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Merger appraisal in oligopolistic markets

Prepared for the Office of Fair Trading by National Economic Research Associates

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MERGER APPRAISAL IN OLIGOPOLISTIC MARKETS

PREFACE

This paper is the 19th of a series of research papers (listed overleaf) to be published by the Office of Fair Trading. These papers report the findings of projects commissioned by the OFT as part of its ongoing programme of research into aspects of UK Competition and Consumer Policy. The intention is that research findings should be made available to a wider audience of practitioners, both for information and as a basis for discussion. Any views expressed in this paper are those of the authors; they do not necessarily reflect the views of the Director General of Fair Trading. The report is not and should not be treated as a guideline issued as a consequence of the Director General's obligation to publish general advice and information under the Competition Act 1998.

Comments on the paper should be sent to me, at the address shown below. Research proposals on other aspects of UK Competition and Consumer Policy would also be welcomed. Requests for additional copies of this paper (or copies of earlier papers in this series) should, however, be sent to the address shown on page 3.

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MERGER APPRAISAL IN OLIGOPOLISTIC MARKETS

CONTENTS

EXECUTIVE SUMMARY

This report contains the results of a research project commissioned from NERA by the Office of Fair Trading. The project specification was to provide an overview of the theory of oligopolistic markets, to review that theory against a set of case studies, and to draw some policy conclusions relevant to the OFT's task in assessing mergers.

Mergers can be horizontal, vertical or diversifying. As horizontal mergers are between directly competing firms, they most often threaten the maintenance of effective competition. Horizontal mergers can raise fears of unilateral effects, co-ordinated effects and exclusionary behaviour.

Unilateral effects

Unilateral effects arise when two closely competing products are brought under common ownership. The term unilateral effect refers to the fact that the post-merger firm has an incentive to raise price even if the merger has no effect on the behaviour of competing firms. The price of both products is likely to rise because sales which would have previously been lost to the acquiring firm are partially recaptured in higher sales of the acquired product. The greater the propensity of customers of the acquirer to switch to the acquired products, the greater will be these unilateral effects.

In markets in which products are differentiated either by virtue of their innate characteristics or by strong branding, market shares can provide an unreliable guide to the possible extent of any unilateral effects. In cases such as this it is often more informative to directly assess the proportion of each of the merging firms' customers who would have switched to the other merging firm's products following a price rise ('diversion ratios'). This information can be used to generate an initial estimate of the size of any unilateral price increases following the merger. A variety of techniques exists for estimating these price rises, ranging from the relatively simple where data are poor to the highly complex where good data exist.

However, even if the diversion ratios or post-merger concentration indices give cause for initial concern about the unilateral effects of a merger, there are many other factors which must be considered in an appraisal of the merger's overall effect on economic welfare. First, in differentiated product markets in which the fear is that unilateral price increases may be 0imposed by the merged firm, it is possible that existing products could be repositioned to compete more closely with the products of the merged firms, either through a change in brand image or through changes to their physical characteristics.

There are also factors which might mitigate concerns over unilateral effects. Concerns will be less in a market in which entry does not require the expenditure of significant sunk costs, where entry can be undertaken quickly and where entry can be successful on a scale which is small relative to the overall market. Concerns would also be lessened by the existence of large and sophisticated buyers, and by rapid product innovation and development.

In addition, the benefits of the merger must be considered. Mergers might create benefits if the merged firm has lower costs due to the greater exploitation of economies of scale, including the rationalisation of overheads, or increased buyer power which reduces input prices.

Co-ordinated effects

In markets in which products are undifferentiated, market shares are much more likely to give a reasonable indication of the possible extent of post-merger price increases. In homogeneous product markets the most important concern may not be that the merged firm will engage in unilateral price rises, but that the entire market will become tacitly or explicitly collusive after the merger. Post-merger effects that rely on the behaviour of the merged firm's rivals are termed co-ordinated effects.

Market shares and the extent of post-merger concentration are highly relevant to an assessment of the risk of greater post-merger collusion. Concentrated markets are more amenable to collusion because the profitability of competing on the fringe of a tacit or explicit cartel rises as the number of firms in the market rises. Concentration also aids the effective policing of cartels by making cheating easier to detect. This in turn may make a cartel more likely or an existing cartel more stable at higher prices.

In mergers raising fears of greater collusive activity, other characteristics of the market will often make collusion impractical even at the higher levels of concentration created by the merger. Since collusion is most successful in stable, predictable and transparent markets, such confounding factors might include a lack of transparency in pricing, a high degree of customisation, widely differing cost bases between suppliers, differing degrees of vertical integration and rapidly expanding or volatile demand. The fact that firms have an incentive to adopt co-operative behaviour does not mean that they will find the mechanisms to adopt anti-competitive market outcomes. Entry threats and efficiency benefits can also affect co-ordinated effects concerns.

Exclusionary effects

The concerns over the potentially exclusionary effects of mergers are less well developed than those regarding unilateral and co-ordinated effects. Often, concerns over exclusionary effects will have been raised by competitors to merging firms. However, testimony from competitors should be subject to the same critical scrutiny as that of the merging parties, since competitors will often benefit from an anti-competitive merger and suffer from an efficiency-enhancing one. Since in many cases the interests of competitors are likely to be diametrically opposed to those of economic welfare generally, competitors' complaints about the exclusionary effect of mergers need to be particularly carefully examined. Where mergers raise legitimate concerns over exclusionary practices it will often be because the merger has had unilateral effects, reducing the competitive constraints under which the merged firm must operate.

Case study analysis

The case studies illustrated some of the themes from the theoretical discussion, and also served to underline the importance of analysing mergers in a dynamic market context. Of the 11 cases that were revisited, in most the decision to clear the merger was found to have been the correct one. In only two cases have subsequent events called into question the wisdom of clearing the mergers, though in both these cases further analysis would be needed to reach a definitive conclusion.

In general, the phenomenon of buyer power was found to have had an especially strong influence on post-merger events. Very often the post-merger structure of the industries which were looked at was more significantly shaped by the decisions of buyers than of the merging parties. For example, of particular importance to the shaping of the markets was buyers' decisions about where to source, from whom to source, whether to encourage new entry and, in the case of retailers, of how much space to devote to different products and whether to launch or promote own-label in competition with brands. In several of the cases, including some of those with the highest post-merger shares, buyer power resulted in prices falling after the merger.

In short, the case studies provide a reminder that mergers do not take place in a vacuum. The dynamic responses that take place after mergers underline the fact that post-merger predictions based purely on clues from demand-side relationships tell only part of the story. Thus, although models of unilateral effects provide useful insights into possible danger areas, they must be supplemented by an attempt to assess how the market may respond to structural changes caused by mergers.

Nevertheless, the case study merger which caused the greatest concerns of reduced competition was in a differentiated product market and illustrates the potential usefulness of oligopoly models based on unilateral effect theories. In that case, while several makers of the products concerned existed, the merging companies were the two major producers of one particular class of the product. By eliminating competition between these two directly competing manufacturers, the merger appears to have reduced competition and may have allowed a price increase which would not have been profitable pre-merger. Crucially, in this case, the fragmented nature of demand and the constraints under which buyers operated prevented the kind of supply-side response to the merger that we saw in several of the other case studies. As a result, the market appeared not to have exhibited any resistance to the post-merger price increases that had occurred.

A framework for analysis of mergers

Drawing on recent developments in economic literature and the lessons of the case studies, we suggest a practical framework for merger appraisal. We recommend that the merger control authority should identify at the outset whether the main concern with the merger is likely to be unilateral or co-ordinated effects. These concerns raise rather different issues and so demand rather different frameworks of analysis.

With unilateral effects, market shares and market definition may be less relevant than a direct assessment of the competitive proximity of the merging firms' products to each other. If sufficient data is available, it may be possible to estimate directly the initial unilateral effects of the merger on prices without having to make too many restrictive assumptions about the structure of demand. Supply-side responses, such as new entry, perhaps with the encouragement of large buyers, and the possibility of product repositioning should also be considered.

In the case of co-ordinated effects, conventional market shares may provide a reasonable preliminary indication of the competitive position in the market. Further investigation should then focus on the extent of product homogeneity, the degree of symmetry between the firms in terms of their sizes and cost structures and the level of transparency in the pricing and output decisions of the firms involved. Entry conditions are also relevant.

In all cases, the lesson from our case studies is that mergers should be seen in a dynamic context and that consideration is given to how the market would have developed in the absence of the merger. In extreme cases it may be that one of the firms would have exited the market. More generally, trends in the market need to be considered as it is these changes which may have prompted the merger and which may give an indication of the potential benefits which the merger may bring. These benefits must be weighed against any perceived risk of lessened competition.

The predictions of oligopoly models are highly sensitive to the assumptions underlying them. It would therefore be dangerous to take a single model of oligopoly behaviour and attempt to draw generalised policy conclusions from it. In the practical evaluation of mergers a range of factors must be considered and weighed by the investigating authority without dogmatic reliance on a single theoretical perspective. Nonetheless, oligopoly theory, despite its diversity, can focus the inquiry on the likely nature of the concerns which a merger might raise and help the investigator to identify those factors which should be considered when coming to a view on the likely outcome of a merger.

1 INTRODUCTION

In February 1997 NERA was commissioned by the Office of Fair Trading (OFT) to undertake a research project examining the impact of mergers on oligopolistic markets. The project specification was to provide an overview of the relevant theory and to revisit a number of past mergers to assess the effect which those mergers have had on the markets concerned.

Specifically, the report reviews the literature and reports on a series of case studies looking at the economic consequences of a selection of mergers examined by the OFT in the early 1990s. The findings of the literature survey and the case studies are synthesised into a set of recommendations for the future appraisal of horizontal mergers in concentrated markets. As with all OFT research reports, the views expressed in the report are those of NERA and do not necessarily reflect those of the OFT.

The report is structured as follows. Chapter 2 explains the significance of horizontal mergers and outlines the issues raised by them. This includes the main competition detriments which may result from a horizontal merger and a summary of the most common reasons given for arguing that horizontal mergers do not result in any significant damage to economic welfare.

Chapter 3 surveys the oligopoly models on which much of the merger literature is based. Chapter 4 then surveys the literature on the effects of horizontal mergers, including, briefly, empirical work on the relationship between concentration and price.

The findings of the case studies are reported in Chapter 5. All the mergers examined took place before 1994. In each study an *ex post* appraisal of the effects of the merger was undertaken to assess whether post-merger developments support the predictions made in the pre-merger appraisal.

The final section, Chapter 6, draws together the findings of the previous chapters and sets out the issues which need to be considered in any comprehensive horizontal merger appraisal and a framework for checking that appraisal.

2 ISSUES RAISED BY HORIZONTAL MERGERS

2.1 The importance and scope of merger control

2.1.1 The importance of merger control

Merger control is important because it can prevent the creation of uncompetitive market structures. Preventative action is better than remedial action since it is often difficult to find remedies which will fully re-create the pre-merger competitive environment. Behavioural remedies imposed after an anti-competitive merger may not be fully able to address the root cause of the problem which is the post-merger structure of the market.

Additionally, effective merger control can deter anti-competitive mergers from forming without the need for detailed scrutiny if the merger control process is sufficiently transparent and predictable. However, by the same token, an overly zealous enforcement policy or one which is unclear or unpredictable could lead to efficient mergers being prevented or deterred.

2.1.2 The scope of UK merger control

Under UK law, a merger qualifies for investigation if it is large enough to meet a test based on the value of the gross assets being acquired (the assets test) or if it results in a merged company supplying more than 25 per cent of a particular description of goods or services (the share of supply test).[1] As a result of this very broad jurisdictional test a wide variety of mergers qualify for investigation. Some mergers qualifying under the assets test will be between firms which have no pre-existing actual or potential commercial relationship as either competitors or as a supplier and customer. These mergers are classified as **diversifying mergers**. Diversifying mergers only threaten the public interest in exceptional circumstances and where they do so it is invariably on grounds other than competition, such as national security.

Mergers between firms undertaking different activities within the same supply chain, often with a relationship as an actual or potential supplier and customer, such as exists between brewers and pub chains, petrol refiners and non-refining petrol wholesalers or car manufacturers and car dealers, can cause competition problems in certain cases. These types of merger are classified as vertical mergers. The conditions necessary for vertical mergers to damage competition are complex and the treatment of vertical mergers needs to be seen in the broader context of the competition policy treatment of vertical relationships generally. A rigorous examination of vertical mergers lies beyond the scope of this research paper.[2] However, concerns may arise over a vertical merger which leads to:

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1 The share of supply test is sometimes called the 'market share test'. However, the description of goods or services over which the firms concerned must have 25 per cent or more of supply need not be an economically well-defined market and the phrase 'market share test' can therefore be somewhat misleading.

2 For a comprehensive discussion of the competition policy issues raised by vertical relationships see Dobson and Waterson (1996). For a discussion of vertical restraints in a retailing context see London Economics (1997). See also Salop and Riordan (1995).

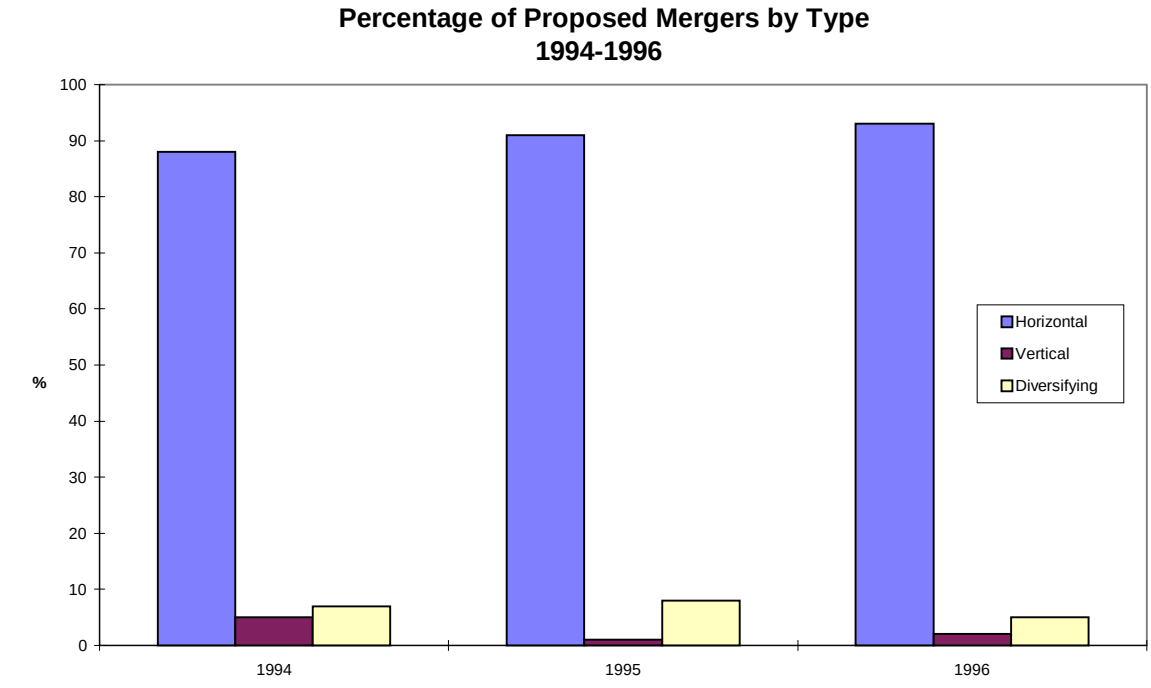
- **foreclosure of the market** - when firms can no longer obtain cost-effective supplies or distribution due to the acquisition of a supplier or distributor by a competitor;

- **collusion** - when vertical mergers lead to firms having greater information about competitors' businesses or can better facilitate the co-ordination of activities between competitors; or

- **avoidance of regulatory constraints** - when firms can avoid regulatory constraints at one level of their activities by shifting capital or revenues into, or out of, unregulated businesses up or downstream of the regulated business.

2.2 Horizontal mergers

The type of merger most likely to raise competition problems, and the type of merger on which this research paper concentrates, is a merger between firms engaged in directly competing activities. These mergers are classified as horizontal mergers. Horizontal mergers account for the overwhelming majority of qualifying mergers. In 1996, 93 per cent of all qualifying mergers were horizontal (97 per cent by value), while diversifying mergers accounted for 5 per cent (2 per cent) and vertical mergers for just 2 per cent (1 per cent). The split for 1994 and 1995 shows a similar pattern.[3]



Source: Annual Report of the DGFT, 1996

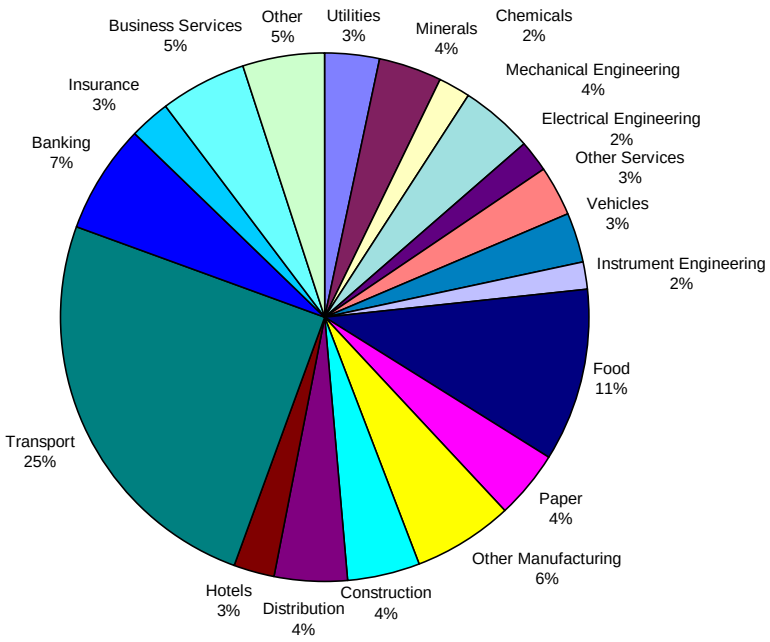
The pattern of mergers referred to the MMC, as opposed to those merely qualifying for investigation, shows a bias towards mergers which qualify under the share of supply test, and,

[3] See the Annual Report of the Director General of Fair Trading, 1996, for a full statistical breakdown of merger activity in the UK in 1996.

consequently, almost certainly have a horizontal component to them.[4] In 1996, 11 of the 14 mergers which were referred to the MMC met the share of supply test, suggesting that only three references had no horizontal dimension. In 1995, eight out of the nine mergers referred met the share of supply test, with just one referred merger meeting the assets test alone.

Moreover, qualifying mergers occur annually in almost all industrial sectors. The sector in which most qualifying horizontal merger activity has taken place over the last few years has been the transport and communications sector which accounted for more than a quarter of all qualifying mergers in 1996. The food, drink and tobacco sector accounted for more than 10 per cent of qualifying mergers in that year. Other sectors in which significant merger activity has taken place in recent years include distribution, mechanical engineering, construction and banking.

Share of Merger Activity by Sector 1996



Source: Annual Report of the DGFT, 1996

As horizontal mergers account for the overwhelming majority of qualifying mergers and a significant majority of referred mergers, and are so widely observed across the economy as a whole, it is important that the dangers to competition posed by such mergers, and the potential benefits they may bring, are clearly understood.

2.3 The anti-competitive effects of horizontal mergers

There are at least two distinct types of concern over the impact of horizontal mergers. These are that:

[4] The only reason a merger qualifying under the share of supply test would not have a horizontal dimension would be if the description of goods and services used for the test was very different to the economic market in which the firms operated.

- they may threaten competition by eliminating the direct competitive constraints which each of the merging parties formerly placed on each other's pricing. A significant constraint is likely to be eliminated if the parties to the merger both enjoyed significant pre-merger market shares or if they were particularly close substitutes for one another. When these conditions are met, the merger may create a firm which is sufficiently large relative to the rest of the market, or its closest substitutes may be sufficiently distant, for it to be able to raise its prices without the fear of substantial volumes of business being lost. These effects are typically referred to as the **unilateral effects** of a merger;

- a merger may threaten competition if it creates an environment in which tacit or explicit collusion between those firms left in the market becomes more likely. This effect is commonly known as the **co-ordinated effect** of a merger; and

- it is sometimes claimed, often by competitors, that a merger will increase the merged firms' ability to engage in **exclusionary practices** to the detriment of competition in the longer term. Fear of exclusionary practices can arguably be considered a variant on the first concern, in which the range of behaviour open to the merged firm is greater following the elimination of the competitive constraint which formerly existed between the parties to the merger.

A merger which created a complete **monopoly** would, other than in exceptional cases, have an adverse effect on competition. However, merger to monopoly can also be regarded as an extreme case of unilateral effects, rather than as a distinct case requiring its own analytical framework, and it fits relatively easily into the more general oligopoly models which have been developed for looking at mergers.

2.3.1 Unilateral effects

The main reason firms do not raise their prices is because they would lose sales if they did so. Many of those sales will be lost because customers who would previously have bought from that firm would buy from their competitors instead. Although the firm which has raised its prices benefits from higher margins on the sales which it retains, it loses the margin it was previously earning on those sales which have migrated to its competitors. A rational profit maximising firm will set its prices at a level at which any further price increase would cost more in lost sales than it would benefit the firm through wider margins on the retained sales.

Specifically, a profit-maximising firm will set its price, p, at the point at which:

$$\frac{(p-c)}{p} = \frac{1}{|\varepsilon|}$$

where c is the marginal cost of producing one more unit of output and ε is its own-price elasticity of demand. The elasticity of demand will, among others things, be determined by the prices charged by competitors. In practice, it is often unclear which costs should be counted as marginal for the purposes of measuring margins. Timing is one important consideration, as costs that are fixed in the short run may not be so in the longer run. A discussion of the issues surrounding the appropriate measurement of costs can be found in, for example, Baker (1997).

Typically, demand for the goods or services offered by the firm becomes more elastic (the absolute value of ε becomes larger), as its prices rise. Eventually, a point is reached at which the elasticity becomes so high that the revenue losses caused by a further rise in price outweigh the revenue gains earned on the retained sales. Intuitively, as prices rise the commercial damage done by the fall in sales caused by that price rise becomes ever larger because the margins being sacrificed on those lost sales are becoming larger. As the price rises, the benefit of further widening margins falls because the base of retained sales on which to earn those wider margins is getting ever smaller.

