Research Report 36

Mergers and Acquisitions

Australian Government Publishing Service
Canberra

ISBN 0 644 12432 6

The Bureau of Industry Economics, a centre for research into the manufacturing and commerce sectors, is formally attached to the Department of Industry Technology and Commerce. It has professional independence in the conduct and reporting of its research.

Contents

	Page
Foreword	ix
Executive Summary	xi
Chapter 1 Introduction	1
1.1 Objective	1
1.2 Background	1
Chapter 2 Issues and Methodology	3
2.1 Introduction	3
2.2 Potential Benefits of Merger Activity	3
2.3 Potential Costs of Merger Activity	6
2.4 The Threat of Takeover	9
2.5 Methodology	9
Appendix 2.1 Derivation of the Cowling 'k' measure	14
Chapter 3 Trends in Merger Activity	19
3.1 Empirical Studies in Australia	19
3.2 Some Features of Merger Activity	21
3.3 Conclusions	24
Appendix 3.1 Data on Merger Activity	25
Appendix 3.2 Studies of Merger Activity	30
Chapter 4 Mergers and Industry Concentration	31
4.1 Introduction	31
4.2 Aggregate Concentration	32
4.3 International Comparisons of Concentration	34
4.4 Industry Data	36
4.5 Conclusions	40
Chapter 5 Case Study 1: Two Mergers in the Roof Tile Industry	41
5.1 Introduction	41
5.2 The Industry	41
5.3 Benefits from the Mergers	51
5.4 Summary and Conclusions	60
Appendix 5.1 Data Details	63

Chapter 6 Case Study 2:
A Merger in the Pastry Products Industry 65
6.1 Introduction 65
6.2 The Industry 66
6.3 Benefits from the Merger 76
6.4 Summary and Conclusions 80
Appendix 6.1 Data Details 82

Chapter 7 Case Study 3:
A Merger in the Automotive Battery Industry 85
7.1 Introduction 85
7.2 The Industry 85
7.3 Benefits from the Merger 94
7.4 Summary and Conclusions 100
Appendix 7.1 Sensitivity Analysis of Cowling's 'k' 102

Chapter 8 Conclusions 103

References 107

List of Tables

A3.1 Estimates of merger activity, 1946 to 1986 25

A3.2 Different measures of takeover activity, 1974 to 1984 26

A3.3 Number of takeover bids as a percentage of listed companies, 1960 to 1988 27

A3.4 Share of total merger activity, by value, by sector, 1974 to 1984 27

A3.5 Average value acquired per acquirer and number of acquirers, all industries, 1974 to 1984 28

