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# Market Imperfections and Employment

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**NO.5**

**MARKET IMPERFECTIONS AND EMPLOYMENT**

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**ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT**

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## SUMMARY

This working paper addresses the question whether imperfect competition in product markets contributes substantially to the level and persistence of unemployment in modern industrial economies. In section I, the paper documents the available empirical research of the origin and extent of product market power held by firms due to market imperfections. The implications for employment are then explored through transmission of such power into the labour market through wages (section 2) and output reduction from pricing above marginal cost or wage levels below marginal revenue product (section 3). The role for such product market power in the macroeconomic analysis of unemployment is also explored in section 3, but little evidence of the importance on the macro level is available.

The paper thus assesses the extent of product market imperfections and their importance in wage setting. It concludes that product market imperfections are widespread and although large deviations of price above marginal cost appear to be short lived, many firms are able to enjoy persistently high returns for long periods of time. The evidence that such surplus rents are shared with workers is mixed. Industry wage premia are related to the presence of rents but cannot explain all the apparent variation in wages above levels predicted by human capital or compensating differentials. What is more such mark-ups are not solely generated/captured by unions. Although company/plant level evidence (including event studies) indicates that unions capture rents -- hence reductions in union influence may reduce but would not eliminate wage premia - such a reduction in collective power would alter the distribution of wages if the premia are now determined by an individual's characteristics. The macroeconomic implications of the existence and capture of surplus rents are difficult to assess given the little empirical analysis at the aggregate level. Yet the implication is that reductions in product market imperfections would reduce rent capture and raise employment.

## **LES IMPERFECTIONS DU MARCHÉ ET L'EMPLOI**

### **RÉSUMÉ**

Ce document de travail examine la question de savoir si la concurrence imparfaite sur les marchés des biens contribue substantiellement au niveau et à la persistance du chômage dans les économies industrielles modernes. Dans la première partie, le document passe en revue la recherche empirique disponible sur l'origine et l'étendue du pouvoir de contrôle détenu par les entreprises sur le marché des biens du aux imperfections du marché. Les effets sur l'emploi de ce pouvoir de contrôle par le biais des salaires sont examinés dans la partie II, puis dans la partie III, par le biais de la réduction de la production due à un prix supérieur ou coût marginal, ou bien à des niveaux de salaires inférieurs à la productivité marginale. La partie III considère en outre le rôle d'un tel pouvoir dans l'analyse macroéconomique du chômage mais il n'y a que peu de données disponibles sur son importance à ce niveau.

Ce rapport évalue la portée des imperfections du marché des produits et leur influence dans la fixation des salaires. Il arrive à la conclusion que les imperfections de marché sont fréquentes et même si les écarts importants de prix au-dessus du coût marginal semblent ne persister que pour des périodes courtes, beaucoup d'entreprises sont en mesure de tirer de grands bénéfices pendant de longues périodes. Le partage de ces rentes excessives avec la force de travail n'est pas clairement établi. L'existence de primes dans les salaires par secteur industriel est liée à la présence de rentes, mais celles-ci ne peuvent pas justifier toute la variation des salaires au dessus des niveaux basés sur le capital humain ou les différentiels compensatoires. De plus les primes ne sont pas réservées uniquement aux syndicats. Bien que les études de cas au niveau de l'entreprise ou de l'établissement indiquent que les syndicats s'emparent des rentes -- une diminution de l'influence de ceux-ci réduirait mais n'éliminerait pas les primes salariales -- cette réduction du pouvoir collectif modifierait la distribution salariale dans la mesure où les primes dépendent des caractéristiques de l'individu. Le manque de données empiriques globales rend difficile l'évaluation macroéconomique de l'existence et de l'attribution de rentes. Toutefois il est clair que la réduction des imperfections dans les marchés des produits diminuerait des possibilités de prise de rentes et augmenterait l'emploi.

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## INTRODUCTION

Does imperfect competition in product markets contribute substantively to the level and persistence of unemployment in modern industrial economies? Whilst the role of imperfect labour markets, especially the role of trade unions and government interventions (such as welfare systems and employment legislation), has been much discussed in the last decade within the nostrum of supply side economics, the counterpart of rigidities in product markets has been less of a focus. Whilst the popular "NAIRU" framework allows for the possibility that such rigidities could be an important influence on unemployment as firms raise prices above marginal cost, the empirical magnitude of such a mark-up and its variation over time (including over the business cycle) has not been addressed in this framework.

Product market imperfections can influence employment paths through time without shifts in the price/marginal cost mark-up, through rent sharing by firms with workers perhaps at the behest of union negotiated wages. For unions or individuals to raise wages above the competitive level without driving the employer out of business or to exit the market requires rents to be generated or captured. Rents can be generated by organising the whole industry or control of the supply of key labour inputs (including effort). Outside these restricted circumstances wage mark-ups require the presence of surplus rents and there will therefore be a key interaction between product market power and the ability to capture rents in shaping wage levels and changes.

In section 1, this working paper addresses the question whether imperfect competition in product markets contributes substantially to the level and persistence of unemployment in modern industrial economies. In section I, the paper documents the available empirical research of the origin and extent of product market power held by firms due to market imperfections. The implications for employment are then explored through transmission of such power in to the labour market through wages (section 2) and output reduction from pricing above marginal cost or wage levels below marginal revenue product (section 3). The role for such product market power in the macroeconomic analysis of unemployment is also explored in section 3, but little evidence of the importance on the macro level is available.

The paper thus assesses the extent of product market imperfections and their importance in wage setting. It concludes that product market imperfections are widespread and although large deviations of price above marginal cost appear to be short lived, many firms are able to enjoy persistently high returns for long periods of time. The evidence that such surplus rents are shared with workers is mixed. Industry wage premia are related to the presence of rents but cannot explain all the apparent variation in wages above levels predicted by human capital or compensating differentials. What is more such mark-ups are not solely generated/captured by unions. Although company/plant level evidence (including event studies) indicates that unions capture rents - hence reductions in union influence may reduce but would not eliminate wage premia - such a reduction in collective power would alter the distribution of wages if the premia are now determined by an individual's characteristics. The macroeconomic implications of the existence and capture of surplus rents are difficult to assess given the little empirical analysis at the aggregate level. Yet the implication is that reductions in product market imperfections would reduce rent capture and raise employment.

## I. THE SOURCES OF MARKET POWER

### 1.1. Introduction

Quick and costless entry into and exit from markets by firms is the benchmark now commonly used to detect the existence of market power. This state is known as "perfect contestability". If entry and exit are quick and costless any attempt by incumbents to raise price above costs will be thwarted by "hit and run" entry [see Baumol et al. (1982)]. Entry and exit will be quick and costless when there are no costs of adjustment penalizing over-rapid expansion, no fundamental asymmetries between entrant and incumbent in costs or demand, and no sunk costs that would impede exit. In short, for a market to be contestable, there must be no barriers to entry or exit.

### 1.2. Identifying barriers to entry

Barriers to entry are conventionally defined as: *"...the advantages of established sellers in an industry over potential entrants, these advantages being reflected in the extent to which established sellers can persistently raise their prices above a competitive level without attracting new firms to enter the industry"* [Bain (1956) pp. 3]. The focus on the ability of incumbent firms to persistently raise prices means that entry barriers are likely to be durable features of a market, or the result of long term strategic investments made by incumbent firms. Needless to say, the existence of substantial barriers means that incumbents are, in principle, able to earn persistently high profits even in the long run.

There are three main sources of entry barriers: product differentiation advantages, absolute cost advantages, and scale related advantages. We consider each in turn [see Geroski (1993) for a fuller discussion].

#### *Product differentiation advantages*

Product differentiation advantages arise from *"...buyers preferences for one of some variety of very similar substitute products...and also to the fact that different buyers have different allegiances or preference patterns, so that the preferences in question do not result in some universally agreed upon system of grading or rating of competing products"* [Bain (1956) pp. 114]. The consequence is that entrants will be forced to charge lower prices to sell the same quantity as incumbents, or will sell less at the same price.

One type of product differentiation barrier is that created when consumers must learn about the characteristics of a good in order to use it properly. Investments in information gathering are sunk costs from the point of view of consumers, and once a consumer has invested in one particular brand, that person is likely to have little interest in experimenting with other brands that arrive later on the market [Schmalensee (1982)]. This, of course, means that follower brands are likely to sell less than pioneers for the same level of prices. Doctors, for example, often digest enormous quantities of technical information before they are willing to prescribe a new drug to their patients. Having made an investment in one drug that works satisfactorily, they are normally unwilling to do the same for similar drugs that arrive later on the market. As a consequence, "first movers" often enjoy long-lived advantages over later arriving competitors [see for example Grabowski and Vernon (1982), Gorecki (1986)]. Much the same applies in other markets. Urban et al., 1984, examined 129 frequently purchased consumer goods, and discovered that the second arriving brand enjoyed a market share 75% as large as the first mover. To achieve a share as large as the pioneer, the average second mover in their sample would have had to have done nearly 3.5 times as much advertising.