However, if a firm acquires one of its competitors this calculation changes. Any increase in the price of the products originally under its control will still mean a wider margin on retained sales of those products. However, it is no longer the case that the reduced sales of those products are lost to the firm, since it will recapture some of those lost sales through higher sales of the previously competing products which it now owns. Since some lost sales are recaptured in higher sales of the acquired products, the merged firm has an incentive to raise its prices. Moreover, since this argument is symmetric it also has an incentive to raise the prices of the newly acquired products too, capturing some of those lost sales in higher sales of its original products.

Importantly, these effects do not rely on any collusive response by the firm's remaining competitors. Indeed, the whole point of unilateral effects is that the larger firm which is created has an incentive to raise its prices even if the merger has no effect on the pricing behaviour of competing firms. The price-raising effects of the individual actions of a merged firm are called unilateral effects, in acknowledgement of the absence of the need for any tacit or explicit co-ordination between the merged firm and its remaining rivals in order for prices to rise.

These effects are possible whenever a merger leaves a single firm with a large share of the relevant market and a significant part of that share was added by the merger. The effects tend to be greater when the market is more highly concentrated, to increase with concentration and to be greatest in differentiated product markets when the products of the merging firms are particularly close substitutes. Of course, there are many other factors besides concentration which will determine whether significant unilateral effects are likely following a merger.

As it turns out, under most plausible behavioural assumptions, other firms in the market will also often find it profitable to change their pricing, with the general prediction being that they

will also raise their prices. This is because the higher prices of the merged firm's products will still cause some customers to switch to products belonging to other firms in the market. This increase in demand for their products will encourage them to raise prices as well.

2.3.2 Co-ordinated effects

The second form of competitive harm which might flow from a horizontal merger is the risk that the reduction in the number of firms and the greater market share held by one firm will lead to collusive price increases among all the firms in the market. The collusion may be explicit, in the sense that a formal cartel becomes viable or more robust following the merger. However, it may be that the reduced number of firms will make behaviour more predictable and more transparent. With fewer firms in the market those firms are more likely to realise that they can collectively benefit from ceasing to compete vigorously. Fewer firms and increased concentration may mean that the mechanisms for detecting and punishing those who try to cheat on any tacitly collusive arrangement become more effective and the emergence of a stable collusive arrangement may become more likely.

The increased prices which follow a shift to a more collusive market situation are termed co-ordinated effects since they do not result from the individual actions of the merged firm, but from the realisation among all firms in the market that they are now better placed to come to a tacitly collusive arrangement. Unlike unilateral effects, co-ordinated effects rely on other firms, as well as the merged firm, modifying their behaviour following the merger. As with unilateral effects, the likelihood of there being co-ordinated effects following a horizontal merger will depend on a lot more than the change in concentration. In fact, the conditions for a successful co-ordinated post-merger price rise are similar to the conditions required for a successful cartel, irrespective of whether the feared post-merger collusion is explicit or tacit.

2.3.3 Greater opportunities for exclusionary behaviour

An additional concern which is often raised in connection with horizontal mergers, particularly by competitors, is that the merged entity will be in a stronger position, post-merger, to engage in exclusionary practices. Unlike the unilateral and co-ordinated effects discussed above, these concerns are not about the immediate exploitation of market power in the form of higher prices, but about the ability of the merged firm to engage in actions designed to weaken existing competitors and raise barriers to entry. For example, it might be feared that the merged firm will be better placed to engage in predation, anti-competitive discriminatory pricing, conditional discounting, full-line forcing or refusal to supply.

It is clear that competitors will be more concerned about mergers which genuinely expand the opportunities for exclusionary behaviour than mergers which merely facilitate exploitative behaviour through unilateral or co-ordinated effects. Indeed, unilateral and co-ordinated effects which lead to higher prices would be unambiguously in the interests of competitors. Of course, competitors may have commercial concerns over mergers that reduce their merging rivals' costs, in which case their private incentives to object to a merger may bear little relation to the objectives of competition policy.

2.4 Defences and benefits of horizontal merger

One of the most frequently heard defences of a merger which involves firms with apparently high market shares is that the market is actually wider than it may initially appear and that consequently the increase in concentration is far less than it might have seemed. There are numerous issues surrounding the important analytical step of defining the relevant market for the purposes of merger appraisal. These are extensively set out in US Horizontal Merger Guidelines (1992), NERA (1993) and the European Commission Notice on Market Definition (1997). When discussing market definition and market shares in the remainder of this paper it is assumed that these have been defined and calculated in accordance with the standard methodology.

Market definition arguments aside, horizontal mergers which generate a significant increase in market concentration and consequently raise fears of unilateral or co-ordinated effects may be defended on two grounds. First, it may be argued that concentration measures alone are an inadequate guide to the impact of the merger on competition and that there are other factors which will ensure that the merger is unlikely to lead to reduced competition and higher margins for the merging firms. Second, it may be argued that even if the merged firm can widen margins following the merger, the merger creates other benefits which will offset this, such as cost savings, and these may lead to lower prices, despite wider margins.

2.4.1 Factors that suggest competition and margins will be maintained

In arguing that competition will not be damaged as a result of the increase in concentration, firms will often cite:

- **ease of entry** - entry is so easy that the threat of new entry into the market is sufficient to deter unilateral or co-ordinated price increases;

- **competitor responses** - competitors exist who have the capacity or the ability to acquire the capacity to react to any post-merger price increase with a significant output expansion without a significant cost penalty;

- **buyer power** - buyers are so sophisticated that they can credibly threaten to seek out or even sponsor new entrants should prices be increased;

- **technical change** - technical change is so rapid that concerns, particularly over collusion, which are grounded in static, price-based models of oligopoly behaviour are irrelevant in the highly dynamic context in which the merger is taking place; and

- **a failing firm** - is about to exit the market and the merger merely eliminates a competitor whose competitive influence would have shortly been lost to the market in

any event.

Each of these factors might mean that a merger which leads to a significant increase in concentration neither confers the ability to unilaterally raise prices nor the ability to tacitly collude.[5] Of course, it is important to establish the detailed circumstances under which each of these factors will be likely to counter the competition-damaging effects of a rise in concentration and, equally importantly, to estimate the magnitude of any such countervailing effects.

2.4.2 Factors outweighing a loss of competition and wider margins

A second set of arguments open to firms seeking to defend a merger which significantly raises concentration is to accept that there may be a small reduction in competition as a result of the proposed transaction, and wider margins as a result, but to argue that there are, nonetheless, economic benefits to be gained from the merger. Moreover, it must further be argued that these benefits outweigh the potential loss of competition and that they can only be achieved by the merger. If genuine, these factors will normally form part of the underlying commercial rationale for the merger. One would normally expect these factors to emerge from a discussion of the business case for the transaction and it will often be possible to characterise the merger as a response to some important change in the market or in customer demand.

Commonly, one might hear firms argue that the merger will create:

- **efficiencies** - the merger will allow the firms involved to consolidate production facilities allowing for the exploitation of economies of scale in production, or consolidate head office functions allowing overheads to be spread more thinly;

- **increased purchasing power** - the merger will allow the merged firm to negotiate more aggressively with suppliers, reducing costs which will lead to lower prices despite the small loss of competition in the market concerned;

- **excess capacity** – many, if not all, firms in the industry are failing fully to cover their fixed costs as excess capacity has driven prices below average cost. Such a situation is neither desirable nor tenable and orderly rationalisation through merger is preferable to disorderly rationalisation through unilateral plant closures or market withdrawal; and

- **dynamic efficiency benefits** - the merger is essential if the firms involved are to become strong enough to compete effectively in tomorrow's marketplace, perhaps due to the need to acquire scale economies in escalating research and development expenditure.

[5] If the excess capacity or failing firm arguments are used it may well be conceded that prices will rise after the merger, but, it will be argued, such price rises would have occurred anyway as firms exited or fully depreciated plant was not replaced with new investment.

These factors, if present, might mean that economic and maybe also consumer welfare is enhanced by the merger even if competition is weaker after the merger than before and margins are wider. Again, these arguments cannot be taken at face value and a clear framework must exist for critically appraising these claims in a rigorous and consistent way.[6]

2.5 Welfare and its measurement

Typically, concern over mergers manifests itself as a fear that the merged firm will, either in the short run, or after the elimination of other competitors through exclusionary behaviour, widen margins. However, price-cost margins are not the ultimate object of concern. The objective of competition policy is usually taken to be the protection and promotion of economic welfare, rather than the denial of profit for its own sake. This aim is usually taken by economists to mean the maximisation of the equally weighted sum of consumer surplus and producer surplus.

An individual's consumer surplus is the difference between the amount that he or she would have been willing to pay for a product and the price that was actually paid. Total consumer surplus is simply the sum of each of the individual consumer's surplus. Producer surplus, or economic profit, is the difference between the economic cost of supplying a product and the revenue that its sale generates. This is not necessarily the same as reported accounting profits.

If one regards consumer and producer surplus as being of equal value one would favour policies which seek to maximise total surplus. However, there are two reasons why one may not want to give equal weight to consumer and producer surplus, in all circumstances. This is because:

- if firms use their producer surplus in the unproductive pursuit of a greater share of a fixed stock of profits, rather than in generating new surplus, (a form of behaviour known as 'rent-seeking') then it might be appropriate to discount producer surplus by the amount of rent-seeking which is taking place. Where rent-seeking behaviour is occurring a reduced weight on producer surplus may be objectively justifiable; or

- if a transfer of wealth from shareholders to consumers is felt to be desirable. Unlike issues of economic efficiency, issues of equity are not amenable to objective analysis, although it may be possible to objectively assess whether a given amount of redistribution could be more efficiently achieved through the introduction of a pro-consumer bias in the enforcement of competition policy or through other means, such as increased taxation of dividends.

[6] A consistent basis must also exist for weighing producer and consumer surplus since some of the offsetting gains may be taken in the form of higher profit rather than lower prices.

In practice, competition authorities usually focus primarily on prices and any consequent changes in consumer surplus. The authorities may also be concerned about loss of choice and reductions in product quality.

The oligopoly models and the merger models on which they are based do not explicitly focus on the effects of concentration on total surplus. These models more usually focus on the effect of a merger induced change in concentration on prices or price-cost margins, with the implicit assumption that these are correlated with economic and consumer welfare.

3 OLIGOPOLY THEORY

3.1 Introduction

The range of theoretical models of market behaviour from which to choose a starting point for merger analysis is a wide one. The two most familiar models of market behaviour are those of perfect competition and pure monopoly. The main attraction of these models is that they provide clear-cut predictions about the way firms will behave and the consequences of that behaviour for economic welfare. Unfortunately, few real world markets are characterised either by perfect competition or pure monopoly.

In fact, most markets can be characterised as oligopolies - markets with few firms. Oligopolies have too few firms to be adequately analysed using models of perfect competition, but neither are they monopolies. Unlike firms in perfectly competitive markets, oligopolists know that their actions can materially influence outcomes in the market in which they operate. Unlike monopolists, oligopolists also know that their actions can engender reactions from others which will have a consequent impact on their own business environment. It is the need to consider one's own actions and the reactions of others which sets oligopoly apart from the simpler models of firm behaviour. However, modelling this strategic interaction is complex. This complexity is evident even in the act of defining the relevant market. In any oligopolistic market the set of products under consideration may be very different from one another. This can be contrasted with the homogeneous products produced in perfectly competitive markets or the unique product of the monopolist. Where to draw the boundary of the market under such circumstances is rarely clear.

Furthermore, one cannot simply regard oligopoly as a half-way house on the road from competition to monopoly. It is not the case that as one moves from perfect competition to monopoly so competition deteriorates in a simple linear fashion. It may be that some markets can move significantly from the perfectly competitive ideal before competition suffers in any perceptible way, but that it does so quite rapidly once a certain threshold is passed. Conversely, it is theoretically possible for the outcomes of perfectly competitive markets to be seen in markets in which there are just two firms.[7]

An understanding of the consequences of horizontal mergers must therefore rely on the less neat, but hopefully more realistic oligopoly models of market behaviour. The strength of the oligopoly models is that they acknowledge that firms have some flexibility in the way they operate, but that those firms will also appreciate that their actions will influence their competitive environment by provoking strategic reactions from their rivals.

[7] Indeed, contestable markets theory suggests that competitive outcomes may be found even if there is just one firm in the market. This is because incumbents are constrained to keep prices at the competitive level for fear of 'hit-and-run' entry by potential entrants. See Baumol, Panzar and Willig (1982).

3.2 Homogeneous goods oligopoly models

The most basic model of oligopoly was developed by Cournot (1838). In the standard Cournot framework each firm produces a single homogeneous product. Since the goods are homogeneous there is only one price. The essential feature of the Cournot model is that the firms in the industry make choices about what quantity to supply. Once each firm has decided how much to supply the market will find a price that ensures that the aggregate quantity produced will be sold.

Equilibrium exists in this model when every firm is producing the level of output which maximises its profits given the output levels of all the other firms.[8] This is an equilibrium because A will not change its output unless B or C change their outputs, but B will not change unless A or C do, and C will not change unless A or B do. Consequently, once this equilibrium is established no individual firm has an incentive unilaterally to deviate from it, since each is doing as well as it can given the behaviour of the others.

In Cournot equilibrium, the price-cost mark-up of any firm, i, is given by:

$$\frac{\left(p - c^i\right)}{p} = \frac{s^i}{|\varepsilon|}$$

where the market price, p, is given by, p=p(Q), where Q is the aggregate output of all firms in the industry, c^i is the marginal cost of firm i, s^i is its market share and $|\varepsilon|$ is the market elasticity of demand.

Under Cournot equilibrium firms with the lowest marginal costs have the highest market shares, the biggest mark-ups and are consequently the most profitable. Less efficient firms, with higher marginal costs, can survive in a Cournot equilibrium, but have smaller mark-ups and smaller market shares.[9]

From the basic Cournot equation, it is possible to derive a link between the share weighted price-cost mark-up across all firms in an industry and the Herfindahl index, H, which is defined as the sum of the squared market shares of all firms in the industry.

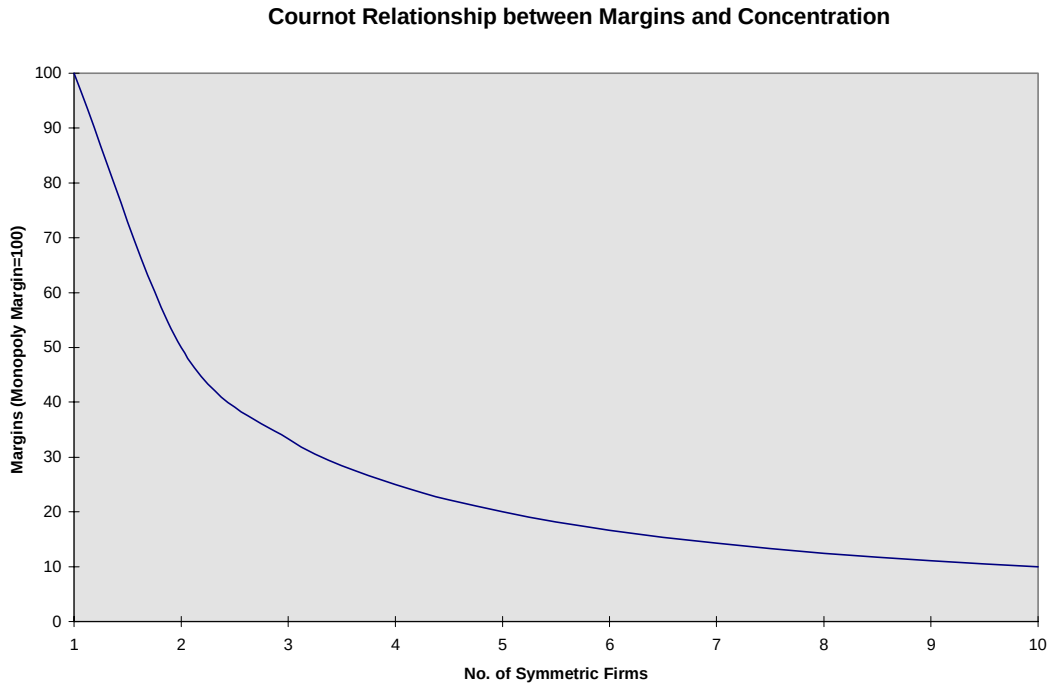
$$\frac{\left(p - \sum_i c^i s^i\right)}{p} = \frac{H}{|\varepsilon|}$$

This basic Cournot result thus provides the first theoretical link between market concentration and higher average margins. Under Cournot assumptions, as market concentration rises, as

[8] This equilibrium is a Nash equilibrium. Like all such equilibria it is self-enforcing since no firm has an incentive to change its behaviour if no-one else does.

[9] This link between size and efficiency is important because some authors, such as Farrell and Shapiro (1990), have suggested that significant positive welfare effects can flow from the reallocation of output from two small inefficient firms to their larger more efficient competitors, following a merger between the two small firms.

measured by the Herfindahl index, so prices rise, for a given level of costs. Hence the Cournot model provides a neat relationship between concentration and margins. The figure below charts this relationship, showing how the Cournot-predicted price-cost margin falls relative to the monopoly level as the number of symmetric firms in the industry rises.



The key features of the Cournot equilibrium are that:

- any Cournot equilibrium will generate prices which exceed marginal cost since all positive levels of market concentration will mean that margins must be positive and that consequently prices must be greater than costs. All Cournot equilibria are consequently socially sub-optimal because output is lower than it would be under perfect competition. However, as the number of firms in the industry rises the Cournot equilibrium approaches the maximisation of total welfare;[10]

- in a Cournot framework, any output reduction by one firm will cause other firms to increase their own output partially to replace the lost output. The initial output contraction will raise the market clearing price, widening the margins available to all other firms in the market. However, the prospect of higher margins stimulates them to try to increase their share of the market by selling more. Thus, the ultimate price rise engendered by a single firm's output contraction is lower than would be generated if it were not for the output responses of its competitors; and

[10] Bergstrom and Varian (1985) show that although the Cournot equilibrium maximises neither social welfare nor profits, it does maximise a weighted sum of consumer surplus and profit. As the number of firms in the industry rises, the weightings become more equal, which is why the Cournot equilibrium approaches the maximisation of total welfare as firm numbers rise.

- the mark-ups for all firms are lower the higher is the market elasticity of demand. This is intuitively appealing since it is clear that the monopoly mark-up is lower the more elastic is overall market demand, and it is equally clear that the Cournot mark-ups must always be less than the monopoly mark-up. The logical consequence of Cournot mark-ups being less than the equivalent monopoly mark-up is that total industry profits are not maximised, as they would be under pure monopoly or perfect collusion. This is an important result and one which has prompted some criticism of the basic Cournot formulation.

Both Chamberlin (1950) and Stigler (1964) are critical of the inherently static approach embodied in the Cournot equilibrium. They argue that the phenomenon under investigation (strategic interaction between a limited number of competitors) is, by its very nature, dynamic. Stigler, in particular, argues that since all firms can do better than the Cournot outcome (as total profits are not maximised), over time, firms will come to appreciate their mutual benefit in ceasing to behave in a Cournot fashion and more profitable, tacitly collusive strategies will emerge. Although Kreps and Scheinkman (1983) have shown that in certain circumstances the static Cournot results may be of more general application, the naïve approach to firm interaction embodied in the Cournot model is a serious problem.[11] Nonetheless, it remains one of the key oligopoly models and has served as the basis for the modelling of mergers for a number of authors.

3.3 Differentiated goods oligopoly models

Bertrand (1883) criticises the Cournot framework on different grounds. He observed that if price is the choice variable in Cournot's oligopoly setting, rather than quantity, prices will converge to marginal cost with just two firms in the industry. This is because at all prices above marginal cost, each firm will always gain by slightly undercutting the last period price of its rival and supplying the whole market. However, this rapidly leads to marginal cost pricing. If firms have different, but constant, marginal costs of production then the entire market will be served by the most efficient firm at a price which is just below the marginal cost of the second most efficient firm.[12] Bertrand competition (ie price-setting) with homogeneous goods may have no equilibrium if there are increasing returns to scale, since marginal cost prices may be below average costs, implying losses at those prices.

The non-existence of equilibrium with Bertrand behaviour in a homogeneous goods setting can apply equally well to products which are imperfect, but close substitutes. However, as the products become more differentiated, so the likelihood of there being a Bertrand equilibrium increases. With product differentiation, firms are able to adjust prices without

[11] In addition to the unconvincing nature of the Cournot equilibrium, the mechanism by which firms are supposed to arrive at the equilibrium is - as described by Cournot - based on expectations about rivals behaviour which is not even adaptive, let alone rational.

[12] Or at the monopoly price, if the marginal cost of the most efficient firm is considerably lower than that of its rival.

losing the entire market. This makes possible equilibria in which prices do not rapidly collapse to marginal cost.

There are few general statements that can be made about Bertrand equilibrium with differentiated products, since the outcomes are sensitive to the demand system used. However, it is generally true that for a given set of demand and cost conditions, the outcomes of price-setting models (ie Bertrand models) are more competitive than quantity-setting models (ie Cournot models).

The specific characteristics of Bertrand models under different assumptions about the demand system used are explored in the context of the models of differentiated product mergers examined in Chapter 4. However, the out-of-equilibrium adjustment mechanisms in the Bertrand specification are as unconvincing as they are in the quantity-setting model of Cournot.

3.4 Co-operative oligopoly models

3.4.1 Co-operative oligopoly

Stigler (1964) provides a very different model of oligopoly to those developed by Cournot and Bertrand, based on the strong incentive which firms in oligopolistic markets have to collude to raise aggregate profits.

This model views profit-maximising oligopolists as being unlikely to accept a non-collusive equilibrium, in which aggregate profits are not maximised, when a more profitable alternative exists. Thus, there will always be an incentive to adopt explicitly or tacitly collusive outcomes which mimic the monopoly outcome, at least to some degree, and generate higher profits than are available from non-collusive behaviour.

However, there are private gains to each firm from cheating on the co-operative outcome. Stigler's model analyses the incentives to cheat under a variety of assumptions about the number of rivals, the number of buyers, the exogenous probabilities of existing customers switching supplier and the rate of arrival of new customers.