A3.6 Average value of companies acquired, constant 1974 prices, 1974 to 1984 28

A3.7 Forms of payment for takeovers, 1947 to 1985 29

4.1 Average concentration for the manufacturing sector, 1972-73 to 1986-87 33

4.2 Industry share of total manufacturing value added, by intensity of concentration, 1972-73 to 1986-87 34

4.3 Average concentration in manufacturing, UK and Australia, 1970 to 1986-87 35

4.4 Concentration ratios for 3-digit ASIC industries, 1972-73 to 1986-87 37

4.5 Changes in dustry concentration, $-digit industries, 1977-78 to 1986-87 38

4.6 Industries with the largest increase in concentration, 1977-78 to 1986-87 38

4.7 Industries with the largest decrease in concentration, 1977-78 to 1986-87 39

5.1 Cowling's 'k' and constituent measures, Boral, total operations, 1981 to 1988 55

6.1 Cowling's 'k' and constituent measures, 1987-88 to 1989-90 79

7.1 Output indexes for GNB and the automotive battery industry, 1981-82 to 1987-88 88

7.2 Contributions to fall in unit costs since the merger 95

7.3 Cowling's 'k' and constituent measures, GNB, 1984-85 to 1987-88 97

List of Figures

2.1 Effects of merger, no pre-merger market power 10

2.2 Effects of merger, some pre-merger market power 10

A2.1 Fixed factor proportions. Neutral and biased efficiency gains 15

A2.2 Substitution of factors induced by relative price changes 16

3.1 Estimates of merger activity, 1946 to 1986 20

3.2 Different measures of takeover activity, 1974 to 1984 20

3.3 Number of takeover bids as a percentage of listed companies, 1960 to 1988 21

3.4 Share of total merger activity, by value, by sector, 1974 to 1984 22

3.5 Average value acquired.and number of acquirers, all industries, 1974 to 1984 22

3.6 Average value of companies acquired, constant 1974 prices, 1974 to 1984 23

3.7 Forms of payment for takeovers, 1947 to 1985 23

4.1 Distribution of concentration ratios by 4-digit ASIC industry, 1972-73 to 1986-87 32

4.2 Share of manufacturing activity by the 100 largest manufacturing firms, various countries. 36

4.3 Changes in concentration, 1977-78 to 1986-87, industries with largest increase 39

4.4 Changes in concentration, 1977-78 to 1986-87, industries with largest decrease 40

5.1 Approximate market shares for roofing materials, Australia, 1989 41

5.2 ASIC 2863 Ceramic tiles and pipes, concentration ratios, 1972-73 to 1986-87 42

5.3 ASIC 2874 Concrete products nec, concentration ratios, 1972-73 to 1986-87 42

5.4 Industry structure in NSW, the ACT, and Victoria 1977 and 1988 44

5.5 Indexes of roof tile prices, 1981-82 to 1987-88 45

5.6 Annual changes in prices, Monier, Boral and total building materials, 1982-83 to 1987-88 46

5.7 Annual changes in tile production and building activity, 1979-80 to 1988-89 46

5.8 Indexes of movements in selected unit costs, Boral, 1981 to 1988 53

5.9 Indexes of output per administrative and sales employee, Monier, 1983-84 to 1987-88 54

5.10 'k' index and 'k' against total output, Boral, 1981 to 1988 56

5.11 'k' index, Boral, 'supply only' operations, 1981 to 1988 56

5.12 Index of labour productivity, Boral, 1981 to 1988 57

5.13 'k' index and 'k' index against output, Monier, total operations, 1983-84 to 1986-87 58

6.1 Food products of Petersville Australia and associated companies 66

6.2 ASIC 2162 Cakes and pastries, concentration ratios, export propensity and import penetration, 1972-73 to 1986-87 66

6.3 Major manufacturers of fresh products, Victoria, NSW and the ACT 67

6.4 Major manufacturers of frozen products, Australia 68

6.5 Price movements in CPI, food group, and product groups, 1986-87 to 1989-90 70

6.6 National market shares, frozen, single serve meat pies, July 1989 71

6.7 Frozen cakes and pastries, national market shares, 1989 71

6.8 Input proportions, cakes, family pies, party goods and frozen pies 73

6.9 Changes in productive efficiency, 1987-88 to 1989-90 91

A6.1 Budgetted 1989-90 input proportions for each product 83

7.1 Automotive battery industry structure, pre- and post-merger 86

7.2 ASIC 3356 Batteries, concentration ratios, export propensity and import penetration, 1972-73 to 1986-87 87

7.3 Market shares, mid 1980s and 1988-89 87

7.4 Industry exports, 1981-82 to 1987-88 88

7.5 Imports and imports share of the domestic market, 1981-82 to 1988-89 89

7.6 Price indexes, GNB, ASIC battery class, and all manufacturing, 1983-84 to 1987-88 90

7.7 Input proportions, automotive battery production 91

7.8 'k' index and 'k' index against output, GNB, 1984-85 to 1987-88 98

7.9 Indexes of labour and material productivity, GNB, 1984-85 to 1987-88 98

Foreword

Throughout the 1980s there was increasing public interest in the effect that mergers and acquisitions were having on the economy. Some observers suggested that too many mergers and acquisitions were taking place and that any efficiency gains resulting from greater firm size were not large enough to offset the losses arising from weakened domestic competition and increased consumer prices.

Finding the right balance between the gains and losses from mergers is not an easy task. This report is an attempt to highlight the issues involved and to assess the extent to which four mergers and acquisitions have affected the outcome in their industries.

The report also provides data on trends in merger activity in recent decades and trends in industry concentration.

A large number of people have contributed information and comment to this report. The Trade Practices Commission was a part sponsor of the project and provided valuable assistance. The Business Council of Australia sponsored the analysis of concentration statistics in Chapter 4 (also published in a more detailed form in BIE 1989c).

Major contributions were made by officials of the four main case study companies: Monier PGH, Boral, Four'n Twenty-Wedgwood and GNB Australia. Without the time taken by company officials to put together the information sought and to pass on their knowledge of developments in their industry, the report would not have been possible.