Product differentiation barriers can also be created by network externalities which exist whenever the value of a good to consumers depends upon how many other consumers use the good. When two different, incompatible goods which enjoy network externalities are offered to consumers, the one with the larger network will always be preferred. Hence, an early moving pioneer who can quickly build up a large customer base will often be safe from entry. In the case of video cassettes, for example, network externalities arise from the fact that a large number of users of a particular type of video (VHF or Betamax) living in a given area will support a much larger and more varied library of videos in video rental shops than the same number of users split between two or more different standards will [Grindley and McBryde (1989)]. Similarly, control over the provision of some complementary goods can frequently give a firm market power by "locking in" consumers. In particular, consumers who have bought complementary goods that are not compatible with versions of the primary good offered by rivals are effectively restricted from buying their product. Classic examples of this lock-in include the mainframe computer industry [Brock (1975)].

Advertising can affect entry through the effect that it has on the choices that consumers make [see, inter alia, Schmalensee (1972), Cowling et al. (1975), Comanor and Wilson (1979), Scherer and Ross (1990)]. Advertising is pro-competitive because entrants can use it to make consumers aware of their products. However, advertising creates market power when it reinforces the market position of incumbents, or when entrants are forced to incur large fixed costs in matching the advertising expenditure of incumbents. Rizzo and Zeckhauser (1990), for example, found that although less well known physicians advertised more heavily than more established ones, the returns to advertising were rather higher for more established physicians and, consequently, that advertising was anti-competitive on balance. Similarly, Geroski and Murfin (1990) found that entrants into the UK car industry were able to advertise extensively and establish a place for themselves in the market. However, as more and more entrants appeared in the late 1960's and early 1970's, incumbents responded to the advertising of entrants by increasing their own advertising. As a consequence, the total volume of industry advertising rose precipitously, which made it more and more costly to acquire an advertising share of any given size. These rising fixed costs eventually choked off entry.

### ***Absolute cost advantages***

Absolute cost advantages arise when the unit costs of incumbent firms lie everywhere below those of entrants, opening up a gap that enables incumbents to raise prices above their own costs without attracting entry: *"For a given product, potential entrant firms should be able to secure just as low a minimal average cost of production after entry as established firms had prior to entry. This, in turn, implies (a) that established firms should have no price or other advantages over entrants in purchasing or securing any productive factor (including investible funds); (b) that the entry of an added firm should have no perceptible effect on the going level of any factor price; and (c) that established firms have no preferred access to productive techniques"* [Bain (1956) pp. 12].

The most common types of absolute cost advantage are created by monopoly control over various scarce inputs or natural resources. However, control over the infra-structure supporting the production and sales of a particular product can also create cost advantages for incumbents. For example, express coaching in the UK was deregulated in 1980, but National Express, one of the two original public sector companies, has retained its dominant position. This occurred in the face of several entry attempts because National Express was able to block access by entrants to coaching terminals [Davis (1984)].

Patents are a source of absolute cost advantages because they restrict the access of entrants to up-to-date, state of the art technology, but their effectiveness depends on how difficult imitation is. Mansfield et al. (1981) examined a sample of 48 product innovations and discovered that the imitation costs and times were roughly two-thirds the costs of the original innovation, and that 60% of patented innovations were

imitated within four years. Patents in drugs were, however, particularly effective at deterring imitators [see Levin et al. (1987) on conditions of appropriability]. More generally, legal restrictions on entry and a whole range of government policies can also create absolute cost advantages for favoured firms. Tariff and non-tariff barriers to trade are examples of such barriers, as are the subsidies doled out to "national champions" suffering from a surfeit of foreign competition [e.g. see OECD (1985) and, for a survey of barriers which fragment the internal EEC market, see EEC (1988)]. Procurement policies by national governments are also often used to support certain firms against their rivals.

Absolute cost barriers often affect entry conditions because they delay the arrival of entrants, giving incumbents time to invest in learning by accumulating experience in production or sales. For example, Lieberman (1984) uncovered strong learning effects in the chemicals processing industry, with costs of production falling appreciably with increases in cumulative output or investment. Learning, however, only brings advantages to firms who can prevent rivals from benefiting from their experience, and firms often have to invest heavily in R&D in order to take advantage of learning curve effects.

### *Economies of scale*

Economies of scale create entry barriers for two reasons. First, whenever economies of scale make large plants efficient relative to small ones, the need to raise finance to construct such plants may create problems for entrants when capital markets are not perfect. Second, economies of scale can be used by incumbents to squeeze entrants margins. On the one hand, if entrants enter at the minimum efficient scale and produce as cost effectively as incumbents, they will produce a large volume of output and depress market price. On the other hand, if they choose to operate at a small and inefficient scale in order to keep prices from falling, they will suffer a cost penalty. Either way, they are not able to enjoy the same margin between price and costs post-entry that incumbents enjoyed pre-entry. Indeed, if economies of scale are large enough, if incumbents respond aggressively to entry and if the market does not expand much, then prices may fall below entrant's expected post-entry costs and entry will be blocked.

There has been a wide range of studies of economies of scale, and they suggest that the advantages of scale economies in production are fairly modest [see Scherer and Ross (1990)]. Of more importance in many industries is the fact that entrants often need to sink substantial fixed costs in order to enter a market. Many of these are associated with advertising and R&D. Brown (1978) for example, calculated that a new entrant into the US cigarette industry would need to devote nearly 50% more of its sales revenue to advertising than an established incumbent in order to compete on a par. More generally, Biggadike (1976) studied a small sample of advantaged entrants (subsidiaries of large firms well established in other markets) in a number of US industries, and discovered that they might need as much as 8 years to break even, and 10-12 years to earn returns comparable to those enjoyed by incumbents. The primary cause of this was the extremely high levels of marketing and R&D expenditures needed to effect entry, these being 41% and 51% of revenue on average in his sample.

Scale economies can often have an effect on entry in markets where competition is "localized" due to product differentiation barriers [Eaton and Lipsey (1978)]. The localization of competition restricts the market open to an entrant who chooses to produce a particular product in a particular location in geographic or product characteristics space. Since scale economies mean that the entrant must capture a large share of that local market if it is to be viable, entry is correspondingly more difficult. However, in markets where consumers tastes are diverse and change rapidly, entrants can overcome the disadvantages of scale by adopting flexible production techniques. Effectively, this requires trading off the ability to produce one product very efficiently at a large output rate against the ability to produce a range of products at rather smaller output rates [Carlsson (1989)].

### ***The strategic exploitation of entry barriers***

Entry barriers are created by factors which cause differences in the costs and demand of entrants and incumbents, and can be exacerbated by the strategic actions of incumbents. Decisions to create or exploit have the character of investment decisions, with costs incurred pre-entry and benefits realized in the future if entry is impeded. Strategic entry deterrence is more likely to be undertaken by far sighted incumbents in markets which are profitable, stable and predictable, or in markets which are dominated by one or a few giant firms.

One strategy open to incumbents is to issue a credible pre-entry signal which persuades potential entrants that the incumbent plans to produce a large output post-entry, depressing prices below average costs. Some economists believe that a low pre-entry "limit" price will do the trick [Modigliani (1958) and, for a more recent version of this argument, see Milgrom and Roberts (1982)], but most now accept that something much more substantial and irreversible is needed [see the discussion in Geroski et al. (1990), Tirole (1988)]. Irreversibility matters because threats made pre-entry which can be undone post-entry lack the credibility needed to deter entrants. In fact, what the incumbent would like to do is to produce at monopoly levels pre-entry while threatening to produce more output post-entry should the entrant begin its assault on the market. One way to implement this strategy is to install sufficient capacity pre-entry to wipe the entrant out post-entry, but then to leave it under utilized unless entry actually occurs [Spence (1977), Dixit (1980)].

Incumbents can also try to limit the demand facing an entrant by restricting its potential market. Many markets are segmented: some consumers live in different geographical areas and must incur substantial transportation costs to visit other areas, and some consumers have well defined and strongly held preferences for particular product attributes. Faced with this segmentation, an entrant will need to locate in a market niche that is large enough to enable it to earn positive post-entry profits if it is to survive, and incumbents can block entry by filling the available product and geographical space with their own products, leaving no room for the entrant. The higher are fixed costs, the larger the market that the entrant will need to reach in order to break even, and, therefore, the less densely packed the available product and geographical space needs to be to deter entry. This can be accomplished pre-entry by excessive product proliferation [for an example, see the discussion of the ready-to-eat breakfast cereal market in Schmalensee (1978)], or post-entry by the use of "fighting brands" (new products introduced by incumbents that exactly match those introduced by entrants) which distract attention away from entrant's products.

Finally, incumbents can pursue strategies that raise entrants costs (either fixed or marginal costs), effectively forcing entrants to sell a larger output in order to break even. Such strategies often raise incumbents' costs as well, but as long as they raise rivals' costs more than they raise incumbents' costs, they will be attractive to incumbents [Salop and Scheffman (1983)]. For example, computer reservation systems are extensively used by travel agents to book airline flights. They are owned by a few airlines, and are often offered to travel agents at or below costs. Rival airlines' costs are raised by this tactic because the system can be used to shift bookings towards the proprietor airline, forcing rival airlines to incur substantially increased marketing expenditures in an effort to attract new customers and retain the loyalty of older ones [Fisher (1987)].