It concludes that concentrated markets are more likely to suffer co-operative outcomes than unconcentrated ones as cheating is more easily spotted and, consequently, the incentives to cheat are lower. First, cheating by a small firm is less likely to be noticed than cheating by a large firm, as a small volume of diverted sales is more likely to be attributed to random fluctuations in demand than is a large volume of diverted sales. Secondly, since it is aberrant movements in their own sales which tip off the non-cheating firms, the greater the proportion of sales accounted for by any one non-cheating firm, the more likely they are to spot cheating. In other words large firms make better policemen than small ones as they have more of the

sales and hence have more information about changes to sales patterns, from which cheating can be deduced.[13]

However, the easier detection of cheating is not the only reason why co-operative forms of behaviour are only typically found in concentrated markets with a small number of competitors. Selten (1973) sets up a model in which it is possible for firms either to be cartel members or fringe competitors. The competitive fringe competes in a Cournot fashion, while those in the cartel collude. In this situation there must be both internal and external stability for the cartel to work. Internal stability requires that given the number of firms in the cartel and the number of firms in the fringe the cartel members are better off in the cartel than in the fringe. External stability symmetrically requires that members of the fringe be better off outside the cartel than in it.

Using linear demand and cost functions and assuming perfect and complete information, Selten shows that with four firms or less a complete cartel will always be formed.[14] However, as the number of firms rises, joining the fringe becomes relatively more attractive. This is because the members of the cartel behave as one player and the output of the cartel does not depend on the number of firms in it. Thus, the higher the number of firms in the cartel the lower the profit of each participant and the greater the attraction of competing on the fringe. As Phlips (1995) points out, this is a very different point from the one which says that more competitors make it harder to enforce the agreement. In the Selten model there is no cheating since the cartels are Nash equilibria with perfect and complete information.

In Selten's equilibrium a partial cartel will exist with some firms in the cartel and others outside. Specifically, within the framework used by Selten, there will be four cartel members with five or six symmetric firms in the industry, five members with seven or eight symmetric firms and six members with nine or ten symmetric firms. Finally, Selten calculates the probability that a firm takes part in a partial or complete cartel. Due to symmetry this probability is the same for all firms. Using the derived probabilities Selten is able to derive the probability of a complete or partial cartel actually being formed. For four firms or fewer the probability is 100 per cent, for five firms it is 22 per cent, but for six firms it is only 1 per cent. This suggests that with six firms or more, even if a partial cartel is an equilibrium, the chances of a cartel actually forming are extremely low.

A high degree of concentration among sellers is not the only factor relevant to an assessment of whether a market is ripe for co-operative behaviour or not. Posner (1976) lists a number of additional factors which may influence the viability of explicitly or tacitly collusive arrangements between firms in a market, other than concentration. The most important of these are:

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13 Of course, the sharing of sales information by many firms may be just as good as one large firm having the same information, but such information pooling arrangements may not always be practical or legal.

14 Selten's result that a complete cartel arises in equilibria only if there are four firms or less has also been obtained by Martin (1993) who extends the analysis to repeated games and by Shaffer (1995) who derives conditions under which the behaviour of the fringe and the cartel emerges endogenously.

- **an unconcentrated buying-side** - the less concentrated are the buyers, the easier it is to detect cheating and the more likely is the co-operative outcome;

- **competition is mainly on price** - if the non-price aspects are important, even fixing prices may not prevent firms competing on non-price dimensions;

- **firms are unintegrated** - if some firms are vertically integrated while others are not, transparency is hindered since a judgement on whether the internal transfer price is too low (ie whether cheating is taking place) must be made based on the visible, final price;

- **demand is static** - if demand is growing rapidly it will be difficult to spot cheating among the rapidly expanding sales and the shifting boundaries of the total market size will generate opportunities for entrants and incentives for individualistic behaviour by existing firms;

- **product differentiation and customisation is limited** - if products are very different it may be impossible to settle on a fair schedule of prices to be adopted for the different types of product. Customisation also makes it harder to maintain co-operative arrangements since every order could represent the creation of a new product whose place in the fixed schedule of prices is unclear; and

- **firms are similarly sized with similar costs** - if firms are of a very different size and, particularly, if they have very different cost structures, they may face different incentives to expand output at the margin, lessening the probability of a collusive equilibrium.

Williamson (1975) argues that these criteria are, generally, tough ones to meet and that consequently it is unrealistic to characterise all, or even most, oligopolistic markets as being ripe for co-operation of an explicit or tacit nature. Product homogeneity is cited as being of particular importance to an effective co-operative arrangement, as are symmetry in cost structures between firms and similarity in sizes. He argues that in the absence of these conditions, co-operative behaviour, and tacitly collusive behaviour in particular, is unlikely to come about. He notes:

> Except, therefore, in highly concentrated industries producing homogeneous products, with non-trivial barriers to entry, and at a mature stage of development, oligopolistic interdependence is unlikely to pose antitrust issues for which dissolution is an appropriate remedy. In the usual oligopoly situation, efforts to achieve collusion are unlikely to be successful or, if they are, will require sufficient explicit communication that normal remedies against price fixing, including injunctions not to collude, will suffice.

3.4.2 Co-operative game-theoretic models of interaction

A series of game theoretic models of co-operative oligopoly behaviour, mostly developed during the 1980s, supports the basic conclusion that firms interested in future as well as current profits may well not behave in a simple Cournot or Bertrand fashion, but will seek to adopt strategies which are more profitable.

As previously noted, the only possible one-off equilibrium for two suppliers of a homogeneous product competing with each other in price (ie Bertrand) is for each to set a price that is equal to marginal cost. However, while this is true in a situation where the firms compete once only, it need not be the case if the firms compete repeatedly with each other.

For example, it can be shown that if a sufficiently high valuation is placed on future profits, an equilibrium can exist in which all firms adopt a strategy of charging the monopoly price if its rivals charged the monopoly price last period but revert to non-co-operative behaviour in all future periods if a rival charges a price below the monopoly level (see Appendix 1).

In this example, co-operation or collusion between firms is held together by the threat of punishment to those who transgress. Both firms abide by the collusive agreement, because each does better than if cut-throat competition ensues. The closer prices are to monopoly levels, the greater the weight which must be placed on future profits if the tacit collusion is to survive, as the short run gains from cheating increase with prices more rapidly than does the difference between co-operative and competitive profits. Equally, the closer co-operative prices are to competitive levels, the smaller is the value placed on future profits which is necessary to sustain the collusion.

The rate at which firms discount future profits will depend on a number of factors, described in Porter (1985). Typically, the longer the reaction lag, the longer the relevant time period, and so the more future profits are discounted. This is intuitively appealing as the longer it is possible to reap the benefits of cheating before rivals react the more likely it is that cheating will take place. Firms will also discount the future according to their expectations of the duration of the game. If firms think that the current market conditions are only likely to prevail for a limited period they are more likely to cheat. This again accords with one's intuition of tacit collusion being more prevalent in stable markets where the game is constantly repeated in a similar format. Conversely, tacit collusion seems highly unlikely to occur in dynamic markets in which the nature of the game being played may change radically from one period to the next.

Although the equilibrium described above is one of many equilibrium strategies in such a situation, Kreps' (1991) 'focal point' theory argues that despite there being a multiplicity of equilibria, there are many situations where players know which equilibria to choose on the basis of relevant past experience and a sense of how individuals act generally. Tirole (1989) has argued that collusive agreements between firms seem to fit this category since they can

result from simple strategies and lead to outcomes that are jointly profit-maximising for the firms involved.

There are many other game theoretic models of dynamic oligopoly that enrich the simple model outlined here. For example, Green and Porter (1984) study collusion in situations where cheating cannot be detected perfectly. In this setting, there is an exogenous source of demand uncertainty, so that sales are a random function of prices. In this situation, firms are faced with an inference problem. For any firm, lower sales than anticipated could be the result of cheating by a competitor or an adverse demand shock. Consequently, price wars, triggered by large deviations of actual from anticipated sales, may be caused either by cheating or by an atypical demand pattern.

In order to analyse the effect of this uncertainty, Green and Porter develop a game-theoretical model to make predictions about the incidence and duration of price wars, where the price wars are viewed as an enforcement device to maintain an explicitly or tacitly collusive agreement in an uncertain environment. Far from interpreting periodic price wars as a sign that cartel behaviour is unstable, Green and Porter (1984) argue that periodic reversion to Cournot behaviour may be a characteristic of stable collusive behaviour.

Their paper also makes several predictions about the incentives that firms have to collude in an uncertain environment. These are that:

- in equilibrium, the incentive structure is designed to guarantee that firms do not deviate from agreed-upon prices in collusive periods, but that price wars will still occur, as random demand shocks will occasionally induce large discrepancies between anticipated and actual sales;

- industry profits are maximised, when there is demand uncertainty, at price levels between the competitive and the monopoly levels, as setting prices at monopoly levels provides too great an incentive to cheat and requires costly punishment regimes. The greater the number of symmetric firms the closer the co-operative price is to competitive levels;[15] and

- the greater the level of demand uncertainty, the closer the co-operative price is to competitive levels. This is because high levels of demand uncertainty increase the frequency of price wars. The costs of these price wars can be reduced by decreasing their duration. But, in turn, this reduces the cost to any individual firm of cheating.

[15] This is because the gains from cheating increase as prices increase towards monopoly levels. In addition, the presence of large numbers of firms increases the benefits to any one firm of cheating. Therefore, in order for cheating to be deterred (so that the cartel is stable) the cost of cheating must also rise when prices rise. But, in the presence of demand uncertainty, these costs are also incurred through atypical demand patterns. Therefore, in order to maximise industry profits, a balance must be struck between the co-operative price level and the punishment that will be incurred when demand patterns dictate that this is needed to deter cheating. Hence collusive prices will generally lie between the competitive price level and the monopoly price level. Large numbers of firms will, ceteris paribus, cause the equilibrium price to be closer to the competitive level.

Consequently, the cartel is only stable if the benefits from cheating are reduced by setting the collusive price at a lower level.

Porter (1984 and 1985) tests these theoretical predictions using data on the behaviour of the US Joint Executive Committee (JEC) railroad cartel between 1880 and 1886. This cartel satisfied the assumption of a homogeneous good and took the form of market share allotments. Total demand was quite variable and the actual market share of any particular firm depended on both the prices charged by all the firms and unpredictable market forces. Porter finds that the operation of the JEC conforms with the theoretical models of Stigler (1964) and Green and Porter (1984). In particular, he finds that as the number of active firms increased from four to five, collusion became more difficult to enforce. He also found that, when the average duration of price wars decreased, there was a dramatic increase in the frequency of their incidence.

The failure to reach perfectly collusive outcomes has also been explained in the literature as a consequence of incomplete information, as opposed to the imperfect information problems found in Green and Porter (1984). Incomplete information problems arise when firms have private information about their profit functions but do not know some or all of the equivalent information about their rivals. For example, each firm knows its own costs of production but does not know its rivals' costs. Such problems have been studied by Roberts (1985), Kihlstrom and Vives (1989) and Cramton and Palfrey (1990). Cramton and Palfrey (1990) show that only if the industry is sufficiently concentrated is it possible to construct a cartel contract which is both incentive compatible (ie induces firms to reveal true information about, for example, costs) and individually rational (ie gives an incentive to all firms to take part in the cartel agreement). Indeed, as with Selten (1973), Cramton and Palfrey (1990) find in their specification that the monopoly outcome can only be sustained with four firms or fewer in the market.

Overall, the conclusions from the analysis of formal and informal collusive agreements can be summarised as follows:

- collusion is most likely with a high degree of concentration
  - because cheating is more easily spotted with few firms;
  - because being part of a competitive fringe which competes with the cartel becomes more attractive the more firms are in the cartel; and
  - because it may not be possible to construct a cartel agreement which induces the truthful revelation of necessary information by cartel members if there are too many in the cartel;
- for collusion to be an equilibrium, it is essential that each firm has a stake in the future (ie they are motivated by a concern over future profits as well as current profits);

- it is necessary in any collusive arrangement that each side is able to monitor the actions of others since secret price cutting must be detectable, even if only imperfectly, for retaliation to be possible; and

- collusive schemes work best when there are fewer noisy variables (eg demand patterns are predictable). As a result we would expect greater levels of collusion in industries where institutions allow for precise monitoring of rivals or in mature industries characterised by low demand variability.

3.4.3 Collusion in a differentiated products market

However, Levy and Reitzes (1992) do not endorse the view that homogeneity is a key feature of stable collusive arrangements. Instead, they argue that differentiated markets may equally well suffer from effective collusion, and that this may be facilitated by merger, if non-neighbouring firms closest to a would-be cheater (in product space) merge, to enable them to monitor more effectively the actions of the potential maverick firm. Merger between such firms also allows them to share the cost of punishing the cheating firm, so eliminating a free-rider based impediment to the enforcement of the collusive agreement.

3.5 Concentration and welfare in oligopoly

3.5.1 Prices and output under different models

In the classic Cournot model, in which a small number of firms produce a homogeneous product, there is only ever one price in the market. The average price-cost mark-up within such an industry is determined by the degree of market concentration, as measured by the HHI, and the market-wide elasticity faced by the producers as a whole. In the absence of new entry or the threat of it, an increase in concentration will smoothly translate into higher price-cost margins through the incentive which the larger merged firm has to withdraw output and drive up the market price.

Equally, a homogeneous goods market characterised by collusive behaviour might also see a widening in price-cost margins if the reduced numbers of players following a merger made collusion stable at prices which were closer to the monopoly level than those that had previously prevailed. While this would also suggest a smooth relationship between concentration and mark-ups, it is also possible that a point may exist in the structure of the market at which behaviour shifts from a non-co-operative form to a collusive form, causing a discontinuity in the relationship between concentration and mark-ups. This would be the case, for example, in Selten (1973) when a shift from six firms to four changes the probability of a cartel forming from 1 per cent to 100 per cent.

In Bertrand settings, with differentiated products, it is far harder to make predictions about the way in which prices and price-cost mark-ups are linked to concentration. Other than in very special circumstances, it is not possible to conclude that concentration increases will lead

uniformly to an increase in price-cost margins because concentration alone does not provide a reliable indicator of the extent of the competitive constraints which particular products place on one another. Moreover, in the differentiated product setting, there are numerous prices and price cost mark-ups, which will almost certainly not be symmetrically affected by a change in concentration.

It is worth remembering that many markets which would normally be characterised as competitive will have positive price-cost margins. Consequently, it is not the existence of positive pre-merger price-cost mark-ups which should lead the authorities to view a merger with suspicion, rather it is the expectation of a widening of those which is indicative of a merger which has diminished competition.

4 ECONOMIC ANALYSIS OF MERGERS IN OLIGOPOLISTIC MARKETS

4.1 Introduction

Mergers lead to structural change in a market. The equilibrium which emerges following a merger is likely to be different to that which prevailed before the merger. The purpose of merger control is to assess the nature of the likely post-merger equilibrium and to make a welfare comparison between that expected outcome and the known pre-merger situation.

In making such a comparison, the main variable of interest is likely to be the level of post-merger prices compared to pre-merger prices. In arriving at an assessment of the post-merger prices, it is likely to be useful to undertake a series of distinct analytical steps. The first step is to choose between the applicability of the co-ordinated effects or the unilateral effects concerns. Does the proposed merger raise fears of collusive behaviour after the merger, or is the danger that the merged group will act to restrict output or raise prices by virtue of the elimination of a previously binding competitive constraint?

Having identified the potential cause for concern, it will then be necessary to assess the validity of that concern against the market evidence. This involves answering three questions. These are:

- would prices be expected to rise significantly if there were no cost savings from the merger and there were to be no new entry or product repositioning by rivals?

- will entry or product repositioning, including that engendered by the exercise of buyer power, thwart any attempt to raise prices?

- what is the likely impact of the merger on costs?

Cost savings are important because they may mean that post-merger prices fall even if price-cost margins have widened due to diminished competition. Second, even if the cost savings are insufficient to wholly offset any price increase, the savings are themselves a source of improved welfare. In those situations in which the cost savings lead to a price fall, both producers and consumers are likely to benefit. However, it is possible that a merger which created efficiency gains but reduced competition might lead to lower costs and higher prices which in turn led to lower consumer surplus but higher producer surplus.

These issues are discussed in more detailed in the sections that follow.

4.2 The unilateral effects and co-ordinated effects distinction

As noted in Chapter 2, the changes to economic welfare caused by an increase in concentration which materially changes the optimal behaviour of the merging firms are

termed the **unilateral effects** of the merger. They are unilateral because the merged firm's behaviour is no longer optimal given its greater share of the market post-merger and it will therefore unilaterally seek to adjust its output or price. Although others will follow by making adjustments of their own, the merged firm has an incentive to initiate a reduction in output or increase in price whether it believes others will react or not.

However, concentration changes may not only have a direct impact on market outcomes through the unilateral effects described above, but they may also have an indirect impact on the market by changing the nature of the prevailing equilibrium. In other words, rather than causing a shift to a different Cournot or Bertrand equilibrium, at higher prices, the merger may mean that firms abandon non-co-operative behaviour (Cournot and Bertrand) altogether in favour of a more collusive mode of conduct. In addition, if the market is already collusive, increased concentration might mean that the price level which can be sustained through such collusion rises. Dansby and Willig (1979) and Ordover, Sykes and Willig (1982) develop models in which the indirect effect of concentration on the mode of competition may be a more significant factor than the direct effects of concentration.

The effects of concentration on the ability to collude or the success of such collusion are often termed the **co-ordinated effects**, since they do not follow from the unilateral incentive on the merged firm to adjust its behaviour after the merger, but from the realisation among several firms in the market that it may be more profitable collectively to refrain from competing in a particular way.

Scherer (1991) argues that merger policy should remain focused on identifying those mergers which are likely to lead to a shift from non-co-operative behaviour to a more collusive mode of conduct (co-ordinated effects). This view is based on the unrealistic nature of the assumptions underlying the Cournot and Bertrand-based non-collusive models and the sensitivity of the predictions of those models to minor changes in those assumptions. Specifically, he notes:

> For a well-informed merger policy, it would be more important, I believe, to have a good insight into the market structural point at which behaviour changes from non-co-operative to co-operative than to spin ever more refined theories about the small or ambiguous difference made by marginal changes in structure within the non-co-operative realm.

However, despite the existence of those who believe that the non-co-operative models have little to offer public policy, many authors have developed non-co-operative models in both homogeneous goods and differentiated product settings. Salop (1991) endorses the pursuit of a more rigorous approach to the analysis of unilateral effects and, in stark contrast to Scherer's view, Werden and Froeb (1996) conclude that:

> In differentiated product industries, we consider co-ordinated effects (co-operative) to be of much less importance than unilateral effects (non-co-operative).

The 1984 US merger guidelines focused almost exclusively on these co-ordinated effects, while unilateral effects were largely ignored. However, the most recently revised US merger guidelines, published in 1992, reflect concerns over both unilateral and co-ordinated effects. Hay and Werden (1993), summarising the implications for US merger policy of recent economic thinking, regard the 1992 guidelines as paying 'roughly equal attention to collusion models (co-ordinated effects) and the Bertrand model for differentiated products (based on unilateral effects)'.[16]

The difference in opinion between those who believe that merger policy should be mainly concerned with the increased risk of collusion and those who believe that it should be mainly concerned with damaging changes to the non-co-operative equilibrium suggests that both effects should properly be considered in any comprehensive merger appraisal.[17] In any specific case, the choice of whether to analyse the market for co-ordinated effects or unilateral effects will require a preliminary analysis of the nature of the industry in which the merger is taking place. Where the product is a relatively homogeneous commodity, allowing suppliers limited freedom over pricing, the main concern may be a fear of co-ordinated behaviour. Conversely, where the products are highly differentiated, either because they offer the consumer fundamentally different product characteristics (eg travel by train or travel by coach) or because of strong branding, then the main focus will usually be on unilateral effects.

4.3 Homogeneous goods merger models

There have been a number of merger models built around the Cournot model of oligopoly interaction. All of these models make strong assumptions about the underlying cost structure of the industry and the nature of competition between the firms. However, they provide a conceptual link between increases in concentration and worsening unilateral effects. They also provide an indication of the factors that might counteract the worst of those unilateral effects.

4.3.1 The basic Cournot analyses

Salant, Switzer and Reynolds (1983) develop a Cournot-based model that involves symmetric oligopolists with constant marginal costs of production. In this setting, the non-merging firms all have an incentive to expand their output to almost fully replace the withdrawn output of the merging parties, and this renders the merger unprofitable for the parties to the merger whenever it falls short of full monopoly.

As Jacquemin and Slade (1989) argue, this unintuitive result obtains because there is nothing to distinguish the merged firm from the remaining unmerged firms. In the new symmetric equilibrium, all firms produce 1/(n-1) of the industry output compared to 1/n before the merger. Since the merger achieves nothing other than the elimination of a firm, it is

16 For a discussion of the different emphasis of merger policy in the EC and US, see Hawk and Huser (1996).

17 This is the approach taken in the 1992 revision of the US Merger Guidelines.

unsurprising that the small profit gain for the merged firm compared to that being earned pre-merger by one of the merging firms is insufficient to outweigh the loss of the entire pre-merger profit of the eliminated firm. The strict assumptions of the Salant, Switzer and Reynolds model severely limit its usefulness for policy purposes and its counter-intuitive results have led others to develop a more general and realistic set of models.

One typically expects the merged firm to be rather different to its non-merged rivals, even after they have adjusted their outputs in response to the merger, and Perry and Porter (1985) create a model in which this is true. They show that the Salant, Switzer and Reynolds (1983) result does not carry across to the case of firms with rising marginal costs of production. Rising marginal costs in this model follow from the assumption that there is a fixed quantity of assets in the industry and that a greater share of those assets falls under the control of a single firm post-merger. Rising marginal cost dampens the output response of the non-parties to the merger and so prevents them from replacing as much of the withdrawn output as is the case in the Salant, Switzer and Reynolds (1983) specification.

Farrell and Shapiro (1990) also develop a model in which the restrictive assumptions of symmetric firms with constant costs are relaxed. They analyse horizontal mergers in Cournot oligopoly and find that the post-merger reallocation of output from the merged to the non-merged firms is an important factor in determining the overall welfare effects of mergers in these settings.

