentration variable requires some discussion since some purchasing industries to which the producing industry sells its output did not have readily available concentration indices. For example, Agriculture, electricity the distributive trade and final buyers. In these cases it was necessary to collect estimates from other sources. We briefly describe here their sources. For industries within manufacturing, classes 2 to 4, we calculate the five firm concentration ratio by sales. For sectors outside manufacturing we gleaned estimates from a plethora of sources. Unlike the U.S., the U.K. does not produce regular census' of distribution, agriculture, or transportation. In consequence we cast our net wider with the resulting data sources for our construction of buyer concentration.

Agriculture : Following Hill(1988) estimates of business size should be based on labour input requirements rather than geographical area since the latter does not allow for the differing productivity of land types. Accordingly, MAFF figures indicate that for 1985 53.2% of U.K. holdings (enterprises) provided less than enough work to occupy one person for one year, and that 12.9% provided enough work for four or more persons. But 90.5% of agricultural production is accounted for by holdings which occupy one person or more a year. From this we might expect a low value for the concentration ratio. We constructed a proxy employment concentration ratio based on the size distribution of the workforce.

Forestry and Fishing : We assumed that the forestry and fishing acted as single buyer and that other agencies are dispersed. The Annual Abstract of Statistics (AAS, 1989) indicates that the productive woodland administered by the forestry commission was 43.8%.

Coal Extraction, coke ovens and the manufacture of solid fuels : According to the Business Monitor (BM) PA111 six enterprises accounted for all output in 1983, although in 1984 the figure jumped to 12. We assign a value of 98%.

Extraction of mineral Oil and Gas : BM PA130 provides figures for total value added, sales, and employment etc., but omits enterprise size and distribution. We follow Robinson and Hahn(1988) and estimate the share of north sea output by principal enterprise. We check for sensitivity in our estimate by cross referencing with estimates provided in James Capel company analysis of the sector.

Mineral Oil Processing : This is available from the annual Census.

Electricity and Nuclear fuel Production : The annual Census indicates that total output of the sector is accounted for by two enterprises. This is further corroborated by the CEEB annual report indicating that the electricity council, the body responsible for the sectors pricing policy, coordinates the CEEB and the 12 area boards.

Public Gas Supply : PA162 gives information on sales, value added etc but not the structure of the industry. However, the industry is administered by a single seller, British Gas.

Water Supply: An estimate is available from the annual Census PA 1700.

Sugar : While a production industry, the annual Census does not provide an estimate of concentration. This appears to be because of disclosure requirements. BM PA420 indicates that there were six enterprises accounting for all industry output in 1984. Further, a Monopolies and Mergers commission report in 1987 shows that the market shares of British Sugar (49.7%) and Tate and Lyle (43.5%) accounts for 93,2% of sugar supply in the U.K. A 100% concentration ratio is assumed.

Construction : BM PA500 gives figures on output, etc but omits enterprise size and distribution. To estimate concentration we estimate the turnover of leading companies in the industry and express these as a ratio to industry work done and goods sold. The principal companies considered are John Lang, George Wimpey, and Trafalgar Woodrow.³ This resulted in an estimated concentration value of 5.9%.

Distribution : Our estimate of concentration comes from the BM SD025 which indicates that the structure of the industry has a concentration ratio of 15.6% in 1984. Caveats concerning the estimate are presented in Elliot(1988) but this is the only sensible figure available. It is noteworthy that of 38 detailed commodity groups identified in SD025 only six of these are below the estimate of 15.6%.

Hotels, Catering and Public Houses : According to BM SDA28 for 1984 60% of this sector is accounted for by Hotels and Brewing. We apply therefore the brewing industry figures.

Railways : sole supplier of output is British Rail

Road Transport : The only reliable estimate of the structure of this sector come from the Department of Transport's Transport Statistics Great Britain 1977-1987. According to the report "not a great deal is known about the precise structure of the industry". We apply a figure based on the distribution of HGV's by number specified on the operator's licence for 1987. This indicates that 11% of operators

³ Ideally we would have preferred to get an estimate of the five firm, as opposed to three firm, concentration ratio but this proved impossible. Giving that these enterprises are the leading companies in the sector if anything it amounts to only a light underestimate of the actual five firm ratio.

have a fleet size in excess of 100. The data source is based on the Continuing Survey of Road Goods Transport (CSRGT).

Sea Transport : Our source is taken from Monopolies and Mergers Commissions Reports. MMC(1987) indicates that the top four enterprises accounted for 70% of the continental freight ferry services. This is supported in another MMC(1984) report investigating market shares of leading companies in cruise provision.