#### **1.3. The effects of entry on prices and profit margins**

In the absence of entry barriers, entry will occur whenever prices exceed competitive levels. As entrants attempt to undercut incumbents in order to penetrate into the market and as incumbents respond in an effort to defend their market positions, prices are likely to fall. Entry, even if it does not occur, can also effect prices if the anticipation of potential entry by incumbents leads them to cut prices (in order to deter entrants). This outcome is particularly likely to occur when fixed costs are not sunk (so that exit is

costless), and when product differentiation and absolute cost advantages do not exist (so that entry is easy). These effects are likely to be observable in systematic movements in profits over-time. In particular, the effects of entry are likely to induce a simple autocorrelation in profits over time: high profits today induce entry, which reduces profits tomorrow.

There have been a number of estimates of such "persistence of profits" equations, and they generally suggest that profits converge to long run equilibrium levels fairly quickly, but that long run profits are not driven to zero [see Mueller (1986) and, for an international comparative study, Mueller (1990)]. Firms with large market shares and in advertising-intensive industries show noticeably higher long run profits than others. Using a structural model of profit dynamics and entry, Geroski (1989a) found that profits converged fairly rapidly towards their long run levels, which averaged  $\pi^* = 15\text{-}20\%$ . Actual and potential entry each seemed to have a (fairly) weak effect on the dynamics of margins [see also Bresnahan and Reiss (1988)], and the effects attributable to each seemed to be roughly of the same order of magnitude. Industries that were highly concentrated and in which advertising was particularly heavy showed both slower adjustment to and higher levels of long run profits [see Geroski (1993) for a fuller survey of this work].

Table 1 shows estimates of projected long run profits,  $\pi^*$ , for a number of broadly comparable industries in six countries. Pharmaceuticals stands out as a high profits sector in all countries (particularly in France, Japan and the US). Electrical equipment also displays above average profits in all six countries, as does cement, stone and glass in four out of the six. Shipbuilding, on the other hand is a consistently low profit sector, as (less clearly) are iron and steel, rubber and paper and pulp. In general, the pattern of projected long run profits across industries is fairly similar in Germany, France, the UK and the US; Canada and Japan display somewhat different patterns.

**Table 1. Estimated long run profits by industry for six OECD countries**

	Canada	Germany	France	Japan	UK	US
Food	1.63	0.23	0.06	-0.93	0.439	-0.01
Textiles	-2.43	-0.44	-2.18	-0.874	0.328	-0.94
Paper and Pulp	1.61	-2.165	-0.08	-0.007	-1.03	0.17
Chemicals	-	-	1.56	0.13	-0.21	-0.46
Pharmaceuticals	1.67	0.516	12.52	1.47	0.14	4.55
Petroleum	1.45	-0.71	5.04	-0.44	-0.20	0.77
Rubber Products	0.43	-0.13	-2.70	0.27	-3.13	-1.77
Cement Glass etc.	-1.14	0.03	2.44	0.37	1.52	-1.48
Iron and Steel	1.03	-0.45	-0.82	0.40	-	-1.72
Nonferrous Metal	3.41	-0.80	-1.41	0.41	0.86	-0.25
Metal products	3.53	-0.13	0.49	-1.10	4.058	-1.10
Machinery and Tools	-1.08	0.18	0.25	-0.39	0.69	0.51
Electrical Equipment	1.31	0.37	0.05	0.01	2.53	2.12
Shipbuilding	-	-0.69	-2.95	-0.026	-4.86	-2.51
Cars, etc.	0.81	1.34	-0.13	0.07	1.37	-1.63
Precision Instruments	-	1.13	-0.73	1.13	-	0.17

Note: Profits are defined as after tax profits plus interest divided by total assets and are normalised by subtracting real profits in each country.

Source: Adapted from Odaini and Yamawaki (1990).

The finding that entry has rather weak effects on profits means that entry barriers are likely to be rather high, most entrants being simply not innovative enough to make a major impact on their host markets. However, there are at least three caveats to this conclusion. First, the use of accounting profits in this work raises a number of well known concerns. However, although accounting and economic rates of return can diverge spectacularly, persistently high accounting rates of return imply persistently high economic rates of return, and this is what we observe in the data. Second, the effects of entry may be particularly slow to come, but very powerful when they finally arrive. Most of the studies that we have examined are designed to measure the short run effects of entry on profits, and it may be that using these short times series exaggerates the height of barriers to entry. Third and finally, entry may have a big impact on prices but very little impact on margins if it causes incumbents to reduce costs in line with prices. There is much evidence to suggest that one of the principal responses of incumbents to major waves of entry is savage cost cutting, and this almost certainly means that entry has a bigger effect on prices than it has on profit margins. The implication is therefore that incumbent firms in these situations have excess costs which can be reduced. This may be due to management slack or inertia but may also reflect rent sharing with the workforce which is reduced when rents are eroded (this will be developed in section 2).

Empirical studies of the determinants entry rates or entry penetration often model entry as depending on expected post-entry profits and various types of entry barriers. Estimating these equations enables one to generate estimates of the size and primary determinants of "limit profits"; i.e. the level of profits sustainable by incumbents in the face of entry. Needless to say, estimates of the level of limit profits provide a good measure of the height of entry barriers. Studies have now been reported for a wide range of countries, using data from as early as the 1950's. Broadly speaking, they suggest that limit profits rise with industry advertising intensity, capital intensity and minimum efficient scale (frequently measured by the median plant size of the industry), and falls with industry size and (less clearly) industry growth [see Geroski (1993) and the international comparisons study in Geroski and Schwalbach (1991)]. This pattern of results is widely interpreted as suggesting that advertising and capital raising requirements are important barriers to entry, and that scale economies inhibit entry in small, shrinking markets. Industry concentration levels are frequently included in these regressions, but display mixed and often rather imprecisely estimated effects on entry. This is slightly surprising: it is generally argued that firms in highly concentrated markets are more likely to overcome the free rider problem associated with deterring entry (which is that only one firm needs do it, but all will benefit) and, therefore, most scholars expect to uncover a negative correlation between concentration and entry. It is now widely recognized that fixed costs must be sunk if they are to deter entry credibly, and some progress has been made in adjusting estimates of the stock of assets such as machinery, building and advertising goodwill for depreciation and for their resale value [see Kessides (1986 and 1989), Mata (1991) and Sutton (1991)]. These sunk cost proxies "work" in the sense of being correlated with entry rates, but it is not evident that they much affect the pattern of correlations of overall fit achieved by these models of entry.

Table 2 shows lists of industries identified as having high or low barriers to entry in the UK, Norway, West Germany and Canada. The ranking of entry barriers by the type of entrant in the UK appear to be similar, and the close comparison to the ranking for Norway should be noted. Canada and W. Germany, however, seem to generate somewhat different rankings. It is hard to conclude from this that entry barriers are similar across countries, although some sectors do display consistently high barriers. Table 3 shows some raw data on entry rates by industry in eight countries and leads to the same conclusion. It follows, then that the importance of entry barriers is likely to be market and less clearly country specific. This is broadly consistent with the evidence on long run profits in Table 1.

Table 2. **Barriers to entry across industries by country**

Canada	Norway	W. Germany	UK
<b>Highest Barriers to Entry</b>	<b>Highest Barriers to Entry</b>	<b>Lowest Barriers to Entry</b>	<b>Highest Barriers to Entry - Domestic</b>
Smelting and Refining	Fertilizers	Stone etc.	Cement etc.
Aircraft and Parts	Primary Aluminium	Ceramics	Stone etc.
Breweries	Tobacco	Paper and Board	Distilling
Petroleum Refining	Cocoa Chocolate etc.	Tobacco	Starch
Toilet Prep.	Petroleum Refining	Cement etc.	Food Machinery
Cement Manf.	Sulphates	Fruit and Veg.	Clay Products
Iron and Steel Mills	Vegetable Oils	Sugar	Pharmaceuticals
Distilleries	Iron and Steel	Soft Drinks	Stone working
Cotton and Woollen Mills	Cement and Lime	Other foods	Office Machinery
Tobacco Products	Spirits and Wine	Asbestos Products	Wines etc.
Battery Manf.			
Pharmaceuticals	<b>Lowest Barriers to Entry</b>		<b>Lowest Barriers to Entry - Foreign</b>
Motor Vehicle and Parts	Made up Textiles		Stone etc.
Clay Products	Metal Products		Food Machinery
Major Appl.	Outer Garments		Other Manf.
Pulp and Paper Mills	Leather Products		Cement etc.
Agriculture Impl.	Boat Building		Pharmaceuticals
Rubber Products	Building Materials		Clay Products
Soap and Clan Products	Sawing/Planing Wood		Stone Working
Synthetic Textiles	Other Foods		Textile Machinery
Meat Products	Fibre Boards		Meat Processing
Wineries			
Small Appl. Printing etc.			

*Source:* Canada, Orr (1974); W. Germany, Schwalbach (1991); Norway, van der Fehr (1991); UK, Geroski (1991).