Their main analysis shows that in the absence of synergies, horizontal mergers in Cournot markets always raise price. In the sense in which they use the term, a simple reallocation of output from a high marginal cost plant to a low cost plant does not represent a synergy; only actions which expand the joint production possibilities of the merged firm count as synergy (eg economies of scale or learning effects). Moreover, they demonstrate that very significant synergies are needed to offset or reverse the price rises which would otherwise result. Consequently, a merger policy that cared only for consumer welfare would have a strong presumption against all mergers in homogeneous goods markets, with the onus of proving substantial synergy lying with the proponents of the merger.

However, despite the finding that all mergers without synergy raise prices they go on to show that in terms of overall welfare many might nonetheless be beneficial as a result of the output expansion by the non-merging firms which the merged firm's output contraction is likely to stimulate. This non-merged firm output expansion is desirable for two reasons. First, it mitigates the aggregate output contraction in the market as a whole, limiting the impact on price and so reducing the damage to consumers (although this effect will never fully offset the output contraction). Second, in a Cournot world, high market share reflects low marginal costs. If the merger leads to a significant shift of production from small (ie high cost) firms to large (ie low cost) firms, efficiency may be improved despite the higher price faced by consumers. Thus, the greater is the non-merged firms' output responsiveness the more likely it is that welfare is improved by the merger, so long as the output reallocation is from small to large firms.

Farrell and Shapiro (1990) show their results to be a consistent generalisation of the special cases explored by Salant, Switzer and Reynolds (1983) and Perry and Porter (1985). In addition, they claim that the linear demand and quadratic cost function used by Perry and Porter (1985) creates the result that mergers involving small (ie high cost) firms are particularly likely to be beneficial. Moreover, this conclusion is strengthened the more concentrated is the non-merging part of the market. This counter-intuitive result flows from the larger output responses which large non-merging firms make under this specification. Of course, since large is synonymous with low cost, it is output responses from large firms which are particularly desirable.

Willig (1991) accepts the logic that output expansions by large firms are superior to an equal sized expansion by a small firm, due to the higher marginal costs of the latter. However, he doubts whether large firms have as great an incentive to expand as smaller non-parties. Generally, he shows that for a given total share of the non-parties, their response to an output contraction by the parties is likely to be more elastic, the greater is the number of non-parties involved (ie the less concentrated is the non-merging part of the market). In addition, he finds that the incentive to expand to replace withdrawn output is greatest when the cost penalty to doing so is low; that is, the non-parties (of whatever size) will more readily expand to replace the withdrawn output of the parties if their marginal cost curve rises only gradually.

Thus, the overall output contraction and price rise caused by a merger will be smallest where the non-parties are unconcentrated. However, for any given level of output it is preferable to have that output produced by large, low cost firms, rather than small, high costs firms. The ultimate impact on prices will depend crucially on assumptions about costs and supply-side elasticity.

4.3.2 An extended Cournot model

Willig (1991) develops a very simple model of a market for a homogeneous good, based closely on Cournot, to justify the US merger guidelines' extensive reliance on concentration and concentration changes in assessing the impact of mergers.

Equilibrium in this simple model is characterised by:

$$\frac{(p-c)}{p} = \frac{H\beta}{|\varepsilon|}$$

Willig's simple innovation is to introduce into the Cournot framework an additional parameter, β, which reflects the mode of competition. The mode of competition parameter, β, can range from zero under perfect competition, implying that price equals marginal cost, to 1/H for a perfect cartel, giving the standard result that the price-cost mark-up is the inverse of the elasticity of market demand. On the other hand, Cournot behaviour is represented by β=1, which gives, as noted earlier, a positive mark-up which increases with the degree of

concentration, H, but which is lower, for market structures short of monopoly, than that which would be seen in a perfectly cartelised or fully monopolised industry.

The price-cost mark-up is dependent on the degree of concentration, H, the mode of competition, β, and the market elasticity of demand, ε.

In the absence of efficiencies, dynamic effects, and ruling out the possibility of entry, this would suggest that the change in welfare associated with a merger would depend upon the initial level of, and the change in, H and β, and the elasticity of demand, ε. However, Willig shows that if the market has been defined using the SSNIP test or, as it is sometimes known, the '5 per cent test', then it is known that the price set by a hypothetical monopolist in the market would be (at least) 5 per cent higher than the prevailing pre-merger price.[18]

Using these known relationships it is possible to show that for a market defined using the SSNIP test, and with efficiencies and entry ruled out by assumption, the change in welfare is determined exclusively by the pre- and post-merger values of H and β. In effect, the act of defining the market allows the market elasticity to be dropped from consideration.

The simple model outlined above is a useful starting point for understanding the effects of mergers. It provides some intuition for the way in which concentration might influence welfare and shows that even if the mode of competition is unaltered by a merger, increased concentration alone may lead to a socially inferior outcome. Moreover, the less competitive is the pre-merger mode of conduct the more damaging for social welfare a given increase in concentration is likely to be.

However, in designing criteria for the assessment of mergers one would undoubtedly want to go well beyond the very simple model set out above; not least because in this setting all mergers lead to a reduction in consumer surplus and economic welfare. First, this model assumes the product to be homogeneous and all firms to have the same marginal costs of production. This latter point is particularly troublesome as it leaves unexplained differences in market share. As noted, similar models, such as Farrell and Shapiro (1990), which explain market share differences in terms of different marginal costs of supply, find that significant welfare effects flow from the reallocation of output between firms with different levels of marginal cost. Second, the model views the mode of competition, β, as exogenous. Of course, it is easy to conceive of the mode of competition itself being partly dependent on the degree of concentration. Finally, and crucially, there is no consideration of supply-side responses in mitigating or preventing the adverse welfare consequences of mergers, either in the form of supply-side responses by existing competitors or of new entry.

[18] For a full discussion of the process of market definition see OFT Research Paper No.1, 'Market Definition in UK Competition Policy', by NERA, or the US Department of Justice Merger Guidelines, 1992.

4.4 Merger models with unilateral effects

4.4.1 The basic analyses

Differentiated product Bertrand models attempt to identify the incentives which merging firms have to unilaterally raise the prices of their products. In much the same way that the Cournot models predict that any homogeneous goods merger which has no effect on costs leads to lower output and a higher price, so Deneckere and Davidson (1985) demonstrate that in the absence of efficiencies and the threat of entry, mergers between producers of differentiated products lead to increases in the prices of the products of the merging parties. They also find that non-parties to the merger also have an incentive to raise their prices.

Levy and Reitzes (1992) show that the incentives to merge in price-setting models are greater than in quantity-setting environments because the reaction of the non-parties to the merger tends to reinforce the profitability of the parties' initial price rise. This is in contrast to the output responses of non-parties in the quantity-setting models, which tend to partially defeat the price raising output reduction of the merging parties. This is seen in its most extreme form in the Salant, Switzer and Reynolds (1983) specification.

Werden and Froeb (1994) also analyse the effects of mergers using a Bertrand model with differentiated products, extending the earlier Bertrand analyses of Levy and Reitzes (1992) and Deneckere and Davidson (1985).

A number of the main insights provided by these models are again similar to those provided in the Cournot models. First, prices rise after any merger which has no impact on costs. This result is no different to that obtained by Farrell and Shapiro (1990), except that under the Bertrand specification with differentiated products there are many prices, not just one. However, there is considerable asymmetry in the way prices rise. Typically, the price of the product of the smaller (in market share terms) of the two merging firms rises by most, followed by that of the larger of the two merging firms. This is because the volumes lost by raising the price of the product with the higher share are less likely to be recaptured by the merged firm in extra sales for the smaller product than are lost sales from the smaller firm to be captured by increased sales for the larger firm. This skews the merged firm's price rise towards the smaller of the two products. The greater the asymmetry in the pre-merger shares of the merging firms the greater will be the asymmetry in price rises. However, these conclusions are sensitive to the structure of the demand system which is assumed.

The prices of all non-merging products also rise, but by considerably less than those of the products of the merging firms. It is possible that the share-weighted average price will fall if there is a significant shift in output towards the non-merging products and they were, on average, cheaper than those of the merging firms. However, since all prices have risen consumer welfare is reduced by the merger.

However, as in the Cournot model, a shift in output from firms with small shares to those with large shares may mean that a greater proportion of total output is produced by lower cost

providers and this may improve overall welfare. In the Bertrand setting a large pre-merger market share may not only signal lower costs than smaller share rivals, but may also be a sign of higher perceived product quality. Consequently, there are benefits in having more output produced by those large firms. This effect is partially offset by the larger non-merging firms' propensity to raise their prices by more than those of smaller non-merging firms, but this effect is claimed to be weak. Consequently, a high degree of concentration among the non-merging firms is, on balance, a factor likely to mitigate or even reverse the adverse welfare consequences which flow from the generalised price rise caused by any merger.

4.4.2 The importance of the assumed structure of demand

Merger models whose results are largely based on an analysis of market shares and market concentration have value when the competitive influence of a product in a market is proportional to its share of the market. However, in differentiated products markets it does not necessarily follow that a product which enjoys a large share of the market necessarily provides a stronger competitive constraint on others' pricing than a product with a lower share of the market. Crucially, in a differentiated product setting it will often be those products that are closest in product or geographic space to the product of concern that provide the most immediate competitive constraint rather than the largest alternative product within the market.

For example, in a differentiated product market in which there are several economy brands, several standard brands and several deluxe brands, it may well be that a merger between two deluxe brands, each with 5 per cent of the total market, might be of far greater competitive concern than a merger between a deluxe brand with 5 per cent and an economy brand with 15 per cent. Defining a market for deluxe brands only might overstate the impact of a merger by ignoring the potentially significant role of economy and standard brands. However, defining a market that included economy, standard and deluxe brands, and gave them each a weight proportional to sales volumes or values (as is implicit in a standard market share analysis), would overlook the greater intensity of the competition which exists between deluxe brands.

Therefore, the view that the sales lost from a rise in the price of a product are more likely to be captured by an alternative product with a large market share than one with a small market share relies on a very strong assumption about the nature of demand. Basically, it assumes that the second-best preferences of the marginal customers of the product that is losing sales are the same as the first-best preferences of the existing customers of *all* other products. If this very restrictive assumption holds then consumers that are lost by the product whose price has risen will switch to other products in proportion to those products' existing market share. Under these exceptional circumstances, it is legitimate to regard a product's competitive significance as being proportionate to its existing market share.

For example, suppose that product A has 40 per cent of the market, while products B and C have 50 per cent and 10 per cent respectively. If the price of A rises some of its customers may switch to B or C. Those models which rely on a simple analysis of market shares assume that those purchasers of A who switch will do so in the ratio of B and C's existing market

shares, so that for every six customers lost by A, five will go to B and one to C. However, it is quite likely in many differentiated product settings that A's marginal customers (ie those switching and therefore of interest) may not have the same preferences, on average, as those not currently buying A. For example, if product A is BMW cars, product B is Ford cars and product C is Mercedes cars, there is no reason to suppose that marginal BMW customers will switch overwhelmingly to Ford rather than Mercedes in the event of a rise in the price of BMWs, simply because Ford's market share as a whole is five times greater than that of Mercedes.

4.4.3 Differentiated products with localised competition

When the differentiated products do not conform to special assumptions regarding the structure of demand, simple market share analysis loses much of its value. Under these circumstances it is likely to be more instructive to look at the nature of the competitive interaction between the merging products and try to measure directly the strength of the competitive constraint provided by one merging product on the other.

One way to do this is to look at diversion ratios, or the proportion of lost sales of one product which are likely to divert to the products of the other party to the merger.[19] If the products in question are peculiarly close substitutes then diversion ratio analysis may show the competitive constraint to be stronger than simple market shares would suggest, while if they are peculiarly distant, market share analysis may overstate the extent of competition lost by the merger. If the pre-merger gross margins of the merging products are known, knowledge of the relevant diversion ratios will permit the profit-maximising price rise to be directly calculated.

Crucially, this initial estimate of the price rises likely to follow a merger between two differentiated products takes no account of any supply-side responses and ignores the impact of any cost savings which the merger might generate. In addition to consideration of *de novo* entry, brand repositioning may be an important factor in a differentiated products setting. For example, the price rise predicted by a merger between two deluxe brands could be thwarted if a standard brand is quickly able to reposition itself as a deluxe product.

Shapiro (1996) provides an intuitive account of the value of diversion ratio analysis, showing that the expected rise in the price of a product following a merger is strongly related to the proportion of lost sales which the merging parties might be expected to recapture in increased sales of the other product. Specifically, with constant-elasticity of demand, and assuming that the brands are symmetric prior to the merger, the post-merger price, p^m, is given by:

$$\frac{\left(p^m - p\right)}{p} = \frac{mD}{\left(1 - m - D\right)}$$

where,

[19] The diversion ratio is the ratio of cross-price to own price elasticity of demand for the relevant products.

$$m = \frac{(p - c)}{p}$$

where c is marginal cost, p is the pre-merger price and D is the proportion of lost sales diverted to the other product of the merging parties. Thus, with a 40 per cent mark-up and a diversion ratio of 20 per cent, it would pay to raise price by 20 per cent following a merger.

Vellturo (1997) argues that in attempting to measure the diversion ratios for merging products in a differentiated setting it is important that proper account is taken of the need to calculate ratios for the marginal consumers of each of the relevant products. If the marginal consumers of a product are sufficiently distinct from all of that product's current consumers then a diversion ratio calculated using market or survey evidence relating to all customers may significantly misrepresent the proportion of marginal customers (ie those lost following a price rise) which might defect to the acquired product. He also argues that since differentiated product analysis which by-passes the standard market share analysis renders redundant the safe harbours in the US Merger Guidelines (ie mergers which fall below certain thresholds will not be challenged), there is a need for guidance on the extent of unilateral effects which will be permitted under the new approach.

Hausman, Leonard and Zona (1992) propose an approach to the analysis of differentiated product markets which focuses on the degree of substitutability among different products. Their approach uses cross-price elasticities - concepts closely related to the diversion ratios - to develop a concentration index for differentiated products which is analogous to the standard measures found in the homogenous goods setting. By rearranging the equation which sets out the standard Cournot equilibrium, it can be shown that the Herfindahl index in the homogeneous goods setting is the ratio of the share weighted margin in the non-co-operative Cournot equilibrium to the co-operative (monopoly) margin. Using cross-price elasticity data, Hausman, Leonard and Zona (1992) describe how it is possible to create a differentiated product concentration measure by comparing the competitive margins with the collusive margins. More importantly, they show that attempts to force an analysis of highly differentiated products into the standard, binary market definition can lead to a serious misrepresentation of the significance of the competitive constraint which exists between two products. The standard concentration measures could overstate or understate the extent of the competition lost by the merger.

4.4.4 Empirical estimation of unilateral effects

The first step in estimating the likely post-merger price rise is to estimate demand. Two alternative methodologies can be used to estimate demand when market level data is available. These are discrete choice models, such as those in Berry, Levinsohn and Pakes (1995) and Nevo (1997), and multi-stage budgeting models, as set out in Hausman, Leonard and Zona (1994). Nevo (1997) compares the two techniques. In general, both techniques are capable of very precise estimation of demand and can usefully be used in those cases in which the data permit.

When individual transaction data for a sample of buyers are available discrete choice methods are the preferred methodology. For example, Goldberg (1995) uses individual transaction data to estimate the demand for cars. In those rare instances where both market level data and some individual data are available, Berry, Levinsohn and Pakes (1997) show that it is possible to take advantage of the information available at both levels to produce more precise estimates.

An estimate of the post-merger price increase absent any other change in the structure of the industry can be obtained using the derived estimates of demand. The simulation of post-merger price changes requires the analyst to solve the first-order condition of the profit-maximisation problem, compute the price-cost margin for each good, and recover the marginal cost from the price-cost margin equation by using the demand estimates (when the marginal cost is not available). Afterwards, the post-merger price is simulated using the recovered marginal cost (or the observed marginal cost in the rare instances when it is available), and the new ownership structure of the industry absent any entry or brand repositioning.

These techniques have been embraced by the US antitrust authorities and, whenever the data permit, they are used by the Department of Justice and the Fair Trading Commission in their evaluation of unilateral effects in differentiated product markets.[20]

4.5 Quantifying co-ordinated effects

While it is possible to present a fairly lengthy list of the market features which might mean that a particular market is more prone to explicitly or tacitly collusive behaviour, including the structure of the market, the analysis of co-ordinated effects is in many respects more complex than unilateral effects. This is because the conceptual basis for quantifying the increased likelihood of collusion following a merger is less well developed than is the case in mergers involving unilateral effects.

However, it is important to note that the lack of a rigorous framework for quantifying co-ordinated effects does not mean that such effects are necessarily unimportant or less important than unilateral effects. Despite the difficulty in precisely measuring the impact of co-ordinated effects, these effects may nonetheless represent a significant danger to competition.

The complexity of co-ordinated effects suggests that it is insufficient to adopt a simple check-list or point-scoring approach and careful analysis of each the factors affecting the likelihood of collusion is required. Each of the factors will differ in importance from case to case and in some cases some of the individual factors may be amenable to quantitative analysis (eg the measurement of aggregate demand variability). Moreover, in some cases, even if several of the conditions for collusion are met, co-ordination may still not be possible if just one of the

[20] See Werden (1997)

structural or behavioural characteristics of the market is capable of destabilising co-ordinated behaviour.

4.6 Supply-side responses

The unilateral effects models described previously focus on the intensity of the mutual competitive constraints which the merging firms are able to eliminate as a result of the merger and the incentive which this provides to raise prices. This provides the first conceptual step in the analysis of differentiated product mergers, but does not represent the end-point of the process. This is because, in addition to ignoring potential cost savings, this initial analysis takes no account of the ability of potential competitors to enter the market or the ability of actual competitors to reposition products so as to provide closer competitive constraints on the products of the merging firms than they had done hitherto.

Product repositioning may require fundamental changes in the nature of the product or it may mean the establishment of a new brand or the modification of an existing brand through changes in advertising and marketing strategy. In this context the importance of large and sophisticated customers may be an extremely important factor when considering possible supply-side responses to an otherwise anti-competitive merger.

Additionally, in mergers raising fears of post-merger collusion, easy entry may be a factor which acts to deter collusion, or to ensure that the collusive price levels which emerge are lower than they might otherwise have been. Evaluation of entry conditions thus provides a second step of the analysis in both types of potentially anti-competitive merger; those with significant unilateral effects and those which concern the likelihood of collusion.

4.6.1 The role of entry with unilateral effects

Willig (1991) and Salop (1991) both suggest that the role of new entry in merger assessment requires clarification. This need for clarification stems from potential confusion over the ability of the threat of entry to deter anti-competitive mergers, as opposed to the ability of the threat of entry to deter unilateral price rises following an anti-competitive merger.

A merger in a market which raises fears of anti-competitive unilateral effects based on an initial analysis of diversion ratios or the econometric estimation of post-merger prices rises might nonetheless be permitted if entry into the market is perceived to be easy. Yet, Willig argues that ease of entry should lessen concerns over an otherwise anti-competitive merger, not because anti-competitive unilateral price rises will be deterred by fear of entry, but because easy entry will deter anti-competitive mergers from taking place. In addition, where anti-competitive mergers do take place, although easy entry cannot be expected to deter firms from raising prices following the merger, it is possible that actual entry may occur to re-establish competition. This is rather different to the view that post-merger price rises themselves will be deterred by the threat of entry.

Willig (1991) and Salop (1991) argue that the reason ease of entry is unlikely to deter post-merger abuse following an anti-competitive merger which raises fears of unilateral price increases is that the post-merger, but pre-entry, prices are unlikely to be the key factor in a new entrant's entry decision.[21] Generally, it will be the entrant's expectation of post-entry prices which will drive its decision over whether or not to enter the market. Of course, a new entrant's expectations about post-entry prices will be determined by the post-entry market structure, and this will be determined by the necessary scale of the new entrant's entry and the pre-entry market structure.

Thus, it is the post-merger market structure, rather than the post-merger prices, which is likely to suggest the existence of an entry opportunity and to determine whether new entry will occur. Since the level of prices is likely to be a weak determinant of whether entry takes place, the threat of entry cannot represent a strong constraint on post-merger price increases. As Salop (1991) points out, the level of post-merger prices in a non-collusive market environment are the product of a market equilibrium, rather than lying squarely within the control of the firms in the market. However, although post-merger, unilateral price rises cannot be deterred by the threat of entry, low barriers to entry may mean that anti-competitive mergers which would have created a market structure which invited entry would be deterred. Furthermore, to the extent that the merging parties misjudge entry conditions and press ahead with an anti-competitive merger regardless of easy entry, it is possible that actual entry will occur to drive prices back down to competitive levels. However, this is clearly distinct from the threat of it deterring the rise in the first place.

As Salop notes:

> After the merger (with unilateral effects), the firms do not collectively choose to hold prices down or raise them in response to the likelihood of entry. Entry either occurs or not in the new equilibrium.

Anti-competitive mergers will be deterred by the prospect of post-merger entry if barriers to entry are low in a world in which all relevant information is known to all parties. In a situation of uncertainty and imperfect information the merging parties' assessment of the likelihood of entry based on imperfect information about, for example, rivals' costs, will become more relevant. However, the basic conclusion that entry prospects will be based on the pre-merger market structure rather than the pre-merger price still holds.

4.6.2 The role of entry with co-ordinated effects

The approach typically adopted in appraising co-ordinated effects mergers has been that following a merger in a market which raised fears of co-ordinated behaviour and collusive price rises, it is possible that, despite the greater concentration in the market, the prospect of

[21] For example, in a homogeneous goods market with Bertrand competition, two firms are sufficient to ensure that prices collapse to marginal cost. Consequently, a monopolist in such a market could set whatever price it liked, safe in the knowledge that even trivial sunk costs will be enough deter potential entrants who are aware that post-entry prices will fall to cost.

entry may be sufficient to deter such price rises and so limit any adverse consequences which the merger may have had for economic welfare.

Salop (1991) also criticises this approach for two reasons. First, systematic measures of concentration and guidance as to the levels of concentration which are likely to cause concern are often set out quite clearly. However, the evaluation of the, arguably, more important issues of entry is often far less systematic. Second, the assumption that post-merger prices are relevant considerations for potential entrants is subject to the same criticism as in the case of unilateral effects.