The report was written and researched by Robert Bennett, Alan Madge, Shaun Drabsch, Paul Robertson and Charles Jubb. John Ryan, Assistant Director, Manufacturing Industries Research Branch, was responsible for the overall supervision of the report in its early stages. More recently, Ralph Lattimore, Acting Assistant Director of the Branch, has had overall responsibility.

June 1990

J. G. Stanford
Acting Director

Executive Summary

A feature of Government industry policy in recent years has been an emphasis on the promotion of industry restructuring with the aim of encouraging a scale of operations which allows firms to compete in international markets. A consequence of this policy can be greater firm size, increased industry concentration and market power. The efficiency benefits arising from industry rationalisation need to be weighed against the potential cost of increased market power.

The objectives of this study are to provide an analysis of the impact of mergers on economic efficiency in Australia and to examine the potential for conflict between industry policy and competition policy. The emphasis of the study is on the impact of horizontal mergers, although the aggregated data on trends in merger activity cover vertical and conglomerate mergers as well.

Issues and Methodology

The usefulness of mergers policies has been the subject of considerable debate. Some argue that industrial structure is constantly adjusting to changes in demand and supply factors and the prevention of a given merger will only temporarily alter the structure which, in the longer term, reflects more fundamental forces. This school emphasises the need to control anti-competitive conduct rather than the desirability of any particular market structure.

The alternative school argues that there is a strong link between allocative efficiency and market structure. It favours mergers policies, on the grounds that prevention is better than cure and that there are practical difficulties in identifying abuses of market power.

Potential Benefits of Merger Activity

The benefits of merger activity can arise in two general forms:

a) More efficient production, marketing, distribution and management methods

The most obvious efficiency gains are economies of scale but greater firm size may have other results. For example:

- the introduction of more technologically advanced plant and equipment because design and set-up costs can be spread over a larger output;
- an improvement in the viability of R and D and other investment activity;
- lower unit costs in administration, promotion, distribution and product development through the elimination of duplication, and spreading fixed costs over a larger output;
- lower costs of purchasing and capital raising;
- increased market power might provide a countervailing effect to offset the market power of suppliers, customers, or other competitors; and,
- an enhanced ability to compete in international markets.

Even without a change in the size of the operations, efficiency can be improved by new management which uses existing resources more productively and sells underutilised

assets, or if the alternative is a disruptive dislocation resulting from bankruptcy of the target firm.

Some of these benefits, for example, the introduction of more advanced plant, can be real economies in the sense that they involve savings in the resources of the economy. Others, such as lower costs of purchasing or capital raising, may be pecuniary economies in that they represent merely a transfer of resources to the merged firm, with no net saving to the economy.

b) Benefits extending beyond the firm
Mergers can provide a demonstration effect of benefits which other firms can adopt. Management and production efficiencies can be observed by other firms. There can also be benefits to consumers through lower prices or any increases in quality arising from the increase in production efficiency.

Potential Costs of Merger Activity
There are a number of potential costs. Firstly, there are costs from any increase in market power of the new entity which leads to lower output levels and excessive prices. This can have a distributive effect, involving the transfer of income from consumers to producers, and an allocative efficiency effect, involving a movement of resources away from their most efficient uses.

The extent of these allocative influences is largely dependent on how much demand and supply change in response to price changes. Demand changes are influenced by the ease of substitution between products. Supply changes in the short term are influenced by barriers to entry.

Secondly, there are the effects on the technical efficiency of the new entity. Any increase in market power need not be translated into monopoly profits. Rather, the lack of competition might result in management and production inefficiencies, including inadequate investment in R and D, or a dissipation of the gains to suppliers of inputs.

A separate category of costs are those associated with the merger activity itself. There are the costs of the intricate financial and legal process of conducting a takeover.

The Threat of Takeover
Merger activity can act as a stimulant to efficient management and therefore provide benefits for all the economy. The threat of takeover can be a means of ensuring that all firms in the economy operate at an efficiency nearing optimality.

Methodology
Because of the inadequacies of the available data, a case study approach was developed. Three industries in which mergers have taken place in the 1980s were examined: roof tiles, involving two mergers; pastry products; and automotive batteries. The expectations held by the acquiring firm at the time of the merger were examined and compared with subsequent developments in the industry.

To allocate some of these developments to the effects of the merger, however, it is necessary to know what would have happened in the absence of the merger. Two comparisons were, therefore, necessary:

- the expected benefits with the realised benefits;
- what has happened with what would have occurred in the absence of the merger, that is, the counterfactual.