#### 1.4. **The effects of entry on productivity and innovation**

Although firms that enjoy positions of market power based on high entry barriers can raise prices above costs and generate supernormal profits, some may opt for the quiet life and tolerate a degree of inefficiency. It follows that their first reaction to the elimination of entry barriers may be to reduce costs. In the deregulated US airline industry, for example, carriers who have faced increases in competition have put pressure on their workforce, freight transporters, telecommunications suppliers and so on to renegotiate supply contracts, and the unit cost savings which they have realized have been substantial [see Bailey (1976)]. The same sort of effect is also often observed when collusive agreements break down [Erickson (1976)]. The elimination of price conspiracies in the US gymnasium seating industry, for example, led to a 23% reduction in costs, and substantial cuts in the salaries of senior management. More broadly, Geroski (1989b), studied a sample of 79 UK industries over the period 1976-1979, and found that entry accounted for roughly 30% of the total factor productivity growth over the period. Much the same effects are regularly observed in industries faced with substantial competition from imports.

Table 3. The distribution of entry across industries

Two-digit US SIC sectors	Belgium			Canada			FRG			Korea			Norway			Portugal			UK			USA		
	ER	EMS	ERS	ER	EMS	ERS	ER	EMS	ERS	ER	EMS	ERS	ER	EMS	ERS	ER	EMS	ERS	ER	EMS	ERS	ER	EMS	ERS
Food processing	0.051	0.021	0.748	0.308	0.214	0.676	0.069	0.050	0.943	0.072	0.025	0.370	0.052	0.006	0.117	0.470	0.280	0.440	0.054	0.021	0.274	0.239	0.148	0.313
Tobacco	0.025	0.017	0.660	0.606	-	-	0.051	-	-	-	-	-	0.000	0.000	0.000	0.000	0.000	-	-	-	0.205	0.026	0.107	-
Textiles	0.041	0.018	0.420	0.338	0.265	0.791	0.058	0.045	0.729	0.107	0.028	0.240	0.076	0.007	0.085	0.420	0.180	0.300	0.084	0.029	0.364	0.372	0.244	0.374
Apparel	0.058	0.026	0.444	0.265	0.270	0.903	0.189	0.118	0.791	0.153	0.049	0.290	0.107	0.016	0.145	0.630	0.470	0.510	0.074	0.047	0.687	0.403	0.370	0.512
Lumber	0.045	0.019	0.497	0.435	0.362	1.082	0.119	0.075	0.494	0.116	0.042	0.490	0.075	0.011	0.139	0.440	0.270	0.470	0.068	0.060	0.999	0.497	0.419	0.424
Furniture	0.056	0.021	0.506	0.364	0.304	0.753	0.143	0.119	0.713	0.154	0.068	0.400	0.065	0.009	0.087	0.530	0.330	0.440	-	-	0.471	0.367	0.383	-
Paper	0.033	0.014	0.359	0.371	0.236	0.684	0.085	0.049	0.395	0.100	0.047	0.420	0.037	0.003	0.076	0.390	0.150	0.280	0.069	0.030	0.657	0.314	0.159	0.304
Mining	0.078	0.019	0.246	0.274	0.295	1.180	0.179	0.075	0.291	0.052	0.020	0.100	0.091	0.014	0.147	0.360	0.190	0.410	-	-	0.490	0.329	0.407	-
Chemicals	0.041	0.015	0.327	0.359	0.238	0.689	0.122	0.060	0.494	0.101	0.035	0.320	0.071	0.001	0.082	0.460	0.140	0.200	0.074	0.024	0.335	0.325	0.132	0.217
Petroleum & Coal	0.007	0.001	0.165	0.437	-	-	0.133	0.003	0.014	0.065	0.022	0.320	0.060	0.000	0.003	0.660	0.200	0.130	0.035	0.001	0.015	0.337	0.230	0.354
Rubber & Plastics	0.057	0.016	0.270	0.514	0.264	0.414	0.185	0.075	0.327	0.090	0.018	0.160	0.072	0.013	0.191	0.500	0.330	0.510	-	-	-	0.431	0.189	0.224
Leather	0.027	0.009	0.310	0.273	0.250	0.983	0.074	0.072	0.769	0.047	0.042	0.200	0.054	0.006	0.140	0.480	0.210	0.280	0.057	0.051	1.076	0.294	0.252	0.476
Stone, clay, glass	0.049	0.016	0.308	0.317	0.294	0.804	0.091	0.085	0.824	0.092	0.052	0.610	0.067	0.010	0.142	0.430	0.180	0.290	0.063	0.028	0.472	0.344	0.183	0.330
Primary metals	0.031	0.004	0.107	0.396	0.139	0.442	0.116	0.054	0.491	0.117	0.037	0.290	0.031	0.001	0.015	0.500	0.140	0.160	0.089	0.014	0.209	0.319	0.182	0.329
Fabricated metal	0.059	0.021	0.358	0.417	0.357	0.802	0.112	0.102	0.725	0.126	0.063	0.440	0.099	0.026	0.260	0.520	0.220	0.260	0.049	0.035	0.733	0.429	0.310	0.376
Electrical machinery	0.039	0.009	0.281	0.634	0.320	0.481	0.111	0.068	0.535	0.098	0.049	0.470	0.119	0.041	0.379	0.530	0.200	0.230	0.084	0.103	0.505	0.465	0.523	0.299
Electric machinery	0.076	0.013	0.174	0.443	0.245	0.379	0.174	0.068	0.262	0.117	0.037	0.290	0.111	0.009	0.070	0.530	0.270	0.330	0.096	0.022	0.193	0.461	0.213	0.216
Transportation equipment	0.093	0.034	0.175	0.359	0.238	0.689	0.123	0.076	0.348	0.073	0.038	0.380	0.082	0.009	0.100	0.370	0.130	0.250	0.052	0.019	0.250	0.465	0.276	0.257
Instruments	0.092	0.061	1.601	-	-	-	0.105	0.076	0.669	0.097	0.020	0.160	0.095	0.035	0.469	1.230	0.230	-0.060	0.078	0.043	0.649	0.603	0.368	0.224
Miscellaneous	0.086	0.032	0.436	0.274	0.303	2.394	0.100	0.048	0.436	0.139	0.053	0.370	0.135	0.020	0.127	0.390	0.230	0.460	0.075	0.036	0.544	0.402	0.271	0.351

Note: ER is entry rate; EMS is market share of entrants in first year; ERS is size of entrants relative to mean size of incumbents.

Source: Schwalbach (1991).

Entry is also likely to stimulate the generation and diffusion of innovations in markets. Although large and powerful incumbent firms may have the means to conduct large scale R&D projects, they often lack the incentive to introduce new products that displace the stream of profits currently earned on their existing operations [Arrow (1962)]. Rapid entry into the UK dry cleaning industry in the late 1950s, for example, was based on the adoption of new technology by entrants that incumbents had known about since the 1930s. Since the new technology facilitated the introduction of on-the-premises dry cleaning operations which displaced the elaborate factory cleaning systems run by incumbents, they held back from adopting the new innovations until entry had begun to seriously undermine their position in the market [Shaw (1973)].

There is also some evidence to suggest that entry plays a major role in stimulating innovation early in the life cycle of new products [Gort and Klepper (1982)], have observed that new products typically evolve through a number of fairly well defined stages. Following the initial introduction of a generically new product, net entry is positive as the number of new firms operating in the market rises, often at a phenomenal rate. Sooner or later, however, the rate of increase of new firms levels out, and is soon followed by a period of consolidation in which the less efficient producers are weeded out. Net entry is negative at this point, with the number of producers often falling by some 40-50% before a new equilibrium is established at which net entry is again zero. Defining industry life cycles in terms of these variations in net entry, Gort and Klepper discovered that the number of major innovations introduced into the market peaked during the expansion phase, while the number of minor innovations peaked just before the contraction phase began. What is more, during the early phases of market evolution, most innovations were introduced by outsiders (that is, entry is used as a vehicle for introducing new innovations). However, as the market continued to develop and mature, the relative contribution of outsiders to total innovation activity fell. Particularly interesting examples of this evolutionary process can be observed, *inter alia*, in the US semi-conductor industry and in computer aided designs [see Tilton (1971), and Kaplinsky (1983) respectively].

## **II. WAGE DETERMINATION AS A FORM OF RENT SHARING**

Having identified the origins of product market power and demonstrated that the implied deviation from a competitive product market is non-trivial, we need to assess the importance of such imperfections for employment. The most widely developed route for such an influence is through wage setting and this is the focus of the next section. However, there are other routes through the output implications of market power and through expenditure on strategic investments, such as R&D, capacity and workforce skills. These alternative influences will be discussed in section 3.

This section is divided into three parts. Each relates to a different set of empirical models looking for evidence of whether supra-competitive rents are appropriable by workers. The first is the literature over what has come to be called inter-industry wage differentials. The second looks for evidence that product market rents are captured from enterprises within industries. This is achieved by: (a) relating wages explicitly to 'insider variables' (such as proxies for product market power), (b) relating profitability to measures of market structure interacted with unionisation and (c) event studies which examine the impact of deregulations/privatisations, which are the economic analogue of natural experiments. The final section examines whether wage premia are due to labour rents alone, generated by the positive dependence of productivity on wages. This goes under the rubric of efficiency wages.