However, he accepts that, in addition to high pre-entry prices giving the new entrant the chance to strike long term contractual deals with customers, which allow it to capture a significant share of the market before the incumbent can respond and start a destructive price war, the ability of the threat of entry to deter in a collusive setting is greater. Specifically, he states:

> …while the existence of sunk costs fully deters entry when products are homogeneous and marginal costs are constant, relaxing those assumptions would establish some role for entry in constraining price increases in the face of a merger-induced cartel or tacit collusion.

Further, he summarises the distinction between the role of entry in the two cases in the following way:

> In the co-ordinated price approach the question is whether the fear of entry will deter anti-competitive co-ordinated price increases. In the unilateral conduct approach, the question is whether fear of entry will deter anti-competitive mergers.

4.6.3 Evaluation of entry

Although the conceptual framework for thinking about the role of entry, and the role which entry is expected to play, differs as between unilateral and co-ordinated effects, it nonetheless remains the case that, all else being equal, one would be more inclined to permit a merger in a market characterised by easy entry, whether one were concerned about unilateral price rises or a heightened risk of collusion. In the former case this is because easy entry is likely to mean that the merger itself would have been deterred were its primary aim to create an anti-competitive post-merger market structure, and in the latter case it is because tacitly collusive or cartelised price rises will be deterred.

Equally, the factors relevant to the evaluation of entry conditions under both unilateral and co-ordinated effects are the same. The nature of barriers to entry are well discussed elsewhere, as in London Economics (1994). Salop (1991) suggests that the main factors relevant to measuring ease of entry can be summarised as:

- **cost or demand disadvantages** - entrants facing higher costs or who are required to offer a lower price than an incumbent in recognition of perceived lower quality are less likely to enter. Examples include patents, control of or preferential access to scarce inputs and customer loyalty;

- **entry lags** - entrants are less likely to enter if incumbents have plenty of time to respond to entry before the entrant is established and, to the extent that one is relying on entry to deter price rises, this is likely to be least effective when the incumbents know that they can earn inflated margins for a longer rather than a shorter time. Examples might include regulatory approvals or licensing, or the time required to set up a distribution network;

- **sunk costs** - entry is financially risky to the extent that entry costs are sunk. By raising the costs of failed entry, sunk costs may successfully deter entry, and will do so more effectively, the higher are such costs; and

- **economies of scale** - Scale economies may mean that entrants may fear being unable to win enough sales to justify entry, even at the high pre-entry prices, and if the scale of its entry is necessarily large it may fear that it will have a serious negative impact on prices. Both of these effects will deter entry if there are sunk costs.

Salop (1991) argues that a number of these factors could be combined to create a minimum viable scale (MVS) of entry in a market, which would be scaled by the overall size of the market. A high MVS makes entry less likely for three reasons. First, the greater the share of the market needed to make entry viable the less likely it is to be achieved. Second, the higher the MVS the less likely is it that incumbents will accommodate entry, but will fight by vigorously cutting prices. Finally, to the extent that costs are sunk, a higher MVS is likely to mean a greater financial exposure for the entrant. The MVS concept and the factors which are relevant to its calculation were adopted into the 1992 version of the US Horizontal Merger Guidelines.

An additional factor which may make entry harder is the existence of customer switching costs. Where customers must incur costs to switch to a new supplier, but would not incur those costs of staying with an existing supplier, more efficient entrants may be unable to enter the market.[22] For example, the decision whether or not to buy a new word processing package depends not only on the purchase price but also on the time and expense which must be incurred to learn about the new system. Purchasing an up-graded version of a package with which the customer is already familiar may not involve the same degree of switching costs as buying a wholly new system.

[22] See Klemperer (1987).

4.6.4 Product repositioning and the role of buyer power

A variant on entry, but one which may be of critical importance in the evaluation of unilateral effects and which is noted by Shapiro (1996), is the repositioning of differentiated products following a merger. If existing products within a differentiated product market can, without significant delay or sunk investment, be repositioned to compete more closely with the products of the merged firm, then the price rise following the merger may be lessened, as the diversion ratio between the products of the merging parties may be reduced by the presence of a repositioned competitor. The calculation of diversion ratios based on substitution by customers between products in their current locations in product space may therefore overstate the extent of the unilateral price increases following a merger.

However, the more extensive the adjustment needed to rivals' products, the less likely it is that they will be able easily to reposition closer to the products of the merged parties. One could envisage repositioning taking several forms. For example, repositioning might require a rival to engage in a fundamental redesign of its products or it could require a change in advertising or marketing designed to move an existing brand closer to the products of the merging parties.

In some circumstances changing the brand image of a product may be as difficult as making fundamental design changes. However, in some contexts it may be relatively straightforward to move a brand or introduce a new one. One important factor determining the ease of new brand entry and repositioning is likely to be the willingness and ability of retailers to accept and promote the brands of other manufacturers and to commission and promote private-label and own-label products in competition with the brands of the merged firm.

Although the ability of retailers to control in-store brand promotion and to launch and promote private-label and own-label brand is often termed buyer power, in reality retailers are often acting as supply-side substituters and entrants in their own right. In promoting rivals' brands and those which they have commissioned for their own use, retail buyers are not merely sophisticated buyers shopping around between existing products fixed in product space, but are taking active steps to introduce and reposition products within the relevant product space. Similarly, in the aftermath of a merger that has significantly reduced the choice of suppliers large customers may seek out or sponsor new entrants. This could be a key element in the appraisal of such a merger.

4.7 Efficiencies and cost savings

A merger which enhances the efficiency of operation of the parties concerned and leaves competition unaffected, unambiguously raises economic welfare. Although it may seem obvious that efficient operation is superior to inefficient operation, anti-trust authorities have not always maintained this view. The alternative view - that efficient operation can bestow an unbeatable and anti-competitive advantage on the firm involved - is based on the notion that economic welfare is advanced through the protection of competitors rather than the competitive process. Armed with such a view, one might conclude that a merger which gives

one firm a significant competitive advantage over another could be harmful to economic welfare simply because it jeopardises the profitable existence of the less efficient company.[23]

The view that firms should be encouraged to seek out more efficient methods of operation - including by merger - has now generally been accepted as one of the benefits of competition rather than a threat to it. However, the challenge is to assess when efficiency benefits - which in themselves are always beneficial - are enough to outweigh any loss of competition inherent in the concentration. There are some clear guidelines which can aid an initial assessment.

Claimed efficiencies should not be taken into consideration if the same efficiency benefits could have been attained through other means. If the efficiencies can be attained through the unilateral actions of one or both of the firms involved, then they cannot be seen as offsetting benefits of the merger. The US Horizontal Merger Guidelines (1992) explicitly state that such benefits will be discounted. They also state that the net efficiencies must be greater the more significant are the competitive risks associated with the merger.

One of the implications of Farrell and Shapiro (1990) is that rationalisation, which involves nothing more than transferring production from a high-cost plant to a low-cost plant, is not a convincing efficiency, in the sense that it does not expand the joint production possibilities of the two firms. On this analysis, the best efficiencies are those which deliver benefits which neither firm could have achieved on its own. For example, a merger which permits the exploitation of economies of scale in production could represent a genuine efficiency, as could a merger which facilitated the amalgamation of overhead functions. Farrell and Shapiro also cite learning effects as a possible source of genuine efficiency which could not be unilaterally attained.

The US Guidelines recognise efficiencies which flow from the attainment of scale economies, better integration of production facilities, plant specialisation and lower transport costs. It states that the antitrust authorities will also consider reductions in general selling, administrative and overhead expenses, although as a practical matter these may be difficult to prove.

Efficiencies lead to cost savings which, in turn, lead to lower prices or higher profits. It is very difficult to argue that efficiencies which lead to lower prices can do anything other than raise output and enhance welfare. In fact, there is a double gain as welfare is improved by virtue of the saved resources and by the output expansion which the lower prices engender. However, efficiencies which lead to higher profits or, possibly, a combination of lower prices and higher profits are sometimes attacked on the grounds that the extra resources available to the merged firm could be used to engage in predatory pricing campaigns or be used to foreclose access to key inputs by out-bidding rivals.

[23] It may be possible to construct theories of dynamic competition in which such considerations could be rationale. However, it is important for merger control authorities to avoid acting on such concerns at the instigation of interested third parties whose real objectives are to prevent competitive developments.

Generally, these arguments are difficult to sustain. They are normally made by competitors who have a strong vested interest in preventing the attainment of efficiencies by a competitor, particularly if it is likely to lead to lower prices. This is because without the benefit of greater efficiency the competitor's profits will fall following a price reduction, although welfare generally will rise. Furthermore, if the alleged anti-competitive actions are profitable for the merged firm in the long run and the merged firm has access to the capital market, it is hard to see that the extra source of funds available from the efficiency gains necessarily expands the range of anti-competitive possibilities open to the firm.

Finally, since the alleged competition detriment flows not from the structure of the market, but from widened behavioural possibilities contingent on deeper pockets, it is difficult to maintain the argument that the structure of the market should be constrained, denying the attainment of efficiencies, when behavioural remedies would exist to address problems grounded in the merged firm having too much money.

4.8 Buyer power

In addition to the potentially very important role which buyers can sometimes play as supply-side substituters and potential entrants, and their ability to facilitate the entry and brand repositioning of manufacturers, buyers and buyer power can also influence the assessment of mergers in other ways.

A distinction can be drawn between the pre-existence of downstream buyer power which could constrain a merging firm from collusively or unilaterally raising prices post-merger and the creation of buyer power through merger which the merging parties could cite as an efficiency created by the merger.

Buyers who are able to enter with own-label or private label products or facilitate the entry of others provide one example of buyer power that might thwart any unilateral or co-ordinated price rise by the merging parties. Where branding is unimportant and alternative suppliers are not readily available to the buyer, a large and sophisticated buyer may be prepared to devote resources to seeking out alternative suppliers and assisting their entry by contracting for a certain volume of business before entry has occurred. For example, two branded goods manufacturers might claim that buyer power among retailers is strong enough to resist any rise in wholesale prices and that their merger would not, therefore, diminish competition.

Conversely, merging parties could argue that their merger creates buyer power which will enable the merged firm to extract lower prices from its suppliers and that these will be passed on in lower prices, raising output and economic welfare.

Both of these arguments are based on Galbraith (1954), who argues that welfare can be improved by strong buyers who force their suppliers to reduce prices. This pressure from buyers provides an incentive for suppliers to improve efficiency and may, in addition, force them to accept a lower margin on their sales. Costs savings are a genuine gain wherever the benefits of those savings accrue. On the other hand, reduced prices which reflect lower

upstream margins are welfare neutral if they merely result in a transfer of profit from the seller to the buyer, but lead to improved welfare if they are passed on to customers in lower retail prices, expanding output in the process.[24]

The benefits of buyer power are not universally accepted and, for example, Dobson and Waterson (1997) argue that in a world of buyers who are differentiated, either geographically or in terms of the services they offer, it is quite possible that the increase in countervailing power from a merger between two buyers may be outweighed by the increase in seller power which it generates, and that the net effect may be harmful to welfare.

However, for the buyer power argument ever to be persuasive the buyers must be able to credibly threaten their suppliers with the possibility of buying from other existing suppliers, engendering new entry or engaging in backwards vertical integration to supply themselves. If none of these is possible, mere size may not be sufficient to bestow effective buyer power, since the bargaining strength of the buyer may not have been significantly enhanced even though it accounts for a greater share of sales than before.

However, buyer-side concentration alone may reduce the likelihood of effective co-ordination between suppliers. Unconcentrated buyers make it easier to detect cheating, while concentration on the buyer-side makes cheating harder to detect. Thus, in mergers which raise *prima facie* fears of co-ordinated effects, concentration among buyers may reasonably reduce those concerns.

Where there are concerns about either unilateral or co-ordinated effects following a merger, size and sophistication among buyers and, in particular, the ability to side-step established brands through the use of own-label, private-label, assistance in the brand repositioning of other existing brands or the encouragement of new entry may legitimately lessen those concerns.

4.9 Technical change and innovation

A market which can be shown to be characterised by rapid innovation either in production processes or products is less likely to suffer reduced competition, and the damage from any reduction may be less, than one characterised by a stable and widely shared technology. There are several factors that may be relevant to the consideration of this issue.

First, even if competition is reduced, through either unilateral or co-ordinated effects, those effects can only endure for as long as the market endures in its current form. Domination of a production process or of the supply of a set of products which are made redundant after a relatively short period 0is less damaging than dominance in a market which is set to endure for many years.

[24] This makes the standard, although not universally accepted assumption that consumer surplus and producer surplus are given equal weight.

Second, technical change means that at any one time firms in the industry may have very different technologies and therefore very different cost bases and may consequently face very different incentives to expand output at the margin, making tacit collusion more difficult. Furthermore, collusive outcomes are more robust when firms believe that the game is likely to continue in its current form for many periods. Conversely, if the nature of the game is set to change radically following major innovation or product development, and has been seen to do so frequently in the past, tacitly collusive outcomes may break down very quickly since there may be no stream of long term collusive profit to set against the higher short term profits available from cheating. In addition, collusive outcomes are difficult to sustain in a world of relative uncertainty, since it is difficult to differentiate between cheating by a firm and an external shock to the market.

Moreover, in a market subject to frequent technical change, a merger with significant unilateral effects may permit the temporary raising of prices and widening of margins, yet if the existing pattern of products is constantly evolving through the demise of old products and the creation of new ones, the elimination of the competitive constraint which may have existed between two merged products will not necessarily give the merged firm the ability to maintain widened margins once the next generation of products has reached the market.

Competition in dynamic markets may not be primarily on price, but may take the form of competition to be the first to produce the next generation of the product. As new generations of product are released, so the prices of the previous generation fall rapidly. The reductions in the prices of products which are based on outdated technology are typically dramatic and occur rapidly once the new generation of products is available. The fall in prices seen over the natural life-cycle of a product in a dynamic market is typically very large.

However, the analysis of dynamic markets, in which competition is characterised by repeated innovation and new product development, does not suggest that competition is unimportant. It suggests instead that the form of competition which needs to be preserved is competition between firms to be the first with the next generation of products. In these circumstances competition authorities may be more concerned with ownership of R&D capability and the barriers to entry which exist at the level of product innovation, development and marketing rather than with the ownership of existing technologies and products, and the barriers to entry into the production of replicas of the current generation of products. It is consequently tempting to try to use merger control to manage the markets for innovation.

However, the relationship between concentration and innovation is a complex one. The basic Schumpterian hypothesis that innovation is more likely in concentrated than unconcentrated markets has been extensively tested. Scherer (1992) surveys the academic literature on the subject and finds that most of the research suggests that Schumpeter overstated the importance of monopolistic firms as leaders in technological innovation. Equally importantly, it finds that the empirical and theoretical analysis has failed to establish any definitive relationship between market structure, innovation and economic welfare. Other

useful surveys of the relationship between innovation and structure can be found in Kamien and Schwartz (1982) and Scherer and Ross (1990).

Nonetheless, attempts have been made explicitly to set out a framework for the analysis of the impact of mergers in 'innovation markets', with a view to screening out those mergers which are likely to have a damaging effect on the quality or quantity of innovation in the market. Notably, Gilbert and Sunshine (1995) set out a five stage procedure for analysing the impact of a merger on innovation markets which looks at the extent of the research and development overlap, alternative sources of research and development, the extent of competition in the downstream market, assesses the impact of the research and development concentration on research and development investment and evaluates research and development efficiencies.

Rapp (1995) criticises the innovation market approach, arguing that the absence of any clear link between concentration and innovation, and the impossibility of identifying the optimal amount of research in a market, suggest that the innovation market approach has weak theoretical roots and that its application may lead to decisions which are positively damaging to welfare.

While these arguments suggest that a conservative approach to the use of merger control as a tool to protect innovation is warranted, it remains true that markets characterised by rapid innovation and product evolution are unlikely to become collusive and that concern over unilateral effects may be much reduced if products turn over rapidly and market shares are consequently highly volatile.

4.10 Other issues

4.10.1 Excess capacity

Excess capacity can be a relevant consideration in the overall appraisal of a merger in several ways. The existence of excess capacity held by non-parties to a merger might imply that those non-parties would be able readily to expand output without incurring an unduly steep increase in their marginal costs of production. As Salant, Switzer and Reynolds (1983) and Willig (1991) show, this may mean that they would be more willing to respond to an output contraction by the merged firm by increasing their own output. This would be a factor liable to make a unilateral anti-competitive output contraction or price rise less likely.

On the other hand, widely held excess capacity might give cause for concern that a tacitly co-operative equilibrium would emerge following a merger, if the excess capacity meant that market participants were likely to view competition as being inevitably mutually destructive and therefore futile. In other words, widely held excess capacity would lead all firms to expect a vigorous response to any attempt by them to expand their own sales and that this vigorous response would leave all firms worse off than they were before the competitive initiative, including the firm which started the price cutting. In these circumstances a tacitly or explicitly collusive outcome may be made more likely by the existence of excess capacity. Osborne and Pitchik (1987) develop a collusive model in which there is excess capacity in

equilibrium, with the sum of the capacities greater than the sum of the collusively set production quotas. As Phlips (1995) points out, the existence of excess capacity is not the result of bad planning but is necessary for the cartel to work. Davidson and Deneckere (1990) show that the result that excess capacity can act as a means of supporting a co-operative outcome is valid even when one replaces explicit collusion with tacit collusion in a repeated game.[25]

Finally, mergers are often defended on the grounds that they allow excess capacity to be rationalised. Prices in markets in which there is significant excess capacity may fail to cover total costs, where these include an allocation covering the fixed costs of the plant. While prices at these levels may lead to accounting losses and, indeed, may not be sustainable in the long run, it does not necessarily follow that co-ordinated rationalisation is a desirable or appropriate response. If the investment in the plant is sunk, such capacity may have an economic cost close to zero, and welfare may be better served by allowing low prices and consequently higher output to prevail. These prices would only prevail until depreciation had reduced capacity to a point at which prices had recovered to a level at which new investments in capacity could be justified. Proponents of an argument that a merger is needed to allow for the orderly rationalisation of excess capacity must be able to show why unilateral capacity withdrawal or the natural depreciation of capacity could not be relied upon to return prices to levels at which all costs, including replacement costs, are covered in the long run. Alternatively, it may be that independent capacity rationalisation would lead to the exit of efficient capacity rather than inefficient capacity and that this provides the rationale for orderly rationalisation through merger.

4.10.2 Failing firms

In some cases, a merger will take place between two firms who are active in the same market, but where one of the firms involved has been making losses. Often it will be claimed that the target of the merger was a failing firm and that they would have been lost to the market in any event. Consequently, it may be argued, no significant competitive constraint has been eliminated by the merger.

This argument has greatest weight when it is clear that the assets of the failing firm would have left the market altogether, absent the merger. If this is the case, the productive capacity of the failing firm would, in any event, have been withdrawn from the market, tending to push prices upwards, and the consequences for welfare of any unilateral or co-ordinated effects that flow from the merger can be no worse than those that would have followed the departure from the market of the failing firm's assets in any event.

However, in other cases, it is less clear that a merger involving a failing firm should be subject to a lesser degree of scrutiny than it would otherwise have been. First, if the firm in

[25] However, it should be noted that the empirical evidence on the correlation between excess capacity and collusion is relatively weak and characterised by ambiguous results. For example, see Esposito and Esposito (1974), Mann, Meehan and Ramsey (1979) and Rosenbaum (1989).

question can reasonably be expected to have been acquired by a new entrant who would have maintained the assets in the market as an independent competitive force, then the appropriate benchmark against which to judge the likely post-merger situation is that with the firm retained as an independent entity.

In addition, even if an independent buyer would not have been forthcoming, the possibility that the assets might have been dispersed among several existing players in the market, rather than concentrated in the acquirer should be considered. Finally, even if the assets could not have been dispersed, but there was a realistic prospect of acquisition by an existing player who would have posed a lesser threat to competition, then the failing firm defence would need to be critically evaluated against these alternative possible outcomes.

4.10.3 Evolving market definitions

A further argument, often framed in terms of the creation of a 'national champion', involves the parties accepting that dominance will be created in a particular geographic area, but claiming that the geographic dimensions of the economic market are actually wider than they appear, or are set to become wider following some recent or forthcoming change in the market.

The first point is dealt with relatively straightforwardly since it is essentially an argument about market definition. If the market is genuinely European or global then a merger that creates dominance in the UK alone is unlikely to damage economic welfare, since UK-based customers will be able to buy from elsewhere should the parties to the merger attempt to raise price. Thus, the merger can be analysed within the standard framework using a broad geographic market definition.

The second argument is harder to judge since it requires not only an assessment of the market changes likely to flow from the merger, but also an assessment of the changes to the market likely to flow from a technological or regulatory revolution which has recently occurred or is about to do so. Where the technological or regulatory change has not yet happened a further tier of uncertainty is added to the assessment since the revolutionary event itself may not take place.

In appraising these arguments it is important that one is clear what the benefits of the merger are supposed to be. It may be that the parties are simply seeking to achieve economies of scale which are only achievable at a scale of operation that is large relative to the domestic market. In those circumstances the assessment may reduce to a weighing of efficiencies against a loss to competition, with the possibility that those losses may be transitory.

Alternatively, it may be that the domestic market is supposed to act as a source of funds for global expansion, in which case the trade-off is less clear. In this case, competition is being explicitly reduced to raise producer surplus, generating funds for investment. Although this can be seen as a benefit to the firm concerned, it can be argued that a domestic monopoly leads to increased inefficiency and reduced effectiveness in global markets. Conversely,

fiercely domestic competition can pave the way for success in wider markets, by eliminating inefficiency and raising quality.

In any event, this scenario brings competition policy and broader industrial policy into conflict and, arguably, moves the assessment of the merger out of the sphere of a pure competition assessment and into the arena of broad public policy.

4.11 Effects on competitors

In any assessment of the impact of a merger it is tempting to regard competitors as neutral commentators with the in-depth industry background necessary to comment knowledgeably on the proposed transaction. However, it is not clear that competitors have the correct incentives to act as reliable or impartial contributors to an assessment of mergers.