The methodology employed contrasts the efficiency gains from industry rationalisation with the costs arising from the exercise of market power. In principle the positive and negative welfare effects can be added to give a result which indicates whether a merger has net benefits or net losses to the economy. In practice there are considerable difficulties with this approach.

The methodology has an implied counterfactual that, in the absence of the merger, the pre-merger situation would have continued indefinitely. In many cases this is misleading. For example, the choice may not be between the merger and no change, but between the merger and the closing down of the target firm. The end result of either path may be the same: a smaller number of firms in the industry, each with potentially greater market power.

Data were also sought to enable productivity estimates to be made. These were mainly labour productivity measures but, in some cases, data were available on materials productivity. Other information obtained from the firms, on technological change, investment, product quality, and innovation, was used to provide a fuller picture of the changes since the merger.

At every stage of the research there have been difficulties in obtaining reliable data. This qualification must be borne in mind when the results obtained are being considered. The limitations of the data mean that the results are not as robust as they ideally would be.

Estimation of efficiency changes provides only part of the story about the impact of the merger. The other part, market power, may affect consumers through increases in prices or reductions in product quality. Suppliers of inputs may also be affected by the merged firm's power in factor markets. Qualitative information was collected from industry participants, including customers and suppliers, on the extent of changes in market power following the merger.

Trends in Merger Activity

A number of studies have used proxies to show trends in merger activity in Australia.over particular periods. Together, these studies provide a picture of merger activity since 1946.

It appears that mergers were uncommon immediately after the Second World War. Activity gradually gathered pace during the 1950s, culminating in a sharp rise in 1958 and 1959. The activity then came off its peak rapidly in the early 1960s. Activity was then generally low and stable until 1967, in a pattern similar to that of manufacturing investment at the time. Since 1967, fluctuations have become more marked but the long term upward trend has continued.

Information on the period 1974 to 1984 shows that manufacturing dominates the distribution between industry sectors of the value of takeovers. It also shows that the number of acquirers fell by about 30 per cent in the period. The total value of

acquisitions increased significantly at the same time, however, causing an increase in the average value of each acquisition.

Most transactions since 1947 have taken the form of either pure equity swaps or cash offers. Cash offers have steadily risen over the period. The decline of the exchange of equity suggests that the freeing up of the financial markets might have allowed cash to be more easily obtained.

Mergers and Industry Concentration

Concentration refers to the size distribution of firms in a particular market or industry. The causal relationship between mergers and industry concentration is not clear-cut and can work in either direction. It could be, for example, that increases in concentration in particular industries lead to mergers of smaller firms as defensive measures.

At the aggregate level, concentration in Australia has increased only moderately over the period 1972-73 to 1986-87. Nevertheless, the proportion of manufacturing value added accounted for by the least concentrated industries has shown a steady fall over the period.

Comparisons of international data are fraught with difficulties. However, it appears that the level of concentration in Australia is at or just above the average for the industrialised countries examined.

Industry concentration ratios can only provide a guide to market structure and the potential for the use of market power. Each industry must be studied in some depth if the market conduct characteristics associated with market power are to be fully explored. The case study approach adopted in this report is an attempt to show more about the development of some industries than is possible from the use in isolation of either concentration or merger statistics.

THE MERGER CASE STUDIES

Roof Tiles

Roof tiles constitute approximately 70 per cent of the total market for house roofing materials, with steel products largely accounting for the remainder. There are two materials used in roof tiles: concrete (about 56 per cent of total roofing materials sales), and terracotta clay (about 14 per cent).

The aim of the case study was to assess the outcome of two mergers in this industry:

- Boral's 1982 takeover of Blue Metal Industries (BMI), including the Clark Tiles subsidiary.
- The acquisition by Monier of Wunderlich terracotta tiles in 1983.

Since the mergers, the major industry developments have been:

- increased investment in terracotta plant and equipment throughout the industry;
- increased demand for terracotta tiles and steel roofing at the expense of concrete tiles;
- a new entrant in the terracotta tiles industry, namely, Montoro;

- an increase in the quality of both concrete and terracotta tiles;
- increased movement of tiles between regions, that is, a broadening of the geographic market boundaries;
- greater links between tile producers and producers of other building materials;
- the expansion by Pioneer, firstly by acquiring Humes and, more recently, by acquiring Brick and Pipe.

Monier expected most benefits to occur through economies in administration, marketing and distribution. Boral expected benefits to occur through the influence of improved management skills on production and administration costs. There appears to have been only modest increases in productive efficiency in the total operations of Monier and Boral since the mergers, although in particular areas of their operations greater improvements have been made.