### **2.1. Inter-industry wage differentials**

Industrial relations experts have long noted the existence of great variation in the wages paid to seemingly identical individuals depending on the industry in which they worked. These industry wage



premia are the observable effects of working in a particular industry after controlling for human capital and other individual characteristics. If significant inter-industry wage differentials exist and persist the view of labour markets as competitive is called into question. Krueger and Summers (1988), using a variety of data sources but in particular the U.S. Current Population Studies from May 1974, 1979 and 1984, claimed to establish the following:

1. Inter-industry differentials are substantial.
2. They are stable across time and therefore unlikely to be due to temporary market disequilibria.
3. They are similar across industrial nations, so do not seem to be due to specific institutional features of the U.S. or other particular economies.
4. They cannot be explained away by competitive forces such as compensating differentials or unobserved labour quality.

Claim 1 is not controversial and has been established by a number of independent researchers [Dickens and Katz (1987); Murphy and Topel (1987); Katz and Summers (1989)]. For example, observationally identical workers earned the following (employment weighted) different mark-ups in 1984 [Krueger and Summers (1988), Table 1, column 4]: Petroleum +37%, mining +24%, chemicals +22%, business services 0, eating and drinking -22%, welfare services -33%. The standard error of the wage equation falls by 4.3 percentage points when industry dummies are included - this compares to a 5.6 reduction when human capital controls are added.

The temporal stability of the effects (claim 2) is beyond serious doubt for the U.S. [see also Slichter (1980)]. The correlation of industry differentials between 1974 and 1984 is 0.91. Even more remarkably, Krueger and Summers (1987) find that the correlation of industry differentials for unskilled workers between 1923 and 1984 is 0.56 - incredibly stable for over 60 years. Claim 3, the international similarity of differentials, is of crucial interest to this study. Krueger and Summers use the ILO Yearbook of Labour Statistics to demonstrate that the correlation of industry differentials in 14 countries with those of the U.S. was high (on average 0.82 in 1982). These raw differentials, although suggestive, do not take any other factors into account. There now exists a more substantial catalogue of international industry differentials [inter alia Wagner (1990), Borland and Suen (1990), Garner and Grenier (1990), Hofer (1992), Haskel and Martin, (1990)]. These studies do indeed suggest that industry rents are robust to controls for individual characteristics, stable over time and similar to those found in the US.

Claim 4 is the most hotly debated issue, and it does not always get support [e.g. Edin and Zetterberg (1990)]. The main contenders for explaining wage differences within the competitive framework are compensating differentials and unobserved labour quality. To the extent that these are associated with the technology of the industry in question, they would also account for the temporal and spatial stability of pay premia. Two pieces of indirect evidence weigh against the competitive rationalisation: job queues and between occupation studies. If, in equilibrium, real wage differences are equalised across industries one would not expect to see job rationing and workers queuing for 'good jobs' in high wage industries. Yet this is exactly what we do see. Tenure and job applications are raised, turnover and quits reduced by higher industry differentials [Pencavel (1972); Krueger and Summers (1988); Holzer et al. (1988); Katz and Summers (1989)]. The second piece of indirect evidence arises because industry differentials appear very similar for different occupations within the same industry. As Layard, Nickell and Jackman (1991) put it: "In a competitive market it would be easy to see why workers on oil platforms get rewarded for the fact that their work is dangerous; however, there is no reason for clerical workers in a petroleum company to be paid more than the prevailing average for clerical workers" (p. 179).

But what of the direct evidence? Studies of compensating differentials do not often find evidence for equalizing differences [e.g. Brown (1980) could not even find a statistically significant premium for

death risk]. Including ten non-pecuniary advantages into their standard wage equations in the Quality of Employment Survey, Krueger and Summers (1988) found that the standard deviation of industry wage premia actually increased. Neither could Murphy and Topel (1987) find any substantial effect from including variables to measure variability of employment. Edin and Zetterberg (1990), on the other hand, found in Sweden that all but three industry premia are driven to zero except when workplace characteristics are included. Yet Sweden has been characterised by the solidaristic wage policy centrally negotiated by unions and employers rather than the decentralised and largely non-union American system.

The unobserved labour quality argument has received the most attention. Murphy and Topel (1987) and Krueger and Summers (1988) use matched samples of the CPS and estimate wage change equations. Although the latter authors find that their panel estimates have not substantially changed, Murphy and Topel argue that the fixed effect of 'ability' explains about 70% of the industry premia. It seems likely that Murphy and Topel's estimates of industry differentials are biased downwards because (i) they use not actual but primary industry of individuals in the previous year and (ii) they estimate occupation-industry cells. More of the variability in occupational wage differences probably reflects unobserved ability. If switching jobs is a choice variable, then workers will migrate to better industrial job matches. Thus, a worker who moves will appear to get an industry wage premium even though the switching may represent better matching of ability. Consequently, Krueger and Summers (1988) and Gibbons and Katz (1991) use information from the CPS Displaced Workers Survey which has information on workers who lost their jobs as a result of plant closure, lay-offs or redundancies making the job changes involuntary. Gibbons and Katz' estimates suggest that only 12-37% of the industry wage premia can be explained by ability using this method.

The evidence for the existence and persistence of substantial industry wage differentials appears strong and resistant to purely competitive labour market explanations. Their existence requires explanation, and raises important questions such as: "What is the source of these rents?" and, "are firms rather than industries the prime repository of market power?" Empirical work has been far less successful in finding an explanation for industry wage premia than it has been in identifying them. The industry differentials are correlated with the following variables [Dickens and Katz (1987)]:

- \* union density
- \* industry profitability
- \* industry concentration
- \* R&D intensities
- \* capital-labour ratios

Union power may be the most obvious explanation as collective bargaining could both re-distribute rents to workers, and, if the union organises the whole industry or can limit labour supply, generate rents [see Stewart (1990)]. In the U.S. however, industry premia are still large for non-union members and union density varies greatly across countries and over time, despite the evidence that the industry wage differentials display a remarkable stability.

Market power (as proxied by profits or concentration, for example) would also seem a likely candidate and we examine it more closely in section 2.2 below. Quasi-rents from innovation and investment may also lie behind the existence of rents, so these are also considered. In the US literature, efficiency wage theory is the common explanation of such premia, so these are the subject of section 2.3.

## 2.2. The capture of product market rents

### 2.2.1. Evidence from wage equations

Substantial variability of firm performance exists within industries (and indeed the very notion of whether the 'industry' is a coherent unit of analysis is, for some, questionable). Even after accounting for individual and industry characteristics Groshen (1991) found that over 50% of the variability of wages remained unexplained. There is a large body of literature which seeks to relate wages to firm and establishment characteristics. A popular methodology is to include both firm-specific 'insider' and more aggregate 'outsider' variables (which would cover industry affiliation) in a firm level wage equation to gauge the relative importance of the two. Wages are essentially determined by a weighted average of the 'alternative wage' and per capita profitability [Christofides and Oswald (1992), Denny and Machin (1991)], revenue [Svenjar (1986)] or average productivity [Gregg and Machin (1991)]. Empirical estimates of insider power have generally been small, but significant relative to outside influences. For example, in fitting an equation of the form:

$$\text{Wages} = (1-y)(\text{alternative wage}) + y(\text{insider factors})$$

and allowing for partial adjustment in wages, Nickell and Wadhwani (1990) estimated  $0.08 \leq y \leq 0.15$ . They went on to argue that  $y$  was positively associated with decentralised bargaining and not with unionism per se. A similar picture emerges from Holmud and Zetterberg (1989) who found that the weight given to insider factors was much smaller for countries with decentralised bargaining systems (US had a  $y$  of 0.3 compared with effectively zero in Sweden, Norway and Finland).

As with the inter-industry differentials, the 'insider power' studies do not distinguish the source of the rents that workers share. There is a substantial literature providing evidence of a weak positive correlation between wages and concentration, but this is generally not robust when measures of labour quality are included [see the surveys in Dickens and Katz (1987) and Blanchflower (1986)]. This could be due to the weakness of concentration as a proxy for market power, collusion being less important than firm specific factors [Schmalensee (1989), stylised fact 4.11]. An alternative explanation is that colluding employers can weaken the ability of workers to get higher wage gains by using divide and rule tactics.

Firm and establishment research examining directly the effects of dominance in the product market on wages is much more supportive of product market rent-sharing. Stewart (1990) using the 1984 Workplace Industrial Relations Survey shows that significant wage differentials are achieved when managers perceive themselves to be faced by few or no competitors. Nickell, Vainiomaki and Wadhwani (1992) and Van Reenen (1993b) examine a firm-level panel and find a strong role for market share in their wage equations. Gregg and Machin (1992) found that wage growth was slower in firms where managers felt competitive pressures had increased in their product markets.