First, competitors may well benefit from an anti-competitive merger if prices rise through unilateral or co-ordinated effects. Second, competitors will often suffer from mergers that generate efficiency benefits. If the costs of the parties to a merger fall, prices may be lowered and the combined market share of the parties may well rise. Competitors facing a more efficient rival may therefore see the general level of prices falling along with their own market share.

Viewed within this framework, competitors' interests could be diametrically opposed to the interests of economic welfare. When a merger is likely to benefit economic welfare through improved efficiency competitors will complain and when a merger is likely to damage economic welfare through unilateral or co-ordinated price rises competitors have an incentive to argue that the merger is benign.

However, it is clear that a competitor who wishes to object to a welfare improving merger cannot credibly go to the competition authorities and argue that the merger will raise prices, since they would clearly benefit from such an outcome. Of course, the inherent contradiction of a firm complaining at price rises within its own industry does not prevent some complainants from doing so.

A more credible response from a competitor who wishes to see a merger blocked is to argue that the merger increases the range of anti-competitive exclusionary practices open to the merged firm. If this were true, the competitor would be damaged, making its objection credible, and economic welfare would be damaged through higher prices in the long run, making the merger undesirable from a public policy perspective.

The inverse relationship which theory suggests exists between the interests of competitors and the interests of economic welfare is acknowledged in a number of empirical studies that look at the stock market reaction to a merger in terms of the share price of the merging firms and its competitors.[26] Naturally, the share price of the merging firms will rise whether the

[26] For example Mullin, Mullin and Mullin (1995).

merger leads to anti-competitive price rises or pro-competitive efficiency gains. However, a rise in the price of a competitor's shares can be viewed as a sign that the merger may lead to anti-competitive price rises.[27] If the share price of competitors falls following announcement of the merger this can be interpreted as a sign that the merger may deliver significant efficiency benefits.

Of course, information from competitors can be useful to the investigating authority, in the same way that information from the parties can aid an investigation. However, it is clear that the views of competitors should be subject to the same degree of critical evaluation as those of the parties. Competitors who argue that a merger is likely to lead to anti-competitive price rises should be asked why they are objecting to something which seems likely to work to their advantage, and those who argue that a merger will lead to exclusionary practices should be made to distinguish between the legitimate advantages that flow from greater efficiency and those that flow from the increased probability of exclusionary behaviour.

4.12 Empirical studies

4.12.1 Concentration-price studies

The empirical links between concentration and economic welfare have been extensively tested by many authors. Typically, they test the existence of direct relationships between the structure and the performance of industries through econometric modelling. Studies centre on the relationship between concentration and prices or profits. A significant positive relationship implies that increased concentration leads to higher prices and, to the extent that it raises concentration, a merger may have undesirable effects on prices.

A typical econometric equation used in one of these models might be:

$$P_{it} = f^{it}\left(CM, \sum_{h=1}^{n} C_n, \sum_{z=1}^{m} S_m\right)$$

where P is the average price in market i at period t; CM is a concentration measure;[28] C is a vector of n cost-related variables; and S is a vector of m other relevant variables.

The aim of these models is to test the statistical significance of any relationship between concentration and price, after controlling for the impact of costs, and other variables, on price.

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27 There may be some occasions when a merger or merger clearance raises the share price of competitors even if it is delivering efficiency benefits to the parties to the merger. For example, if an entire industry needs to restructure to reap efficiencies benefits, the clearance of the first merger may send a positive signal to others in the industry that their mergers are likely to be cleared too.

28 The Herfindahl index is quite popular, but a number of other concentration ratios have been used, such as the n-firm joint market share.

However, there are two characteristics common to these studies which have called into question the validity of such studies. These are the possibility that a relationship exists between concentration and cost and, more importantly, the presence of a two-way relationship between price and concentration.

The first problem may arise where there are cost economies from mergers, and where the sample does not include markets of significantly different sizes. If this is the case, then costs will be highly correlated with concentration, making it difficult to test the statistical significance of the price-concentration relationship due to multicollinearity.[29] If multicollinearity exists it should be taken into account when drawing conclusions from the observed relationship.

The more important problem, however, is the two-way relationship between concentration and prices, which arises when concentration affects prices but, simultaneously, prices affect concentration through induced entry and exit. This creates a serious endogeneity problem in which the right-hand side variables, including concentration, cannot be presumed to be exogenous to the dependent variable, price or profits. Consequently, appropriate econometric techniques, such as two-stage least squares or generalised method of moments, need to be used when estimating these models.[30]

Concentration-price studies also pose problems in industries in which the pricing mechanism is not transparent, as is the case, for example, in the airline industry. A number of studies, such as Borenstein (1989) and Evans and Kessides (1993), have attempted to isolate the effect of mergers on market power in the airline industry, but none has been able to unambiguously conclude that the observed relationship between concentration and price is the result of market power. One problem is the existence of hidden restrictions on the availability of cheap fares.[31] A further problem arises because capacity and frequency of departure are both a source of quality improvements (through increased flight frequency) and a source of cost savings (through density of traffic).

Despite the difficulties involved, there have been a large number of concentration-price studies, across a wide variety of industries (although banking and petrol retailing seem particularly well represented). Weiss (1989) attempts to draw together the findings of numerous price-concentration studies undertaken over many years and across a range of sectors to produce some generalised conclusions on the empirical evidence for a positive concentration-price relationship reflecting market power. In total, he examines 121 data sets, some of which have been analysed by more than one author. He finds that 63 per cent of the

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29 Due to the high collinearity between the two dependent variables, the individual impact of each cannot be identified. Multicollinearity inflates the standard errors of the collinear variables rendering t-tests meaningless.

30 Technically one would find that the residuals are correlated to the error term. Estimation must then proceed with the Instrumental Variables (IV) approach or, more commonly, Two or Three Stage Least Squares (2SLS and 3SLS, respectively). A comprehensive discussion of the issues involved in the estimation of price-concentration relationships can be found in Evans *et al* (1993).

31 By restricting the share or number of aircraft seats allocated to cheap fares passengers may be forced to buy more expensive tickets. Note that cheap fares would still show as available on the flight, but fully booked.

data sets and 73 per cent of the studies find a significant positive relationship between concentration and price. Conversely, just 3.5 per cent of both the data sets and the studies find a significant negative relationship. He considers that this provides overwhelming support for the basic hypothesis that concentration raises price.

Of course, it is possible that a bias exists in the selection of markets which have been investigated by economists over the years, either towards those which give significant results or, more worryingly, towards those likely to give positive results. However, Weiss believes that any bias which may exist towards significant results would not undermine the basic finding that significant positive results outweigh significant negative results by 18:1. Additionally, if there was a positive or negative bias in the data sets typically chosen for analysis, Weiss feels that any bias would be more likely to be towards data sets that were likely to produce negative results. This is because a significant negative finding is an inherently more interesting finding than a significant positive result which is, after all, fully in accord with the theoretical predictions.

Additionally, Weiss examines which measures of concentration have provided the best results from among the many studies undertaken. Of course, the nature of the concentration measure which is found to be linked to price is important because of what it can tell us about the type of behaviour underlying the link. Unilateral effects might be thought to become gradually worse as the Herfindahl index rises, and many studies have used H as their measure of concentration. Others have used 1/N, the inverse of the number of firms in the industry. This is similar to H, if the firms have identical costs and, consequently, are very similar in size. The critical concentration ratio (CCR), where the data is tested to see if the relationship changes once a particular level of concentration is reached, is less consistent with unilateral effects, but is suggestive of a market structural point at which competition switches to a more co-ordinated mode. Weiss finds that although CCRs appear to have fallen from favour they do fit the data well in several cases (eg Marion and Geithman (1995)), and he feels they deserves greater use where the data permit. The n-firm concentration index, CR_n, has no clear support from the theoretical literature, yet has been widely used in empirical studies. Its popularity is partly explained by the ready availability of the market share of the top three, four or five firms in most industries, but it also performs well in the regressions.

The level of concentration that was found significant in the empirical studies varies from industry to industry, but Weiss finds that the effects of concentration below a four-firm concentration index of 50 per cent are small in all those cases where it was possible to test at these levels. However, this was only possible in a number of markets involving cement and supermarket retailing. A four-firm index of 50 per cent implies that the fourth largest firm can control no more than 12.5 per cent of the market and that there must be at least eight firms in the market as a whole. This is consistent with auction models examined by Weiss in which most of the effect of numbers on winning bids are exhausted by the time there are eight bidders in the market.

Weiss neatly summarises the findings of the numerous price-concentration studies he looks at, stating:

> I believe that our evidence that concentration is correlated with price is overwhelming. I also believe that contestable markets is a largely empty box and that until someone provides us with clear evidence that it exists it should play no part in public policy. Our evidence on functional form is so diverse that we cannot justify any one oligopoly theory over the others. It does look as if concentration makes little difference below CR_4=50, but our evidence below that is limited to cement and supermarkets.

4.12.2 Investor perception studies

A second source of empirical evidence on the impact of mergers can be found in a number of investor perception studies. Unlike the concentration-price studies which attempt to identify a general relationship within an industry between concentration and market power, investor perception studies look at the reactions of the stock market to specific events regarding industry structure, such as the announcement of a merger or the announcement of an antitrust challenge. The idea underlying these studies is that the reaction of share prices - which reflect expectations about a firm's stream of future profits - will allow alternative hypotheses as to the consequences of a merger to be tested. By looking at who gains and loses when mergers or merger challenges are announced, different hypotheses can be tested regarding expectations about market power or efficiency.

The hypotheses to be formulated in terms of stock exchange reaction would vary depending on whether the stock market is reacting to news of a merger or a merger challenge. For example:

Stock market effects of an antitrust *challenge*

Hypothesis	**Effect on merging firms**	**Effect on rivals**	**Effect on customers**
Market Power	negative	negative	positive
Efficiency	negative	positive	negative

Source: Mullin, Mullin and Mullin (1995)

The usual approach, as in Mullin, Mullin and Mullin (1995), would be to model stock returns econometrically, including a number of control variables.

A fundamental characteristic of the investor perception methodology is that it deals with expectations of investors, as opposed to the actual behaviour of the firms. These studies therefore rely on investors being well informed of the underlying characteristics of the industry, and on stock market efficiency. Moreover, to the extent that markets partially

anticipate merger announcements or merger challenges, it can be difficult to isolate the full stock price impact of the event under consideration.

Mullin, Mullin and Mullin (1995) look at stockmarket reaction to events relating to the US Steel industry between 1911 and 1920. The methodology used consists of modelling the normal return on the stock of the firm under observation and adding to it a set of dummy variables for each relevant event. These events would include the announcement of investigations, appeals, or other significant developments in the investigation process. The dummy variables would pick up the direction and statistical significance of each event.

The results of Mullin, Mullin and Mullin (1995) support the view that US Steel possessed monopoly power and that its dissolution would have raised industry output and lowered steel prices. More generally, it concludes:

> …the results indicate that mergers can have serious anti-competitive consequences…[and] our use of a natural experiment allows us to test the pure economic effects of a merger absent the inference problems created by the deterrent effect of modern merger policy and the diversification of rival firms.

5. CASE STUDIES: SUMMARIES AND ISSUES

5.1 Case summaries

As part of this study, NERA considered 11 horizontal mergers which had been examined by the OFT between 1990 and 1994. In each case study, NERA approached the post-merger firm, its customers and its competitors, to assess the development of the market post-merger. These firms all agreed to participate in the study.[32] The main issues arising in the regulatory assessment of each case are indicated in the headings.

5.1.1. Case A Product differentiation

Merger A was between two firms involved in the manufacture of scientific instruments. These instruments were highly differentiated in that there were many different types depending on the specific end use and a large proportion of sales were modified to customer specifications. The merger occurred as the parent company of the larger firm, with [approx. 50%] of UK sales, wished to withdraw from the sector. Between them the parties accounted for [>75%] of UK sales and for almost all UK production. The merger therefore raised concerns of single-firm dominance. Despite these concerns, the merger was cleared on the grounds that the small scale of the market, at less than £1m, meant that the case was *de minimis* and that imports from international suppliers could be expected to mitigate against undue price increases.

Five years after clearance there is strong evidence that the relevant market for these instruments is worldwide. Although the comments of the parties and third parties were contradictory on some points, it appears that the market is competitive. Customers who wish to shop around for quotes can easily do so, although individual customer's demand for these products is so small that some customers may not find this worthwhile. These developments confirm the decision to approve the merger.

5.1.2. Case B Failing firm, entry and market definition

Case B involved two firms competing on a route for both passenger and freight traffic. One of the firms was declared insolvent and was purchased by the other, although it would have exited the market in any event. The acquiring company claimed that it purchased its rival to minimise disruption. There were no other interested buyers. The acquisition left the acquirer with a monopoly of passenger traffic, whereas before the two firms had held roughly equal shares, and a market share of [>75%] in freight traffic. The acquiring firm argued that the passenger route was only large enough to support one firm. The OFT accepted this defence and noted that competition from other forms of transport existed and cleared the merger. On the freight route barriers to entry for other firms were believed to be very low and so approval was also given for the merger in that sector.

[32] In one case it was not possible to speak to a current employee of the firm involved.

Subsequent events bear out this decision. While there has been no new entry into either service, prices in one of the affected services have fallen in real terms apparently due to the need to deter entry. In the other product market, prices have risen only marginally in real terms, while the quality of the service provided has significantly improved. Third parties seemed mostly satisfied with the service.

5.1.3. Case C Market definition and technical change

Case C involved a horizontal overlap in a heavily advertised consumer goods industry. In this industry, competition usually occurs by product innovation and market shares can vary considerably over time. Indeed, in the space of just one year this company's share in one sector had fallen from [>75%] to [<50%]. Post-merger, the firm would have substantial shares of some market sectors. Competitors argued that the firm's size would allow it to foreclose the market to competitors and potential entrants.

Where market shares were highly variable, there were few concerns and it was doubted whether the merged firm would be able to foreclose the market. There were some concerns in sectors where shares were more stable over time but, in these sectors, substantial competitors existed and large customers were acknowledged to have buyer power.

Subsequent developments confirm these judgements. The merged company has not had significantly more success in developing products. Third party comments testified to all sectors remaining competitive. Buyer power also appears to be significant. It is also highly questionable whether the sectors identified could be considered to be relevant markets.

5.1.4. Case D Rationalisation and buyer power

Case D involved two food manufacturers in a declining market. The acquired firm had been loss-making and its parent company wished to withdraw from the market. The acquirer was the only interested buyer. The post-merger firm would have had a very high share of some product markets [>75%], raising concerns of single-firm dominance.

The merger was cleared as it was accepted that the acquired firm would have exited the market in any event. The market in general was in decline. Brands were weak in this market. There were few formal contracts between retailers and suppliers who were forced to carry most of the price and volume risk. The large retailers had several suppliers from whom to obtain quotes.

Post-merger developments confirm this decision. Since the merger, the market in general has continued to decline. There has been a steady shift away from branded production towards own-label in the firm's mix of business. The power of the retailers and the decline in demand for the product has resulted in retail prices for many products falling, even though the firm's share of production remains high, often [>50%]. Where prices have risen, it is usually attributable to a rise in the price paid to suppliers. Some efficiencies in production appear to have been made as a result of the merger.

5.1.5. Case E Buyer power

This acquisition brought together two of the three UK-based suppliers in the industry concerned, each with a share of [>25%]. There were only a few significant customers who each accounted for large parts of demand. The merger appears to have been prompted by the decision of the largest of these customers to reduce its number of suppliers from three to two. A number of other customers had also stated an intention to single source. The merger was cleared because it was felt that the customers had significant buyer power. Moreover, although there was currently no competition from imports, the barriers to entry for imports were low.

The main market development was a substantial increase in demand by the largest customer, as a result of which it decided to seek an additional supplier. It contacted a firm which began importing the product into the UK and which now has a share of [>10%]. Prices have fallen in real terms since the merger. Since the merger there has been minimal integration of the two businesses and it is hard to point to any significant synergies from the acquisition, or to any competitive harm.

5.1.6. Case F Technical change

This merger enhanced the acquirer's global and national market leadership and eliminated their only major local competitor. Some customers had argued that there was a local basis to competition, meaning that other UK firms were not direct competitors and this firm would have a local monopoly. The post-merger firm's share of the UK market would be increased by [>15%] to [>60%]. No rationale was given for the merger, other than 'to increase market share', raising concerns of single-firm dominance.

Despite these concerns the merger was cleared as it was believed that existing regulation would prevent the firm unilaterally raising retail prices post-merger. In addition, the power of the ultimate upstream supplier of this product was thought to be able to constrain the firm. Entry was not thought to be difficult and, in any event, a major technological change was expected to revolutionise the industry.

Post-merger developments are ambiguous as to whether this merger should have been cleared. Pricing in this market is not transparent so it is impossible to judge whether retail prices have risen post-merger. Location appeared to play a role in quality of service and some dissatisfaction was expressed with the service of the merged firm. Post-merger, the firm's share of the market has increased slightly to [>75%]. The merger clearly eliminated one of the acquirer's closest competitors, both in terms of size and location. The anticipated technological change has not taken place, though there has been expansion by competitors, in some cases helped by the acquired company's former staff.

5.1.7. Case G Market definition

This merger brought together the only two suppliers of a component used in a specialised sector of UK manufacturing, with market shares of [>70%] and [>15%] respectively. The product is supplied as original equipment (OE) to the manufacturers, and as replacement equipment (RE) to the ultimate users of the final product. The RE business almost always goes to the supplier whose OE was fitted to the final product in the first place. Competition between manufacturers takes place on R&D, and through responding to the international tenders of the major manufacturers. There was a stark choice between a UK market definition, in which the merged firm would have had almost 90 per cent share, and a world market definition in which it would have had just 10 per cent, and would have faced several major competitors. In the end, it was decided that it was a global market and cleared the merger.

Post-merger developments confirm this decision. The only major UK customer for the component has continued to tender worldwide for component suppliers and has not been constrained to using this supplier, although it has chosen to do so. Demand for the component is driven solely by the competitiveness of the final product in the undoubtedly global market in which the final product competes. The relationship between manufacturer and supplier is therefore more akin to that of joint venture partners than supplier and customer, as any attempt by the supplier to exploit its customer that led to that company being less able to win international business would impact directly on demand for the component.

5.1.8. Case H Buyer power and rationalisation

This merger gave one firm control over all the major brands and most of the own-label supply of a food product with a downmarket image. Most sales took place through major retailers, whose own-label and tertiary brands were taking an increasing share of the market.

Although the parties accounted for [>75%] of production, the merger was cleared for three reasons. First, there was a question as to whether some other products ought to be included in the market definition. Second, buyer power was believed to be substantial and other suppliers existed who could quickly increase capacity. Third, demand for the product was expected to decline, thus depressing prices.

Post-merger events have confirmed all of these predictions and thus vindicated the decision to clear the merger. Despite continuing to be a larger supplier than all its competitors, the merged firm's margins have fallen in real terms on branded products and by even more on own-label. Retail prices have also fallen in real terms, though by less than the fall in margins. The size of the market has also fallen in volume terms.

5.1.9. Case I Buyer power and market definition

This merger brought together the two major suppliers and the two major brands of a consumer goods product in the UK. This product was sold through two types of outlets, with different brands in each. The merger was between the two largest brands in one retail sector, where own-label product was not well developed. These two brands had shares in this sector of [>40%] and [>25%].

As the two types of retail outlet were viewed as separate markets, it was believed that control of the two major brands in one sector would be expected to lead to a significant reduction in competition. The parties accepted the recommendation to divest one of the acquired brands.

During the period between this agreement and the actual divestment, the acquired brand disappeared from the shelves. Attempts by the acquiring firm to get the brand reinstated failed and now the brand is sold in very few outlets, where it has a down market image. The failure of the disposal to restore competition between the two brands allows us to see how competition might have been affected had the disposal not occurred. The other brand is now the only brand, and often the only product of its kind on offer in many outlets. However, this does not appear to have been translated into market power, as it appears that the existence of alternative suppliers in the other retail sector is used as leverage to keep this firm's margins low. Several companies have tried to enter this sector, but were thwarted as the incumbent supplier matched any price offer they made. Thus, the decision to have just one brand appears to be a retailer choice, rather than a reflection of market dominance. The speed of the devaluation of the disposed brand suggests that the importance of brand image was overstated. The willingness of the retailers to threaten entry by other producers, suggests that the potential for supply-side responses from producers in both sectors was underestimated, and thus that a wider market definition may have been appropriate.

5.1.10. Case J Market definition and buyer power

Merger J brought together two of the UK's largest manufacturers of a particular product. There were two main methods of making the product, one more complicated than the other, method A and method B. Although both construction methods could be used method A was often preferred as, though the product was more expensive than those produced using method B, the resulting final product allowed the incorporation of more specialised features and was generally acknowledged to be superior. There were around 30 purchasers of the final product, each of whom had their own particular specification, so all production was made to order.

The merger reduced the number of producers of method A from three to two, and gave the post merger firm a market share of [>80%] of production of this method, as well as [>50%] of the simpler technique.

Despite this, the merger was cleared as it was believed that the two building methods were close substitutes for each other and that the market shares overstated the actual market power, as all contracts were put out to tender. This was expected to give the firm little or no market

power in the medium to long-term. Barriers to entry for both types of end use product were believed to be low.

While the merged firm's share of method B has fallen post-merger, its share of the more complicated method A has, if anything, risen. No new entrants have yet entered into this sector, and customers have complained of capacity problems at the only other manufacturer, with the result that for much of the year there is only one available manufacturer. Prices for this type of product have risen since the merger, and customers who were accustomed to using method A have not switched to method B, as was predicted. Although a large part of this price increase is attributable to specification changes, part of the price rise appears to be due to the reduction in competition caused by the merger. Third party comments asserted that for a significant proportion of customers, the products produced by methods A and B are not substitutes and that the market for method A is not competitive. This may change in the near future, as there are reports of some firms planning to enter method A production. Although further detailed analysis might lead to contrary conclusions, *prima facie*, it appears that this merger has led to a significant reduction in competition, and that the propensity of customers to switch between the product types and their ability to counteract market power was overestimated.

5.1.11. Case K Buyer power and entry

This merger brought together a major producer of secondary brands and the major own-label producer in a sector of the food industry. This product had a complicated production process resulting in long lead times in production. It was feared that post merger, the firm would concentrate on its brands and reduce own-label supply. If a market was defined for secondary brands and own-label the post-merger firm would have a share of [>55%] of production, though less if the market was defined more widely. The merger was cleared as it was believed that firstly, other potential suppliers of own-label products existed; secondly, the firm was too reliant on supermarkets for sales of its brands to risk such a strategy.