Airline Transport : Our principal data source is the Civil Aviation Authority (CAA, CAP504) annual operating, traffic and financial statistics for 1984. We measure the size of U.K. airlines by available capacity in terms of output in available tonne km. This indicates that 84.94% is administered by the top five enterprises.

Transport Services : we apply a weighted average of all other transport sectors.

Postal Services : This sector includes the Post Office and agency services but excludes the national girobank. It is reasonable to apply a 100% concentration ratio.

Telecommunications : In 1984 the input output tables show that this sectors total output is £7133m. The turnover for British Telecommunications for this year was £6879m. (source : BT annual report). We assume a 100% concentration ratio.

Banking and Finance : This sector includes banking and bill discounting and other financial institutions. We estimate the concentration ratio on the basis of market loans and advances to the U.K private sector by classification of bank. The Bank of England Quarterly Bulletin breaks down this activity by nine broad bank groupings. In August 1983 total lending to the private sector was £104468m and the six London clearing banks accounted for £47441m of this. We apply a six firm concentration ratio of 45.4%. Note that this is an under estimate of the actual concentration since Coutts & Co. will not have a higher market share than some other British banks. The sensitivity of this estimate was checked by calculating the concentration ratio for four previous years. We found it was stable.

Insurance : In 1985 841 insurance companies were authorised to write insurance business in the U.K.. The estimate of concentration is based on net premium incomes for 1984. The six largest enterprises accounted for 37.2% of general insurance written in the U.K. (including Lloyds).

Business Services : This is a diverse group which might be expected to have a low concentration ratio. A priori, however, we cannot simply restrict it to zero. We identify the principal industries in the sector, about which we have information, and apply a weighted concentration index.

Miscellaneous services : We apply the (low) concentration ratio associated with the distribution sector. In the absence of any other information concerning this sector this seems sensible.

Consumer Purchasers : we apply a concentration ratio of zero. We discount any argument that

consumer groupings, and representative bodies, exert real power as buyers.

Central Government Final Consumption : As a consumer of output we consider the important purchases made by government were in the defence, pharmaceuticals, shipbuilding industries and in public administration. The concentration index was calculated on the basis of these component elements expenditure as a ratio to total government spending for 1984.

Gross Domestic Fixed Capital Formation : The Input-Output tables allocate current purchases fully among industry sellers. Capital formation, however, is allocated to a single column. Given that no simple alternative exists we apportion this figure among principal buyers in the proportion in which they purchased current output. The same applies for current stocks.

Exports : We applied a weighted concentration measure of all principal exporting sectors. We assumed that exports were sold to foreign sectors which themselves had similar concentration ratios to the U.K.. In the absence of a simple alternative this seems appropriate.

This concludes the brief discussion of the construction of indexes of concentration for the purchasing industries used in this paper. Once values for were obtained for all sectors then the estimate of buyer concentration was found by applying the above formula for BCR at the beginning of this section.

The sources for the two other buyer power variables were more easily calculated. We proxied union power in the buying sector by the proportion of all manual male employees covered by collective bargaining agreements. The New Earnings Survey special question of 1985 enables the construction, not only in the manufacturing sector but in all sectors, of all three digit SIC industries from 001 to 990. In a minority of industries the 3 digit value was nor directly available and so we applied the relevant two digit value or we applied a weighted estimate from the other three digit industries within the broad group. We now evaluate the measure of the price cost margin in consuming industries to be used in this study. It is possible to define the price cost margin accurately for 80% of the sectors from the census of production data. However, for many sectors the margin does not readily exist. Instead, we define the margin from information given in the input-output tables. The measure of profit for each industry is defined as the gross trading profit and other trading income after deducting for stock appreciation. This was expressed as a ratio to turnover in the industry to ascertain the margin. Given the impossibility of obtaining consistent and commensurate measure from alternative sources this proved the only feasible solution. Again, once having defined the variable for all sectors we applied the above formula to calculate BPCM and BCOVER.

Given that the data sources from which the estimates of the above concentration estimates are drawn are disparate, does this imply a commensurability problem? According to Lustgarten(1976) the answer must be in the negative since whilst not directly commensurate the measure are a proxy of

concentration nevertheless. Indeed we can go further by arguing that those industries for which we required an estimate of buyer concentration are those industries which will have extreme values (Eg. Agriculture) and are in consequence important in the fixing a line in a regression plane.

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