Despite these findings there is still a question mark over the role of unions. It is well established from micro data that the union mark-up is not a statistical artifact arising from differential abilities of unionised workers [e.g. Jakubson (1991)], temporary shocks or mis-specification [Stewart (1987)] and, for Britain, is in the region of 8-10%. But is the source of the mark-up a redistribution of rents? Stewart's (1990) work suggests that it is, but many other studies do not [e.g. Nickell et al. (1992)]. It is an important issue: if unions merely redistribute rents from shareholders to workers and leave employment unaffected, then there will be no negative employment effects of an exogenous shift in insider power. This could happen if unions struck 'efficient bargains' with managers, simultaneously bargaining over wages and employment. By only bargaining over wages both sides end up at an inefficient solution. Abowd (1989) showed that falls in shareholder's wealth after a successful union election (as measured by changes in the stock market value of the firm) were exactly offset by gains to union wealth (higher wages at the same

employment). If this was generally true, then the NAIRU analyses would be seriously misleading. Reducing insider power would change the distribution of wealth rather than reducing unemployment and raising efficiency. Unfortunately, most attempts to test between the 'Efficient Bargaining' and 'Labour Demand' union models have yielded ambiguous results [see Pencavel (1991) for a survey and critique].

### 2.2.2. *Evidence from profitability equations*

An attractive way to look for evidence of worker appropriation of the gains from tacit collusion emerges naturally from the history of the Structure-Conduct-Performance paradigm. Omitting union power from a profitability equation will bias downwards the coefficient on proxies for market power if unions are sharing the gains from collusion. In the long-run, the only industries where union power should depress profits are those where market power exists and a surplus can be shared. Consequently, the importance of an interaction term between say, union presence and concentration should give some insight into how rents are divided between capital and labour.

The British evidence is generally favourable to the rent sharing hypothesis. At the industry level Conyon and Machin (1991a) find that the elasticity between profit margins and concentration rises from 0.089 to 0.146 when one controls for union coverage and industry unemployment. Furthermore, the depressing effects of union power seem confined to concentrated industries [Conyon and Machin (1991b)]. One objection to their study is that the union interaction is merely another variable in disguise. Haskel and Martin (1992), using a similar data set over the same period (1983-86) wipe out the union interaction by including an unemployment-concentration interaction. Nevertheless, they still interpret this as a bargaining effect due to unions being stronger when unemployment is low. Fortunately, the rent-sharing story is supported by work at a lower level of aggregation. Using a two year panel of 145 manufacturing firms Machin (1991) found that the negative effects of union recognition on accounting profits were confined to firms with higher market shares or high levels of industry coverage. Similarly Machin and Stewart (1990) found that the union-induced reduction in managers' perceptions of their plant's financial performance were only significant when the establishment had a high share of industry employment or faced few competitors. This is consistent with a strongly efficient model of union bargaining where it is only rents which are redistributed without negative employment consequences.

A similar pattern appears in the U.S. literature. Early studies which found a significantly negative effect of unions only in concentrated industries [e.g. Karier (1985)] have been sharply criticised for being unrobust [e.g. Connolly, Hirsch and Hirschey (1986)]. The micro evidence seems more secure [see Clarke (1984), however, for an exception] but is given a sharply different interpretation. It is argued that organised labour skims off the rents from investment in general and innovative activity in particular. Rather than being a countervailing force to monopoly power, unions are prematurely harvesting long-lived capital and so destroying the economic crops [Grout (1984) gives the theoretical statement and Hirsch (1989) some corroborating evidence]. This argument would hold good even if union bargains were strongly efficient, so long as the union's time horizon was shorter than the firm's [Baldwin (1983)]. The British evidence, however, does not in general support the existence of these negative investment or innovation effects [Metcalf (1993)].

Evidence of the effects of innovation and investment on wages is hard to come by. The few studies to tackle the issue head on have found positive effects to be the rule [Van Reenen (1993a,b)]. The difficulty is to disentangle whether the effect is due to rent sharing or competition. New technology may lead to upgrading in the human capital mix, higher effort and short-run increases in wages to attract more workers, all of these would lead to higher wages for purely competitive reasons. By focusing on the impact on wages in the firm which first commercialised an innovation and looking at longer-run effects, Van Reenen's (1993a) study of large union firms showed that most of the wage impact appeared to be due to sharing in the rents rather than purely competitive forces. Even then, not all workers gain by the same

amount. Skilled workers earn a premium on technological changes, possibly due to capital-skill complementarities. An increase in this complementarity or an increase in the pace of technological change will mean that technological rent-sharing will generate increased wage inequality until there is a supply side response in increased training. Since this response tends to be very slow, some writers have suggested that technological factors lie behind the very large increases in wage dispersion witnessed in many industrialised countries in recent years [e.g Juhn, Murphy and Pierce (1993)].

### 2.2.3. *Evidence from event studies*

One of the main criticisms of the regressions used to examine rent sharing is that the measure of rents used are endogenous. Wage shocks will obviously affect market power as well as vice versa. Using instrumental variable techniques is one solution, but there are always major questions surrounding the validity of the instruments. A popular response is to look for 'natural experiments' in the data such as deregulations or privatisations.

Rose's (1987) study of the trucking industry revealed that the Teamsters Union captured about two-thirds of the industry's rents, whereas non-unionists were substantially unaffected. Hirsch (1988, 1993) comes to a similar conclusion. Card's (1989) examination of airline deregulations, however, did not find dramatic falls in the union mark-up, but it is not clear that monopoly power has been reduced in this industry.

Card's study reflects a general problem as many deregulations have not been obviously associated with a decrease in monopoly power. As in the case of Britain's privatization programme there is a feeling that the main change has been in transferring a state monopoly into a private one in order to maximise the revenues from selling off the public assets. This may be one of the reasons why there has been far less work in Britain and other European countries on the wage effects of deregulation. It seems that the productivity gains have come predominantly from labour shedding rather than output increases/price decreases even where wage reduction has occurred [Haskel and Szymanski (1992); Domberger et al. (1986)]. There is also considerable doubt over whether the cost reductions are viable in the long-run without substantial wage reductions. For example, the compulsory contracting out of British refuse collection appears to have caused private operators to offer unsustainably low prices in order to be the winning inside bidders when the contracts are renegotiated [Szymanski and Wilkins (1993)]. In this case though reductions in wages were often substantial and coincident with increases in hours and reductions in other employment rights.

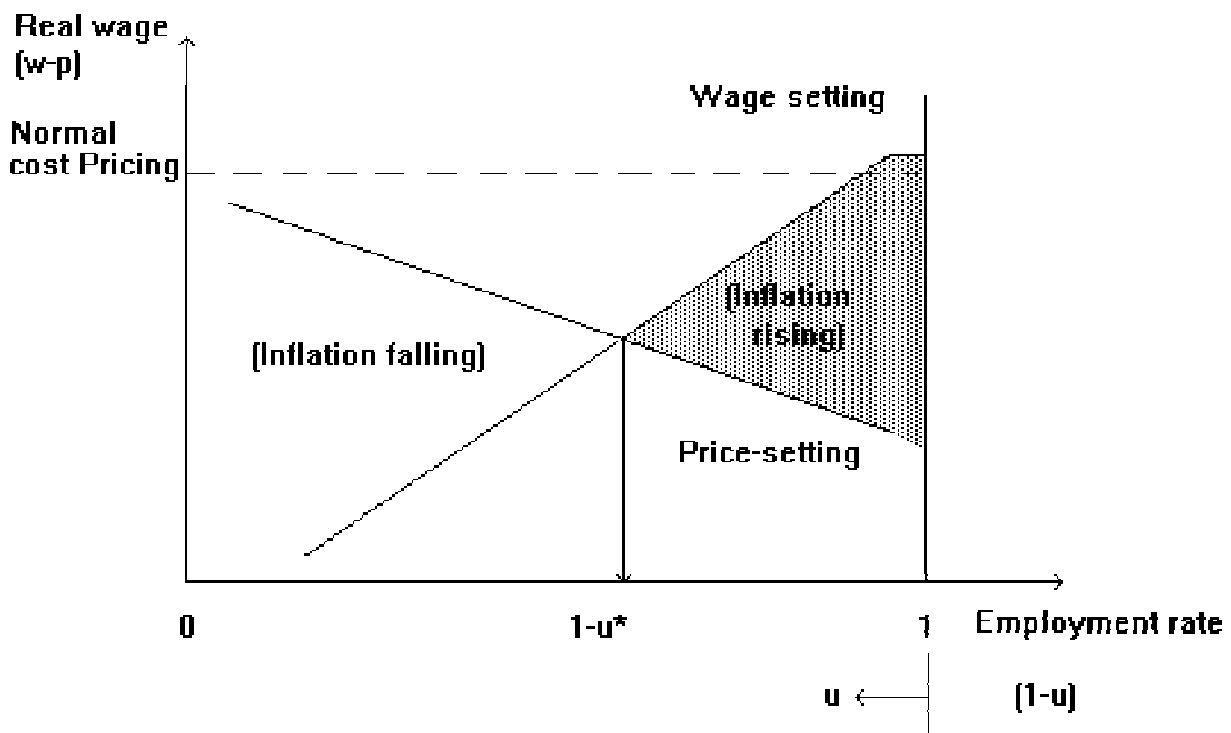
### 2.3. **Labour rents: efficiency wages**

Since there is a common belief that US product markets are more competitive than European ones, U.S. economists have tended to play down the relative importance of product market power as an explanation of industry wage premia and have emphasised efficiency wages. Additionally, the manufacturing sector appears to offer the highest interindustry wage premia and yet faces stiffest foreign competition relative to other sectors. The findings of section 1, the lower level of import penetration and the existence of increasing returns to scale in manufacturing [Hall (1988)] may cast some doubt upon this assumption. Furthermore, if it is decentralisation of the wage bargaining process which gives insiders their power rather than union strength per se then the fact that U.S. industry wage premia are very high and Nordic ones very low should come as no surprise. The fact that union wage premia are also internationally high in the US could be due to a similar process.