Contrary to claims that own-label supply would be restricted by the merger, since the merger the volume of own-label and tertiary sales has risen dramatically while supplier margins have plummeted. Branded producers, who had misjudged the level of market demand, used own-label and tertiary supplies as a way to rid themselves of excess stocks. As a result, wholesale prices have fallen by more than a third since the merger. The merger was ironically a factor in this, as senior staff in the acquired firm, with knowledge of the own-label market, joined other suppliers whom they helped to enter the own-label sector. The ability of the major buyers to restrain price increases and the ease of entry into own-label supply were factors correctly recognised in the original clearance.

5.2. Issues

All of these mergers increased concentration sufficiently to raise prima facie concerns about the merger. Nevertheless, all but one of the mergers was cleared. The main arguments used in the analysis of these cases are discussed below.

5.2.1. Market shares and market definition

The ease and relevance of market definition depends to a large extent upon the degree of product differentiation. In some of the cases product market definition was relatively straightforward. In others, however, market definition was unclear and was a critical issue in the analysis of the case.

The aim of defining a market is to assess the competitive constraints on the merging parties and thus gain a first indication as to whether they are likely to have market power. In the case of a market with little product differentiation, market shares may be expected to give a reasonable indication of such market power, and thus the likelihood of such a price increase being profitable. Where the products are differentiated, different products may compete with different intensities though they are all part of the same economic market. In these cases, market shares should be treated with more caution. In the cases we encountered two different forms of product differentiation - fundamental differences in the product, such as in case A and in case C, and differentiation introduced by branding, such as in case I and case K.

In case C each product was fundamentally different from the others in the industry. The top end of the sector is so highly differentiated that each product competes only loosely with the others, though a single owner of all the products would be likely to be able to profitably increase prices. The original merger analysis calculated shares for specialised sectors, based on commonly used industry categories. Although it was eventually decided that such sectors did not constitute economic markets, the calculation of shares for these categories gave a misleading indication of the true competitive constraint on the merging parties. When market definition is properly undertaken, the true competitive constraint should be captured. This illustrates the need for careful consideration in defining the relevant market.

However, in this innovative market even the usefulness of this analysis needs to be treated with caution due to the wide variations in the share commanded by products over time. As competition in this sector was mainly about finding next year's success story, analysis of the market position should also focus on whether the merger would give the merged company any significant advantages in the ability to spot successes. The analysis found that the acquisition would give the firm in C no major advantages and so the merger was cleared.

In case J the main issue was whether two different production methods resulted in effective demand-side substitutes. One technique was more complicated than the other and resulted in a product able to incorporate more special features, important for one particular end use. While the original investigation decided that the end products resulting from the two different

production methods were effective substitutes, it appears from third party comments that this is not the case.

Two of the other cases dealt with differentiation of products by branding. Unlike case C where each product was fundamentally different from the other, in many branded goods markets the product is often homogeneous pre-branding. In cases I and K the merger was of firms whose brands were previously positioned very close to one another. In both cases the focus was on how closely the parties' products competed with each other pre-merger. This focus was justified as the competition between two closely competing products will be more intense than between two brands at opposite ends of the market.

However, in both these markets, concerns were lessened by the ability of other companies to reposition their brands to compete more closely with those of the parties. In case K this involved other branded producers entering the own-label market. In case I, although no brand repositioning actually occurred (except the devaluing of the image of one brand), retailers were able to use the threat of entry and repositioning, for example by introducing a branded or own-label product, to keep the firm in case I in check. The apparent effectiveness of this constraint suggests that it may well have been appropriate to consider a broader market definition.

In case A the market also appeared to be defined too narrowly. The geographic market was defined as the UK, though it was felt that increased imports may act as a constraint on the post-merger firm. Developments since the merger confirm that A faces significant competition from non-UK firms suggesting that the relevant geographic market should have been defined more widely. Like G the current high UK market shares of the parties appeared to have bestowed no power over prices and a worldwide market definition seems to have been appropriate.

5.2.2. Buyer power

Buyer power emerged as one of the strongest constraints on market power in the cases examined. It was cited as a crucial factor in approving seven of the mergers, and there were only two mergers where it did not feature as an issue. Post-merger developments have justified the authorities' decision in most cases; however in case J buyer power seems to have been overestimated.

In case G the close relationship between the merging firm and its main customer, especially in the area of product design, was more akin to that of an in-house supplier or joint venture partner rather than an independent customer. While all large contracts for the product were put out to tender, such tenders were infrequent and the firm had an advantage in winning this customer's contracts due to a long history of co-operation. The success of the firm's business depended entirely upon the success of the final product into which they are placed. The apparent dependence of firm G on this long-term relationship meant that it would be unlikely to risk upsetting this relationship.

In C the particular characteristics of this industry meant that retail buyers exercised control due to competition for scarce shelf space. In this industry, branding, and to an extent the name of the manufacturer, is unimportant. Retailers are more interested in the product, whether from either a large or small company. Large manufacturers do have an advantage in that they have more experience in promoting products and due to long-term relationships they have superior access to retailers. However, this market is ultimately driven by the strength of the products rather than the manufacturer.

Four of our cases involved products sold through the major multiple retailers and wholesale chains. Cases D, H and K supplied both branded and own-label products, though the firms in cases D and H operated in markets dominated by own-label sales. Case K involved the take-over of an own-label supplier by a branded supplier. It was argued that the large share of production the merged firm would have with respect to own-label and brands positioned just above own-label would enable it to reduce supply of less lucrative own-label.

Subsequent developments in all three own-label cases have shown such concerns to be groundless. In all three cases, the margins commanded by the supplier have fallen substantially in real terms since the merger. These major retailers seem adept at managing their sources of supply. In cases H and K the major supermarkets reacted to the merger by reducing the volume of own-label contracts they placed with the firm, to avoid dependence on any one firm. In case H a new supplier even appears to have entered at the encouragement of a large retailer. Supermarket buyer power is facilitated in these markets by the homogeneity of the basic product prior to branding, so that they can switch between suppliers for both their own-label and private labels without customer complaints.

The contracts placed by the supermarkets for own-label supplies are testimony to their power. Formal contracts are rare and renegotiations are frequent. Although contracts for own-label supply do not change hands frequently, this is attributable to suppliers typically agreeing to match the best offer received by the supermarket.

In addition to being able to manipulate own-label suppliers, supermarkets in particular are able to influence sales of branded goods. Buyer power in consumer markets is the ability to circumvent the power of brands. Following the merger, the firm in case K did attempt to use its increased size to strengthen its negotiating power, but found that the supermarket's power was stronger than any of its brands. Even with must-stock brands supermarkets can influence sales by where the products are placed on the shelf and by brand positioning of its own-label product. In case I, the threat of entering with an own-label product or stocking another brand appears sufficient to give major retailers and wholesalers the upper hand in negotiations.

In case I the buying power of these retailers seems to have been greatly underestimated. This case differed from the three discussed above, in that it involved the supply of branded products. The merger gave the firm in case I control over the only brands most supermarkets and wholesalers stocked, in a market where own-label product was unusual. However, the existence of alternative producers, with sufficient capacity, active in a more specialised retail

sector, meant that the retailers were still able to use the threat of switching brands or introducing own-label supplies to keep supplier margins low. Although brand recognition was high, brand loyalty was low enough for this threat to be credible. Thus, even control over the only recognised brand was not sufficient to counteract the power of the retailers.

Of course, buyer power of intermediate customers is most beneficial for the consumer if there is competition in downstream markets. The clearest evidence of this competition in the retail sector was the emergence and growth of tertiary brands in cases K and H. Unlike conventional brands where the purpose of branding is to signal quality, the purpose of tertiary brands appears to be to signal low price. These brands are launched without any advertising support to sell at a price below that of own-label product. As both supermarkets and producers had lower margins on tertiary brands than on own-label and branded products, neither welcomed the development of these brands. We were told that the development of these brands was prompted by the activities of the cheapest retailers who sell purely on price. As the major supermarkets had to be seen to be competitive with these retailers, they had to stock tertiary brands, although they did not wish to do so.

The buyer power exhibited by the largest customer in case E was similar to that exercised by the intermediate customers in the retail sector. This customer was actively involved in managing the market between its suppliers. The merger itself appears to have been the result of this customer deciding to switch from three suppliers to two. A subsequent change of mind led to this customer seeking and securing the entry of another supplier. As with contracts for own-label supply, the contracts appear to favour the customer. For example, its contracts give it the right to vary the proportion of business that it places with each supplier based on price and quality of service. These contracts place most of the risk with the supplier.

In one case, however, the assessment of buyer power appears to have been over-optimistic. In case J the only other supplier of one type of product faced capacity constraints and so buyers were unable to play the two suppliers against each other to achieve better margins. Each of the approximately 30 different customers had their own particular specification, so demand was highly fragmented. Indeed due to capacity constraints, those with large orders faced higher prices than those with small orders as it was less likely that both manufacturers could handle their order at any one point in time. The only significant competitor to firm J in the main area of concern suffers from capacity constraints and so cannot compete actively for a significant proportion of contracts. In four of the nine tenders for this product in 1997, there was only one bidder, in three cases this was firm J. As there was no alternative producer to turn to, customers had very little buyer power in subsequent negotiation. Although specification changes make it difficult to compare prices across years, third party comments indicate that the merger substantially reduced competition in the sector, and that prices have risen as a consequence.

One difference with the cases above, is that customers were unable able to guarantee orders and so were less able to reduce the risks associated with entry. Even so, the barrier to entry

quoted did not seem insurmountable in relation to the size of the market, and it is not clear why entry has failed to occur in this case. Currently, a number of firms are said to be preparing to enter this market.

In summary, buyer power requires more than a customer that accounts for a large percentage of sales. It is the ability of customers to circumvent producer power, even where producers have a large market share or strong brands. This typically involves facilitating post-merger product repositioning by other branded suppliers, entry through the commissioning of own-label, private label and tertiary brands or other supply-side responses, such as guaranteeing contracts partially to underwrite the entry risks of a new supplier. However, this ability can only be present where buyers have a credible alternative supplier of the commoditised element of the product to call upon.

5.2.3. Dynamics and entry

One of the notable features when looking at the cases as a whole was the difficulty of predicting future events from a snapshot of a market. This is always going to be a problem for merger control. However, this is further complicated by the fact that the disruption of the merger itself can strongly influence post-merger developments. In three of the cases, this disruption led to new entrants into the affected market.

In both cases K and F, employees from the acquired firm left to join rivals, bringing with them expertise and contacts enabling their new firms to compete closer with that of the post-merger firm. In both these cases the merger and rationalisation acted as a catalyst for increased competition in the industry.

5.2.4. Rationalisation

In four of the mergers, the parties argued the take-over was a response to either a declining market or that one of the firms would have left the market in any event. Cases B and D appear to be classic examples of declining markets. In cases G and A, while the acquired businesses were still profitable, the market appeared to be becoming more global.

Case B was a classic example of a failing firm. Every time two companies had operated on the route, both had lost money. One firm on the route was insolvent and was due to withdraw from the route. New entry was considered very unlikely, given the unprofitability of the exiting firm. The firm in B's acquisition of its rival appears to have been a crisis measure to minimise disruption to the route, rather than a conventional take-over. As the evidence suggested that there was room only for one operator in the market, there was little ground for refusing the merger.

The acquisition by the firm in case D also appeared to be a response to a declining market. Due to the sustained and substantial decline in demand for its product, the market was no longer large enough to sustain the number of players who were supplying the market. The exiting firm had considered unilateral rationalisation and new investment, but had concluded

that the market was such that it was unlikely ever to see a return on its investment. It had also been in negotiation with another possible buyer, but this negotiation had failed. This firm was the only interested buyer of a failing firm.

The claim that the firm would have withdrawn from the market anyway was also used in case A, though here the claim was less well supported. Although the acquired company was put up for sale by its parent, the acquirer was not the only company interested in purchasing it. However, this firm's total worldwide sales are currently significantly below the combined parties prior to the merger, which suggests that the market is indeed declining. In clearing the merger, A's claims of the need for rationalisation were disregarded, and instead more weight was given to anticipated competition from imports, which has since occurred. Given the lack of evidence that either company would withdraw from the market and the existence of other interested buyers, the decision to disregard the failing firm argument was justified.

Similar circumstances occurred in case G. Again the parent company decided to put one of its businesses up for sale and the acquirer was one of the firms interested in purchasing the business. This firm argued that the company involved was no longer viable as a stand-alone business and the other interested firms were US based, which would result in a loss of UK based expertise. Again the analysis ignored the failing firm argument, and focused on competition from imports. It was clear that the market for these components was worldwide, so the merger was allowed to proceed.

Cases D and B appear to be examples where, as the firm would have exited anyway, and there were no alternative buyers, the merger had little impact on the market. In cases A and G, other buyers were available, but the market was worldwide rather than UK. In situations where other buyers are available, with less overlap with the firm for sale, less weight should be given to failing firm arguments and correspondingly more weight to other constraints on the merging firms.

5.2.5. Technical change and innovation

This formed a factor in the clearance of two cases, C and F. In case F the acquiring firm claimed that the merger was a response to fundamental change in the industry. This firm argued that in the near future a technological change would completely change the nature of the market. Although this was cited as part of the rationale for clearing the case, this prediction has not been realised. Five years after the merger, this development has still not occurred and the market seems likely to change only slowly in the years to come.

The market in case C was characterised by constant innovation, so that even a successful product may only achieve significant success for a single year. In this innovative market, competition takes the form of finding next year's 'success'. It is not uncommon for a company to come from nowhere to gaining a substantial share of the market on the strength of just one product. While we were not able to obtain current shares for this sector, it appears as though the post-merger firm's share has fallen. As competition is mainly about the introduction of new products, the authorities did not see that the merger would give the firm a

dominant position in either spotting or developing successful products. Third party comments testify to this market currently being competitive, despite concerns voiced at the time of the merger.

6. CONCLUSIONS FOR MERGER APPRAISAL

6.1 The conceptual framework for horizontal merger appraisal

6.1.1 The purpose of merger control

The purpose of merger control is to prevent mergers from taking place when they will lead to reduced economic welfare. It is equally desirable that merger control permits mergers that are likely to lead to enhanced welfare. Mergers that lead to lower costs and prices improve welfare. Mergers that lead to higher prices and do not lower costs normally harm welfare. Mergers that lead to higher prices through reduced competition, but lead to lower costs because of improved efficiency are, in theory, ambiguous in their effect on welfare, although in practice a merger that raised prices is likely to be viewed with suspicion. This may reflect either a public policy decision to place a higher weight on consumer rather than producer interests, or a view that in the absence of effective competition potential cost savings may never be fully realised.

6.1.2 The nature of competition detriments

Horizontal mergers may threaten competition by eliminating the direct competitive constraints which each of the merging parties formerly placed on each other's pricing. A significant constraint is likely to be eliminated if the parties to the merger both enjoyed significant pre-merger market shares or if they were particularly close substitutes. When these conditions are met, the merger may create a firm that is sufficiently large relative to the rest of the market, or its closest post-merger substitutes may be sufficiently distant, for it to be able to raise its prices without the fear of substantial volumes of business being lost. These effects are typically referred to in the literature as the **unilateral effects** of a merger. They are unilateral since the incentive to raise prices comes solely from the elimination of the competitive constraint which the acquired products previously placed on the products of the acquiring firm, and vice versa. These effects do not rely on the tacit co-operation of other firms in the industry, although under most models of oligopoly behaviour the other firms will normally adjust their output and pricing decisions to take account of the modified behaviour of the merged firm.

Horizontal mergers in relatively highly concentrated markets may also threaten competition if they create an environment in which tacit or explicit collusion between those firms left in the market becomes more likely. This effect is commonly known as the **co-ordinated effect** of a merger. It is co-ordinated because it will only be profitable for the merged firm to significantly adjust its prices or output if the remaining firms in the market choose not to compete aggressively and instead decide to tacitly collude with the merged firm in reducing output or raising price. It is also possible that the merger will make possible an explicitly collusive arrangement that would not have been possible prior to the merger. Alternatively, the merger may make tacitly or explicitly collusive arrangements, which were already in existence, more stable or allow them to remain stable at higher collusive prices than had previously been possible.

The collusion literature is well established even if the detailed policy conclusions to be drawn from that literature are complex. The fear of post-merger collusion was the primary concern in the 1984 US Horizontal Merger Guidelines, with concentration ranges providing the initial criteria by which mergers should be vetted for co-ordinated effects. Subsequent developments in the literature have lead to unilateral effects joining co-ordinated effects with more-or-less equal billing in the 1992 US Merger Guidelines. The impact on prices of unilateral effects are more amenable to theoretical model-building and estimation than those of co-ordinated effects, and a range of techniques are used in the US to estimate the initial impact of a unilateral effects merger on prices. Each of these techniques has different data requirements and makes different assumptions about the structure of demand.

Unilateral effects analysis has been embraced by the US anti-trust authorities and the conceptual framework underlying unilateral effects is generally considered to be the appropriate one for looking at mergers in differentiated goods markets. While the estimates derived from the different models can be sensitive to small changes in the key assumptions made about the nature of demand and the nature of competition in the market, it is usually possible to discriminate between good and bad estimates. Often an estimation will be capable of validation by reference to other available evidence. The authorities should normally be able to replicate econometric results from the raw data to understand fully the assumptions made in the construction of the estimate and to spot any selective use of the data by the parties.

Nonetheless, irrespective of the merits of the estimation of unilateral effects in any given case, the conceptual distinction between co-ordinated and unilateral effects is a valid one and one which should be kept in mind in the analysis of any merger, particularly one taking place in a differentiated products setting.

6.1.3 The impact on competitors

When prices rise through either unilateral or co-ordinated effects competitors of the merged firm will benefit. If the merged firm has made a unilateral output reduction or price increase, competitors will benefit by being able partially to replace some of the withdrawn output of the merged firm or by finding that the merged firm's price rise has raised demand for their own output, permitting them to raise the prices of their products. If the merger has co-ordinated effects competitors will clearly benefit through the enhanced ability to come to tacitly or explicitly collusive arrangements. Consequently, competitors have no incentive to complain about mergers that have significant unilateral or co-ordinated effects. These perverse incentives are recognised in some of the empirical work on the impact of mergers which monitors the movement in the share price of competitors following merger announcements and interprets a rise in the share prices of competitors as being consistent with an anti-competitive merger.

However, competitors will have legitimate grounds for complaining about a merger that increases the merged firm's ability to engage in **exclusionary practices** which might force

rival companies out of the market. Exclusionary practices are often claimed to follow from vertical mergers which have the potential to foreclose rivals from important sources of supplies or distribution. Horizontal mergers are also sometimes claimed to increase exclusionary possibilities, often by expanding the resources available to the merged firm for campaigns of predatory pricing or discriminatory discounting. These arguments are generally hard to sustain, although to the extent that they can be supported they will normally rely on the merger eliminating a competitive constraint in a similar manner to a merger raising fears of unilateral price increases. In these circumstances it will be argued that the merger enhances the post-merger firm's bargaining power with either upstream or downstream firms in a way that raises rivals' costs or threatens access.

Competitors may also have an incentive to complain if they fear that the merger will create synergies and lead to lower prices and tougher competition. Generally, therefore, the harm to competitors from efficiency enhancing mergers and the benefit to competitors from mergers with significant unilateral or co-ordinated price raising effects means that their interests and those of economic welfare are not well aligned. For this reason competitor testimony should be given the same critical scrutiny as that of the merging parties.

6.1.4 The role of market definition and concentration measures

Market definition permits the calculation of market shares and consequently allows the impact of a merger on market concentration to be statistically summarised in measures such as the Herfindahl-Hirschman Index (HHI). The impact of a merger on concentration is a relevant considerations in assessing whether a merger is likely to have significant unilateral effects and in the consideration of its likely co-ordinated effects.

However, market share changes and concentration measures need to be used with caution. The market shares that can be calculated once the market has been defined are most useful in those situations in which there is a relatively clear distinction between the products that are in the market and those that are out of the market and the products within the market are relatively homogeneous. If these conditions are met then it may be reasonable to argue that each percentage point of market share carries a similar degree of competitive influence within the market. However, when the market boundary is indistinct and the products involved are highly differentiated then market shares have much less analytical value in estimating potential unilateral effects.

6.2 Concentration and co-ordinated effects

Concentration measures are often highly relevant to the assessment of whether the remaining firms in the market are likely to come to a tacitly or explicitly collusive arrangement, or come to a more effective one than before. The established literature suggests that collusion, both tacit and explicit, is more likely to be effective when there are a small number of large sellers. The importance of concentration has been confirmed in more recent game-theoretic analyses. There is also some empirical support for the effect of concentration on the effectiveness of collusion. Concentration is important because large sellers have less to gain from cheating

than small ones, are more likely to be caught if they cheat than are small ones, and are more likely to detect the cheating of others because they have information about more of the market by virtue of being a bigger part of it.

In addition, fears of collusive activity are, by and large, confined to industries in which the products are relatively homogeneous, with little differentiation or customisation. This is because it is easier to fix a schedule of collusive prices when products are similar than when they all have different characteristics, sell at very different prices and can be modified for specific customer needs. However, it is markets in which there is a high degree of product homogeneity in which market shares are most meaningful because each percentage point carries broadly equal weight in the market place. For these reasons, concentration in the assessment of co-ordinated effects is relevant and the standard measures of it, such as HHI, are meaningful.

Of course, there are other factors which need to be considered when looking at the likelihood of a merger having co-ordinated effects, but an initial appraisal based on concentration and concentration changes is likely to provide a reliable foundation for the subsequent analysis.

6.3 Concentration and unilateral effects

Standard concentration measures are also relevant for an appraisal of the possible unilateral effects of a merger and market definition and markets share calculation may provide a useful first step in the analysis. However, the caveats surrounding the use of market shares and concentration measures are much greater in this case than in the case of co-ordinated effects, and there have been numerous articles highlighting the potentially serious errors which could be made from over reliance on market shares in some cases. The purpose of a unilateral effects analysis is to try to identify the strength of the competitive constraint which has been eliminated by bringing two or more previously competing products under common control.