There are many versions of the efficiency wage hypothesis [see Akerlof and Yellen (1986) for a survey]. The common theme is that firms have an incentive to raise wages above the market clearing level in order to elicit higher productivity. There are many versions of the transmission mechanism and we offer

three examples here. The turnover model says that higher wages will reduce turnover [Salop (1979)]; the Shapiro-Stiglitz (1984) effort model suggests that a higher wage increases the costs of getting caught shirking on the job; sociological theories of gift exchange [Akerlof (1982)] argue that workers will feel aggrieved unless they receive a 'fair wage'. These models generate equilibrium involuntary unemployment because the firm will not lower wages even if there is an unemployed worker who would do the same job for below the prevalent wage of the firm. This is because cutting the wage would have a detrimental effect on productivity and profitability. At this equilibrium an increase in wages will still increase productivity, but not by enough to offset the loss of profits. Thus it is wrong to imagine that efficiency wages rely on any imperfections in the product market, although one could certainly combine both types of models

**Figure 1. Wage and price setting in Layard and Nickell NAIRU Model**



**Source: Adapted from Layard Nickell and Jackman, 1992.**

[e.g. Layard et al. (1991)].

Section 2.1 described indirect tests of efficiency wages. Unfortunately, direct tests of these models have rarely been successful, usually because observable proxies for the theoretical constructs are hard to find. The most common approach is to estimate a production function with extra terms to represent the 'cost of job loss' such as the firm's own wage viz the prevailing alternative wage. Some evidence in favour of the significance of these terms was given by Wadhvani and Wall (1992) using a firm level panel. The main problem with this is that, as the authors admit, their results are observationally equivalent to a compensating differentials or bargaining model. Machin and Manning (1992) try to overcome this by looking at the different predictions regarding the short-run dynamics of these models. They found that the efficiency wage

model worked only in industries where union density was low. Even then, their results depend on some restrictive assumptions over the dynamics and, like the Wadhvani and Wall model, only one version of the efficiency wage hypothesis, namely the shirking model of Shapiro and Stiglitz, is tested. Other attempts to test the shirking model by relating wages to monitoring intensity by using the proportion of supervisors have been quite unsuccessful [Leonard (1987); Green et al. (1992)].

The turnover model has received more attention. Several writers have estimated quit, turnover, and recruitment equations and related them to wages. As mentioned earlier quit rates usually decline with industry wage premia. Firm level wages in a quit function have the advantage of disaggregation, but the disadvantage of endogeneity. A firm which by accident pays higher wages will have lower quits, there is nothing special about efficiency wage theory in predicting this. Moreover, the parameter estimates from such studies are usually quite small which casts doubt on whether turnover costs could be large enough to offset the loss of profits in increasing the wage and be a significant driving force behind the wage structure [Leonard (1987); Campbell (1993)].

A further problem with the effort and turnover based efficiency wage models is that they are technologically biased. We would expect wages to be highest where turnover costs are high and monitoring of worker effort is very difficult. Some authors argue that capital-labour ratios are a good proxy for these [e.g. Howell (1989)], but capital intensity could easily be correlated with other things such as high ability. Yet the fact we observe similar industry wage premia for different occupations casts doubt on these stories, as the technologies are very different across occupations in the same industry. Ironically, the sociological version of efficiency wages may be the most attractive alternative, but also the one which is hardest to implement empirically.

#### 2.4. **Monopsony: wage below marginal revenue product**

An alternative representation of efficiency wage arguments with very different implications for the impact of market power on employment is where **employers** enjoy power within the labour market (or monopsony power). Monopsony models have many similarities with efficiency wage models but imply wages below the workers marginal revenue product. For instance a model derived from turnover costs faced by the worker, rather than the firm as in the model of Salop (1973), implies firms face an upward sloping supply curve and will offer lower wages and employ fewer workers than in a competitive market [see Burdett and Mortensen (1989)]. Monopsonistic conditions were normally studied in situations with a single employer of a certain labour type, e.g. governments being a dominant employer in university lecturers or health workers [see Sullivan (1989)]. However, more recently the potential existence of monopsonistic power in low wage labour markets has been debated extensively in the US and UK. The debate has largely been in the context of the employment consequences of minimum wages [Card (1991), Katz and Krueger (1992), Machin and Manning (1992)]. However, Machin, Manning and Woodland (1993) investigate the role of monopsony in a UK low wage labour market not subject to minimum wage criteria. This work is as yet inconclusive as to the pervasiveness of monopsony power but it does imply that the employment consequences of minimum wage legislation may have been overstated in past work.

In conclusion, there appears to be considerable evidence of insider rent-sharing from industries, firms and establishments. Although clearly linked to product market power, rents from efficiency wage considerations, investment and innovation may also be important. Tying down the precise economic model, especially as it concerns the role of union bargaining, has been less successful than the demonstration of the existence of imperfections.

### III. MARKET IMPERFECTIONS, OUTPUT AND EMPLOYMENT

In conditions of monopolistic competition (or more restricted market structures) it has been established that insider influence on pay will result in lower employment providing employment is determined by management. However, there is also a direct impact on employment, not via wages, that is output reduction through pricing above marginal cost. This section starts by giving a brief overview of the microeconomic evidence in this area. Such direct effects of product market imperfections on employment also have implications at the macro level which are discussed briefly.

#### 3.1. Output restriction from price above marginal cost

Monopoly prices are created by artificially induced scarcities, and, if barriers to entry protect monopolists, then output restrictions are likely to translate into a reduced demand for labour. Traditionally, empirical work on this subject focused on the relationship between market concentration and profits, the former being a proxy for market power and the latter a measure of supernormal profits [for a survey, see Schmalensee (1989)]. However, recent work on this subject has used more sophisticated techniques to make more precise inferences about the degree to which firms restrict output [for surveys, see Bresnahan (1989) and Geroski (1988)].

The most natural way to test whether firms are restricting output is to compare prices with marginal costs. Since the latter are not observable, it is usually necessary to estimate a marginal cost function and then to detect significant differences between it and prices at observed outputs. More generally, one might jointly estimate the parameters of a production or cost function and a marginal revenue curve, and then test to see whether the latter is horizontal. There are several ways to do this, but most work has involved estimating conjectural variations (the apparent response of firm *i* to change in *j*'s output), estimating residual demand curves (i.e. the relationship between firms' price and quantity after the supply responses of all rivals have been accounted for), or looking at equilibrium responses to shocks (such as tax changes). Testing for price taking behaviour is far more complex when industry output is not homogeneous, but the principle is the same [e.g. Bresnahan (1981)].

These exercises make strong assumptions about functional forms for costs and demand, and Hall (1988) has suggested a much more robust approach. When the capital stock is fixed and no technical progress occurs, the rate of growth of industry output will be proportional to the rate of growth of labour inputs. If price equals marginal cost, this factor of proportionality equals labour's observed share in revenue (but not of costs), while if price exceeds marginal cost, then the factor of proportionality will exceed labour's observed revenue share, and is marked-up by the ratio of price to marginal cost. With capital stock adjustment, the crucial relationship is between rates of change of output-capital and labour-capital ratios, and technical progress adds a constant to the equation. All these relationships hold regardless of the details of demand and cost functions, and are defined in terms of variables generally observable across as well as within industries. Hence, very simple regressions provide estimates to use for testing the equality between price and marginal cost, and, unlike cost or demand function based methods, such tests can be made on inter-industry as well as on intra-industry data.

Virtually all the studies of this type which have been reported have rejected price taking behaviour; i.e. have detected clear signs of output restriction. Appelbaum (1979) rejected price taking for the US Petroleum and Natural Gas industry during the period 1947-78, as did likewise Summer (1981) and Ashenfelter and Sullivan (1987) for US Cigarettes, Iwata (1974) for the Japanese Flat Glass industry, Cubbin (1975) for UK Cars, Baker and Bresnahan (1985) for two of three leading firms in the US Beer industry, Slade (1987) for the local Vancouver Gasoline market in 1983, and Appelbaum (1982) for the US Electrical Machinery and Tobacco industries, 1947-1971. The existence of dominant firm pricing leading to prices above marginal costs has been found in the Oil market [e.g. Griffen (1985)], Tomato Production



in the US [Just and Chern (1980)] and the US Coffee Roasting industry [Gollop and Roberts (1979), and Roberts (1984)]. Borooah and Van Der Ploeg (1986) discovered relatively high degrees of monopoly power in 10 two-digit UK industries, 1954-79, and Hall (1988) failed to reject price taking behaviour in four of twenty-one two-digit US industries, finding a price-marginal cost gap of 30% on average in US Manufacturing. Finally, work on the Joint Executive Committee, a cartel controlling freight shipments from the East Coast of the US at the end of the last century, suggests a systematic pattern of alternating cooperative and non-cooperative pricing phases, with the latter often occurring after entry but not necessarily in periods of low demand [e.g. Lee and Porter (1984), Porter (1983), (1985)]. Similarly, work on the Uruguayan Banking sector observed major changes in behaviour following the relaxation of legal restrictions on entry (e.g. Spiller and Favaro (1984) and Gelfand and Spiller (1987)).

### ***Event studies***

As has already been noted, it seems that the productivity gains after privatisation or deregulation have come predominantly from labour shedding rather than output increases/price decreases even where wage reduction has occurred [Haskel and Szymanski (1992); Domberger et al. (1986)]. There is also considerable doubt whether substantial wage reductions occur in the absence of a marked increase in the level of competition in the product market. There is evidence to suggest that one of the principal responses of incumbents to major waves of entry or other increases in competitive pressures is savage cost cutting. The implication is therefore that incumbent firms in these situations have excess costs which can be reduced. Hence, although firms that enjoy positions of market power based on high entry barriers can raise prices above costs and generate supernormal profits, some may opt for the quiet life and tolerate a degree of inefficiency. It follows that their first reaction to the elimination of entry barriers may be to reduce costs (see section 1.3/1.4).

Therefore transfer of ownership (privatisation) that fails to reduce market power of firms results in cost cutting through labour shedding rather than wage cuts. Indeed the market power position of the firm may be exploited more actively (and shared less through managerial slack) if prices were restrained by government controls prior to privatisation.

### **3.2. General equilibrium and macro implications of monopolistic power**

The presence of market power analysis at the micro level has been demonstrated, however, there have been empirical studies identifying market power at the aggregate level [e.g. Bils (1987) and Hall (1988, 1990)]. The inclusion of product market imperfections in macroeconomic models analysing the determinants of unemployment is rare. One exception to this is Layard and Nickell (1986). In this model firms set prices as a mark-up over (expected) wage costs and workers bargain wages as a mark-up on prices. In the absence of market power prices are set with a zero mark-up on marginal cost (normal cost pricing), the hatched line in Figure 1. However, with market imperfections a mark-up will exist and may rise in an economic upswing (when unemployment is lower), producing the downward sloping price setting line in real wage and employment space. The extent to which imperfect competition may reduce employment over time or between countries has not been estimated in models of this form but the cyclical variation produces important dynamics. This model retains a common feature with competitive models, namely a single well defined equilibrium. Manning (1990), however, extends the model so that firms face increasing returns to scale. This relatively minor alteration produces a non-linear price setting schedule that generates two equilibria (i.e. the price setting schedule intersects that for wage setting at two separate points with high and low levels of unemployment). The key feature of his model is that depending on the degree of sluggishness of adjustment of wages and prices-either or both equilibria can be locally stable and an economy could move between them. Hart (1982) and Silvestre (1993) amongst others offer a more comprehensive theoretical structure than Manning (1990), describing the implications of imperfect competition for general equilibria. Unemployment in these models is an inefficiency derived from an

absence of cooperation or co-ordination by economic agents and unemployment persists without any union bargaining or labour market influence by employees. The persistence of unemployment derives from the possibility of a number of locally stable equilibria rather than the unique pareto optimal Walrasian equilibrium of perfect competition. This could imply a number of "Natural Rates" around which economies will cycle and potentially shift between if a shock of sufficient magnitude occurs. The translation of product market power into unemployment in these models requires that a competitive sector capable of absorbing those not employed in the non-competitive sector, either does not exist or is incapable of doing so at wages above subsistence levels (or available benefits). In these circumstances product market power can generate unemployment without labour market wage rigidities. The emphasis such models place on co-operation and co-ordination, with or without wage setting power of unions, has led to arguments for the institutions that induce co-operation/co-ordination in wage setting, such as Calmfors and Driffel (1987), Soskice (1990) or Bean (1993).

## **Conclusions and policy implications**

Unemployment is recognised to be a phenomenon intimately linked with supply side phenomena of imperfect competition. In the popular "NAIRU" framework this is due to insider power (a category wider than just unions) in the labour market, and less commonly recognised, monopolistic power in the product market.

This working paper thus assesses the extent of product market imperfections and their importance in wage setting. It concludes that product market imperfections are widespread and although large deviations of price above marginal cost appear to be short lived, they do not return to zero, so small mark-ups persist. These mark-ups are maintained by barriers to entry of various kinds - product differentiation, cost advantages, and economies of scale. They boost profit margins and reduce output. The evidence that such surplus rents are shared with workers is clear. At the level of the industry, wage premia are related to the presence of rents but this cannot explain all of the apparent variation in wages above levels predicted by human capital or compensating differentials. What is more such mark-ups are not solely generated/captured by unions. Company/plant level evidence (including event studies) indicates that unions capture rents, however, reductions in union influence may reduce but would not eliminate wage premia. Moreover, such a reduction in collective power would also alter the distribution of wages if the premia are determined by an individual's characteristics in the absence of the union bargain. The macroeconomic implications of the existence and capture of surplus rents is difficult to assess given the little empirical analysis at the aggregate level.

The implication is that reductions in product market imperfections (i.e. removing barriers to entry/exit) would reduce rent capture and raise employment. There is a caveat to this, transferring a near monopoly from the public to the private sector may produce employment shedding rather than wage cuts and employment growth. Such changes of ownership result in major cost cutting through employment. A similar result holds for private sector firms suddenly losing a cartel or other market advantage. Lower wages tend to result when deregulation is accompanied by sharp increases in competition and casualisation of labour inputs.

The condition of entry, and, therefore, the basic competitiveness of any market is determined by two things: the height of entry barriers, and prevailing market conditions. Economies of scale, for example, present a formidable barrier to entry in stagnant or declining markets where entrants will have to compete vigorously for sales against entrenched incumbents anxious not to lose market share and so incur cost penalties. In growing markets, on the other hand, it is often possible for an entrant to acquire a sufficient market share to build a plant of minimum efficient scale without taking sales from existing firms, and in such settings entry will be considerably easier. Similarly, as consumers become wealthier and more

confident, their demand for diversity increases, and this enables numerous more customized suppliers to inhabit specific market niches profitably, despite high set up costs, an inability to exploit economies of scale, lack of access to mass distribution outlets and other disadvantages.

It follows from this observation that there are two types of policy lever which might be used to lower entry barriers and make markets more competitive: those which affect prevailing market conditions and those that operate specifically on barriers to entry. Consider each in turn.

Most conventional macroeconomic policy tools have an effect on the competitiveness of markets because they affect basic conditions of demand and costs. However, most macro policy tools affect all firms in a market, entrants and incumbents alike, and this means that they often do not affect the wedge between entrants and incumbents which is responsible for deterring entry. Thus, using monetary policy to reduce the costs of capital will make it easier to finance entry, but also for incumbents to expand, and it is by no means clear that entrants will emerge as the net beneficiaries. Other policies, such as subsidizing R&D or training or providing financial assistance for exporters are likely to benefit well established firms more than they benefit new entrants, and are, therefore, likely to make entry more difficult. As the examples cited two paragraphs above suggest, the major exception to this conclusion lies with barriers created by scale economies or large fixed costs. In this case, what matters to both entrants and incumbents alike is market size, and macroeconomic policies, which expand the size of particular markets, reduce the limit on firm numbers which economies of scale creates, and so facilitate entry.

Micro based policies which aim directly at reducing particular types of barriers to entry are more direct. The major problem with this kind of policy is that it will always be inherently selective and discriminatory. Selectivity arises partly because policy makers must choose which particular types of entry barrier to address, but mainly because the importance of particular types of entry barriers (as well as their height overall) varies across markets. That is, the importance of barriers to entry is market specific, and, to be effective, policy must also be so. Competition policy is an obvious example of the kind of policy which is called for.

Nevertheless, there is a case to be made in favour of the view that policy makers ought to concentrate attention on certain types of entry barriers wherever they appear in particular markets. The 1992 single market programme of the EC, for example, focuses on trade barriers which impede the realization of scale economies, and on subsidies and home biases in national procurement policies. Similarly, numerous policies aimed at small business are focused on filling the so-called "equity gap" that is alleged to arise from the unwillingness of large financial institutions to lend to small firms. Finally, some countries have tried to stimulate the diffusion of new technology by loosening patent restrictions or positively promoting the flow of new information (particularly from abroad). These types of policies are usually designed to give administrators enough flexibility to adapt them to the particular circumstances of particular markets, and many succeed in doing so. What limits the appeal of these policies is that there is no one simple panacea to the problem of market power: monopoly can be created on any number of bases (i.e. on anything which drives a wedge between the costs or demand of the monopolist and that of any putative rival), and sustained on any number of other bases.

It follows, then, that policy towards competitiveness must be thought of in terms of a *fluid portfolio* of specific initiatives targeted at particular types of entry barriers, and applied in somewhat different ways in the different sectors where particular barriers exist.

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