6.3.1 Unilateral effects models

In the unilateral effects models sales which would have been lost to a rival firm following a price rise are no longer lost if that rival is acquired. Following the acquisition of a rival there is consequently an incentive to raise prices because some of the sales of the acquirer's original products which are lost following a price rise will now be recaptured in higher sales of the acquired products. The proportion of a product's lost sales captured by another product is known as the diversion ratio. The higher the diversion ratios between two products the greater the unilateral effects following their merger and the greater the expected price rises which will occur in the absence of any offsetting supply-side adjustments or cost savings.

Under certain conditions, market shares might provide a good proxy for the relevant diversion ratios. Specifically, if the products are very similar or if there is some other good reason to think that those customers who would switch products following a price rise are likely to divert to all other products in proportion to those products' existing market shares, then existing market shares will naturally provide a good indication of the extent of the unilateral

effects. However, the consensus in the literature is that this is, generally, a strong assumption to make.

A high market share does not necessarily mean that a product will benefit greatly when a rival product raises its price and loses customers. When products are differentiated it is highly likely that those customers who switch following a rise in the price of their first choice product will not switch to other products in proportion to those products pre-merger market shares. For example, one might reasonably suppose that if the price of BMW cars were to rise, marginal consumers of BMWs would probably not switch overwhelmingly to Ford cars even though Ford cars have a substantial share of the car market as a whole. In most differentiated product markets, market shares are not likely to be a good proxy for the diversion ratios of interest. The more differentiated are the products the less informative are the market shares likely to be. Of course, one could narrow the market very substantially to try to obtain market shares which are more relevant, but this runs the risk of failing to take sufficient consideration of the products which have been excluded from the market, and may therefore overstate the unilateral effects of the merger; after all, some BMW drivers would switch to Ford.

This kind of analysis goes further than market definition and the calculation of market shares, and focuses attention on those mergers which are most likely to pose a potential problem for competition because of the closeness of the competitive constraint which is lost by the merger. However, estimation of the likely price rise which will follow from a merger with unilateral effects does not provide the last word on the desirability of a merger. In fact, this kind of estimation is only a partial analysis and a first step in the complete evaluation of a merger.

A pure demand-side analysis can never truly simulate the effects of a merger. As the case studies show, supply-side adjustments, new entry and other dynamic factors which are not taken into account in the demand-side modelling, is the norm rather than the exception. For this reason unilateral effects analysis must comprise a three-stage approach; the first step identifies the extent of the competitive constraint which is lost using purely demand-side considerations, step two looks at supply-substitution, brand repositioning and new entry, while step three analyses the efficiency benefits of the merger.

6.3.2 Stage one: identifying the extent of the lost competitive constraint

While a large pre-existing market share may make a product a likely alternative purchase for another product's disaffected marginal customers, the more telling factor is likely to be how closely the products were perceived to be competing by each other's customers (eg BMW customers may perceive Mercedes as a closer substitute than Ford despite the latter's higher market share).[33] A qualitative appraisal of the two products' characteristics may help to

[33] Of course, within a differentiated product market even products which are not perceived as particularly close substitutes by the customers of the merging parties will have some competitive influence on each other. Ultimately the extent of the influence exerted by any product is an empirical question.

determine whether market shares can be relied upon, and in some markets it may be clear that the merging products are both particularly close substitutes for each other, regardless of their market shares. Generally however, the appropriate route will be to try directly to estimate the extent of the competitive constraint lost. In data rich markets it is possible to construct econometric estimates of the size of the post-merger price rises, largely by-passing market definition, and without the need to adopt overly restrictive assumptions about the nature of competition by imposing a particular model on the data. In other cases, the likely post-merger price rise can be estimated using data on diversion ratios and pre-merger margins by making specific assumptions about the mode of competition and the nature of demand. A range of high and low level techniques is available to attempt to quantify post-merger price rises.

However, even where the application of data intensive techniques is not possible, it may be worthwhile exploring directly the relationship between the merging products rather than trying to impose a market definition on a market of highly differentiated products and then seek to interpret the market shares, as if each percentage point of share was equally effective as a competitive constraint as every other. Questions directed at, or surveys of, the existing customers of the merging products may be able to identify the likely destination of their custom were they to switch, and this might aid in the estimation of a diversion ratio. The most relevant views are those of the marginal customers of the existing products, who are the ones who would switch following a price rise.

6.3.3 Supply-side responses

While an analysis of the detriments which might flow from a merger in the form of higher prices through unilateral or co-ordinated effects is an important part of the analysis, it is nonetheless only the first stage. In many markets there is the possibility of subsequent supply-side adjustments taking place which will act partially or fully to offset the effects predicted by a static analysis of the market based on existing suppliers and existing products. Broadly, it is possible to categorise supply-side responses into supply-side substitution, product repositioning and new entry.

Supply-side substitutes should have been considered in the market definition stage of the appraisal process if they are such effective constraints that their existence is already reflected in pricing in the market. Once included in the market, they will have been included in the calculation of market shares and other structural measures. However, if the market has been too narrowly defined, and effective supply-side substitutes have been excluded from the market, standard concentration measures will overstate the impact of the merger because the concentration measures used will have effectively omitted some market participants from the calculation. Supply-side substitutes should only be considered again at the second stage of a structural analysis if they were omitted as market participants at the first stage. In two of our case studies pricing does not appear to have been materially affected by mergers which, on the basis of the definitions adopted, were merger to monopoly. In these cases, it would have been entirely appropriate to include other suppliers in the initial market definition, despite the absence of demand-side substitution between their existing products and those of the merging

firms. The inclusion of supply-side substitutes in the market is recognised in the market definition approaches set out by competition authorities in the UK, US and the EC.

However, supply-side substitutes are not reflected in the price rise estimates generated by the econometric modelling of unilateral effects. These models explicitly only account for demand-side effects and the strength of any supply-side constraints must be accounted for in the second stage of the analysis.

Brand or product repositioning can be considered as a variant on supply-side substitution. Although existing suppliers' capacity and their existing brands may already be included within the market, in a differentiated product setting the closeness of rivals' products to those of the merged firm will be relevant to the assessment of unilateral effects. One important issue will therefore be the extent to which it is possible for rival suppliers to reposition their products by, for example, taking them up or down market, or by introducing a new brand, to create a product which is closer to the merged firm's products than those which had existed before the merger.

In certain situations large customers may be able to assist in the creation of new brands or the repositioning of existing ones. In the branded consumer goods sector, own-label brands, private-label brands and tertiary brands are all examples of retailers commissioning products whose place in the existing spectrum of products they determine. More generally, buyer assisted repositioning of the products sold by rivals to the post-merger firm can be an important factor. Large buyers have the power to facilitate supply-side responses through strategic actions such as underwriting the sunk costs incurred by the supply-side substitution. Where brand or product repositioning is easy, initial concern over significant unilateral effects may be misplaced.

Finally, supply-side responses may take the form of new entry. New entrants are those whose existence, by virtue of the need to make a significant or risky investment, or due to the length of time which would elapse between their decision to enter and actual entry, is not reflected in the pre-merger prices and would be unlikely to be reflected in post-merger prices either. Recent industrial organisation theory suggests that an entrant is unlikely to be attracted into a market simply because the post-merger prices in that market are high. More likely, a new entrant will be attracted in to a market in which it anticipates that the prices which will prevail in the market after it has entered will be high enough to justify its initial investment in entry. While pre-entry prices may influence this expectation, it is more likely that it will be the post-merger market structure which will hold out to the would-be entrant the prospect of profitable post-merger entry. Viewed in this way, mergers in which entry is thought to be relatively easy are less likely to raise competition concerns not because post-merger price rises will be deterred by actual entry, but because forward-looking incumbents whose only motive for merging is to create an anti-competitive post-merger market structure will be deterred from doing so by the prospect of ex-post entry.

In the merger case studies, one quite striking feature of the ex post analysis was the frequency with which the market had developed since the merger through entry or supply-side responses. The case study experience usefully highlights the practical importance of assessing each stage of the analysis suggested by the unilateral effects check-list. Although the first stage in that check-list - the evaluation of demand-side factors and diversion ratios to construct a list of possible post-merger price increases - is a useful starting point, the case study experience cautions strongly against any temptation to stop the analysis at that stage, or to reach conclusions on the merger purely on the demand-side implications.

6.3.4 Efficiency gains

If the preceding analysis raises no fear of any significant post-merger detriment through either unilateral or co-ordinated effects because the post-merger shares are too small, the products are insufficiently close substitutes within the market, or supply-side responses are likely to have deterred a purely anti-competitive merger at its inception or are likely to thwart any post-merger price rise, then a detailed examination of the claimed benefits of a merger may not be necessary. However, if there are outstanding concerns following the first two steps of the analysis then it will be necessary to explore whether the benefits of the merger are great enough to risk a loss of competition of the expected magnitude.

Generally, it is inadequate for merging firms merely to argue that a greater market share will make them a more effective competitor without explicitly spelling out how this superior competitive state is to come to pass. Furthermore, some authors suggest that cost savings which could have been achieved without the merger, such as savings made through the self-contained re-organisation of an acquired firm's operation, might reasonably be given less weight than cost savings which are uniquely the product of the integration of the merging parties. Genuine integration might permit the greater exploitation of economies of scale, engender learning effects or allow for the consolidation of head office functions and other overheads. A combined firm might also be better placed to obtain savings on its inputs if it is able to obtain volume discounts as a consequence of its greater volume of orders. These kinds of efficiency benefit are, in principle, amenable to quantification and the proposed means of achieving them can be set out in advance of the merger. The greater the danger to competition identified in the first stage of the analysis, the greater will be the efficiency benefits needed to offset those concerns. Also, efficiencies which impact on marginal costs are more likely to be reflected in lower prices than those which would otherwise prevail than savings in fixed costs of operation. Even so, fixed cost savings are efficiency gains, albeit ones without the additional benefit of a direct impact in terms of lower prices and potentially higher output. Both kinds of cost saving are recognised in the US Guidelines.

6.3.5 Failing firms

Occasionally, other benefits of a merger will be claimed. Merging parties may claim that one of the firms involved is failing and that acquisition will allow the business of the failing firm to be continued in an orderly fashion without disruption to its customers. These claims are most persuasive when it can be clearly demonstrated that the firm involved would surely have

exited the market and that its assets would, in all probability, have exited too. If this is the case the appropriate benchmark for assessing the post-merger structure is the market without the failing firm or its assets. Typically this will significantly reduce the competitive impact of the merger. However, if the firm might have had a buyer from outside the market, or if it might have been bought by a firm within the market whose acquisition would have raised less concerns for competition, or even if the assets might have been divided among several market participants, then the appropriate benchmark for judging the merger will be the least anti-competitive of the possible alternative scenarios for the distribution of the assets. In those cases, the avoidance of disruption may have to be weighed against the impact of diminished competition.

Benefits which are contingent upon some future market development, such as the future reduction of trade barriers, or the globalisation of a currently domestic market might act to lessen concerns about a merger which generates significant competitive concerns on an analysis based on existing technologies and geographic markets. The more speculative the market changes which are postulated, the more appropriate it may be to rely on an analysis based on historic technologies and market definitions based on historic patterns of substitution. In one of our case studies reliance was placed on a fundamental shift in technology which would require fewer, larger firms in the market than could be sustained with the existing technology. However, after five years this technology has made virtually no impact and is still seen as many years away from doing so.

6.3.6 Market dynamics and innovation

Even so, market dynamics can be an important element in the assessment of a merger. Benign mergers are often a response to existing trends in the market place or to a shift in technology or consumer tastes. Many mergers may be prompted by a decline in the market, the failure of a rival or the introduction of a new technology. Ascertaining at an early stage of an investigation what market developments have prompted the merger may allow any diminution of competition to be put in its proper context and enable the key benefits of the merger to be identified. Conversely, mergers which occur within a relatively stable environment may raise greater fears of post-merger collusion and may be harder to justify as being a benign response to external developments. Most of the mergers examined in our case studies had dynamic elements to them. In very few cases did the merger appear from a relatively stable and unchanging environment, and those that did tended to be the ones about which there appears to have been the greatest detriment to competition.

In addition, in some markets, the primary mode of competition does not take the form of supplying existing products at the lowest prices, rather the main form of competition in the market is dynamic. In markets in which firms compete by offering fundamentally different products which are better than the previous generation, a static view of competition may not be appropriate. For example, in markets for pharmaceuticals, video games and computers, concern is less for the extent of price competition between suppliers of the current generation of products, and more for competition between firms to supply the next generation. The competitive advantage of existing technologies is usually rapidly eroded once the next

generation of products is available, and so static dominance of a particular generation of products is unlikely to confer the power to raise prices above their competitive level for very long. Indeed, it is the prospect of short-lived, but high profits from a successful product which persuades firms to invest in the speculative search for new products.
In one of our case studies it was very clear that high market shares were only ever transitory. Mergers which create high market shares in such a situation may not harm competition, provided that the merger does not materially diminish the extent of competition for the market. Dynamic competition may take the form of formal R&D programmes, creative effort by the firms themselves, or the ability to spot a hit pop song or toy created by others. This way of thinking about mergers in innovative markets is reflected in recent literature which suggests that the focus should be on the innovation markets which lie behind the visible product markets.

6.4 A practical framework for merger appraisal

Based on the lessons learned from the case studies and the existing literature on horizontal mergers, it is possible to create a template for merger appraisal which captures most of the key elements.

An initial distinction must first be made as to whether the key concern is with co-ordinated or unilateral effects, as these involve different approaches to the merger analysis and differing effects are looked for.

Under both approaches, if the demand-side analysis reveals significant concerns, supply-side responses should then be looked at to see if these would prevent any exploitation of market power. Under co-ordinated effects the main focus is on conventional supply-side substitution, where an identification of a supply-side substitute leads to a widening of the market definition, which may negate competition concerns. Under unilateral effects, the initial analysis of identifying the competitive constraints on the merging parties explicitly focuses solely on demand-side constraints. In addition to supply-side substitutes, supply-side responses can take the form of repositioning of brands, for example by a rival producer changing its brand image to be closer to that of the merging parties, or entry.

In both cases, any expected efficiency gains from the merger should be looked at to see if they outweigh any anticipated detriment.

6.4.1 Co-ordinated effects

If concerns are voiced that the merger is likely to create an environment more conducive to tacit or explicit collusion, or make existing collusion stable at higher prices, the following factors should be looked at.

Table 6.1: Identification of initial concerns for co-ordinated effects

Factor	Comment
Is the product relatively homogeneous?	Product homogeneity makes collusive outcomes easier to sustain.
Is competition mainly based on price?	Extensive non-price competition may mean that even agreement on prices does not prevent collusion-breaking competition between firms.
Are prices transparent to competitors?	Transparent pricing makes cheating easier to spot and so deters it making collusion more stable.
Is there a history of explicit attempts at cartelisation in the market?	Markets with a history of cartel behaviour are likely to be susceptible to co-operation.
Is demand stable?	It is harder to spot cheating in markets which are rapidly growing and so collusion is less likely in an expanding market.
Are the remaining players of similar size and with a similar cost structure?	Differences in cost structure or size may give firms different incentives to cut prices making the collusion less stable.
Are buyers small?	It is easier to sustain collusion with many small buyers rather than a few large ones.
Does the merger materially increase concentration?	Fewer firms each with a larger share of the market are more likely to spot cheating, have less incentive to cheat themselves and are more likely to get caught cheating.
Was the acquired firm a maverick?	If the acquired firm was noted for being particularly aggressive in its response to competition its loss may make collusion much more likely once it has disappeared.

6.4.2 Unilateral effects

Unilateral effects concerns arise if a merger eliminates competition between two firms who were particularly significant constraints on each others' pre-merger pricing, either because they both held significant market shares or because they were particularly close substitutes.

Here a three-stage analysis is required:

- identification of initial concern based on demand-side factors;
- identification of supply-side responses; and
- identification of efficiencies.

Table 6.2: Identification of initial conditions for unilateral effects

Factor	Comment
How good a proxy for the competitive influence of each firms' products are market shares?	In highly differentiated product markets market shares may not be a good proxy for the constraints placed by one firm on the other.
Rather than implicitly making strong assumptions about the structure of demand by relying on market shares, would it be better to try to directly identify the extent of competition between the merging firms?	If the products are particularly close or distant substitutes, direct measurement of the competitive constraint lost by the merger may be better than inferences from market shares.
Is there sufficient data to permit direct econometric estimation of post-merger price rise or the calculation of diversion ratios?	It may be possible to estimate price rises directly if good data are available, making the minimum of assumptions about the structure of demand.
Is there qualitative information about the preferences of the current consumers of the merging products which identifies the products they would buy if the price of their existing purchases rose?	Even without detailed quantitative data, it may be possible to identify the key competitive constraints of the products of the merging parties and see if the products of the other merging party feature highly among them.
Do potential competitors face capacity constraints or steeply rising costs if output were expanded?	If competitors cannot easily expand output or can only do so with a cost penalty, they are less likely to respond to the unilateral actions of the merged firm in a pro-competitive way.

If either of the two approaches outlined above has raised significant concerns, then possible supply-side responses which may reduce such concerns should be investigated.

Table 6.3: Identifying supply-side responses

Factor	Comment
If a structural, market share-based approach has been taken, have all supply-side substitutes been included in the relevant market?	If there are firms whose entry into the supply of directly competing products would be so quick and easy that their existence is already factored into the price (eg retailers have been getting quotes from them to use against the incumbent(s)), then they should be in the market definition and counted in market shares.
If the merger causes concern because the products were particularly close competitors, is the creation of new products by existing suppliers, or the repositioning of old products sufficiently easy for those concerns to be overcome?	New or repositioned products which fill the gaps in product space left by the merger will limit the extent of post-merger price rises by the parties.
Have any existing suppliers recently launched new brands or repositioned existing brands?	Historic evidence on supply-side movement could be the best way to discriminate between post-merger reactions that are technically feasible, and those that are actually likely.
Have retailers in this market been instrumental in assisting in the repositioning of brands?	The crucial feature of buyer power is the ability of large buyers to facilitate supply-side responses, by sponsoring or underwriting rivals.
How large a share of the market would a new entrant have to win to be viable post-entry, bearing in mind economies of scale in production and distribution, and any benefits from large scale purchasing?	The larger the share of the market which an entrant is required to win in order for it to be viable, the less likely that such entry will occur.
How likely is it that a new entrant will reach its minimum viable scale, considering consumer resistance to new entry or other natural advantages of the incumbents?	If markets have been defined narrowly, or if the focus is on two closely grouped competitors, the requirements for 'entry' or supply-side shifts from rivals located in adjacent product areas may be less onerous than if entry requires de novo investments in new fields of activity.

Even if concerns still remain, in some cases, the benefits to be achieved by the merger may be sufficient to offset any outstanding competitive concerns.

Table 6.4: Identifying efficiencies and other factors

Factor	Comment
Would the acquired firm have certainly exited the market absent the merger?	If the assets would have exited the market anyway the merger may have no significant impact.
Is the merger taking place within an established pattern of market development which provides a rationale for the merger?	By understanding the market context, it may be possible to identify a pro-competitive rationale for mergers which are responses to external changes to the size of the market, the nature of the technology or consumer tastes.
Do the parties have a clearly defined set of benefits which are anticipated from the merger?	The more well-specified and quantified the benefits of a merger, the greater weight it may be possible to place on their eventual attainment.
Is it clear that the claimed benefits are only attainable through the merger?	Benefits which are solely attainable through merger may be given a higher weight than those which could have been unilaterally attained.
Are the claimed benefits likely to impact on marginal costs and have a consequent impact on prices?	Savings in marginal cost are more likely to lead to lower prices and therefore more likely to offset any harm from a reduction in competition.
If the merger is claimed to be necessary in the light of some future market development, how certainly will these developments happen?	The more speculative the future market changes to which the merger is claimed to be a pre-emptive response, the less weight should be accorded to such claims in countering a significant diminution in competition.
Is the market characterised by rapid innovation, technical change and new product launches?	If competition primarily takes the form of the innovation or new product launches, leading to highly variable market shares from year to year, it may be better to concentrate on the impact of the merger on the creative upstream activities, rather than look at its impact on a structure of products which will not endure for more than a short time.

APPENDICES

A

Imagine a two firm industry producing a homogeneous good. Let p* denote the price that a monopolist would charge in this industry. When each firm charges p* the industry profit is Π. For convenience, we can assume that the profits of each firm are Π/2.

In a one-off game, each firm has an incentive to deviate from any collusive agreement because a price slightly lower than p* will enable them to capture the entire market and dramatically increase their profits. For this reason, the only equilibrium in a one-off game is where both firms set a price that is equal to their marginal cost of production, say c, in which case each firm's profits are zero.

In a repeated game, however, future profits as well as current profits are relevant considerations. Suppose that each firm adopts the following strategy. Charge p* so long as your rivals have charged p* in the past, but charge c otherwise.[34] As long as each firm puts sufficient weight on its future profits, these strategies can be shown to be an equilibrium without explicit agreements being made by each firm. As a result 'tacit collusion' can be defined in game-theoretic terms as the achievement of the collusive outcome without explicit co-operation.

In equilibrium, notice that although each firm can double its immediate profits by cutting price a bit in a single period (taking the other firms strategy as given) this will trigger price slashing by one's rival, and subsequent profits will be zero. Therefore, any firm contemplating a secret price cut will face a trade off. It could increase its short run profits to Π, but it will permanently sacrifice all its future profits, beginning with the next period. With a discount factor of δ (which is higher the greater the value placed on the future), firms will resist the temptation to cut prices so long as the discounted stream of future profits under the tacitly collusive equilibrium is greater than the one-off profits of cheating. Formally, tacit collusion is preferable to cheating when:

$$\frac{\Pi}{2}+\frac{\delta\Pi}{2}+\frac{\delta^2\Pi}{2}+\ldots>\Pi$$

which simplifies to,

$$\frac{\Pi/2}{1-\delta}>\Pi$$

This condition is satisfied if,

$$\delta>\frac{1}{2}$$

[34] This strategy is known as a trigger strategy since any act of cheating by one firm *triggers* non-co-operation forever. Friedman (1971) was the first to show that co-operation could be achieved by oligopolists in an infinitely repeated game by using such trigger strategies.

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