In its application to the Trade Practices Commission for authorisation, Monier claimed that public benefits would result from increased capital expenditure, improvements in production arising from input by Monier's R and D Branch and economies in the production and distribution of tiles.

Evidence regarding the extent to which the merger achieved these benefits is equivocal. Although the quality of the Wunderlich product has improved, the role played by Monier's R and D branch is unclear. On the other hand, Monier's commitment to a program of large scale capital expenditure on a new terracotta tile plant at Rosehill has been exceeded and a comprehensive refurbishment of the Vermont plant in Victoria has also taken place.

The effects of the mergers on the industry depends critically on what would have happened in the absence of the merger. The Monier/Wunderlich merger allowed new investment to occur. It is arguable, however, that additional investment in terracotta tile facilities in the years following the merger would have occurred in one form or another, regardless of what happened to the Wunderlich plants. The resurgence of demand for terracotta tiles, the upgrading of facilities by all the other terracotta tile manufacturers and the entry of a completely new manufacturer all suggest that the merger had little to do with the timing or the extent of the investment.

For Boral, the merger with Clark Tiles was a means of entering east coast markets. Boral increased the efficiency of the Clark Tile production process by improving the management. Among the developments unforeseen at the time was the Monier/Wunderlich merger.

As was the case before the merger, Monier has the major share of the Australian market and the most potential market power. Neither the merger nor any of the other changes that have occurred have changed this position. The competitiveness of roof tile markets appears to be based less on price and more on product quality and differentiation, marketing and services such as tile fixing. Product quality is widely acknowledged to have improved as a result of the entry of Boral. Improvements in other areas of competition are less certain but the changes in demand that have occurred since the merger, the entry of new producers and the broadening of the market all provide scope for improvements to take place. All these other changes have meant that the mergers are likely to have had only a small effect on the development of the industry.

Pastry Products

In 1986 the pies and pastry division of Petersville Industries Limited purchased the Herbert Adams group of companies from Bunge Industrial Limited. Petersville already produced pastry products under the Four'n Twenty and Wedgwood brand names.

The pastry products industry is characterised by producers of all sizes. Competition in the fresh products market, combined with little market growth has resulted in decreasing profits for the large manufacturers. By contrast, the frozen products market is contested almost exclusively by large national manufacturers. Sales are growing rapidly, with the fastest growth in the frozen dessert sector. The takeover of Herbert Adams provided Petersville with entry to this sector.

Petersville expected benefits from the merger through economies in purchasing, promotion, administration and production. Some economies in administration have been achieved but economies in production appear so far to have eluded Petersville, although labour productivity has probably risen. There has been little change in unit costs of promotion or purchasing.

The effect of the merger depends on what would have happened in its absence. Four outcomes appear to have been possible: withdrawal from the market; switching of production; increasing efficiency; or increasing demand.

Elements of each of these possible courses are evident since the merger. It appears that the merger has played a substantial role in bringing them about and the pace at which they have occurred. The merger allowed Herbert Adams effectively to withdraw from the market. It also assisted Petersville to move its production focus from fresh pies to the growth areas of frozen pastries and cakes, and encouraged it to make additional investments to improve efficiency.

It appears that productive efficiency in Petersville has fallen since the merger. The integration of the two plants inevitably resulted in costly disruption and they are only now starting to work together. Competitors have reported that Petersville has only recently begun to put pressure on their costs.

Offsetting the resource costs of the merger are the efficiency improvements in several other firms. One producer was forced by the merger to improve its efficiency in an effort to maintain or raise its market share and its profitability. It is likely that the net adjustment costs of the merger were less than would have been incurred in the absence of the merger.

The potential for the use of market power in fresh products is kept in check by low barriers to entry. The market power of the large producers of frozen products is further constrained by the countervailing power of the large wholesalers and retailers.

While it is too early to be certain about the overall outcome of the merger, it appears that it has produced net benefits to the economy. The major costs incurred have been costs to the efficiency of production while the two plants were being combined but these are now being reduced as the relocated plant settles in. There has been little discernible change in the limited market power of the company. The major benefits have come through the pressure it has put on the other firms in the industry to examine their own cost structures and improve their efficiency.

Automotive Batteries

In 1985 Chloride Batteries Australia Ltd merged with the batteries division of Pacific Dunlop Ltd (then Dunlop Olympic Ltd and now GNB Australia). The main appeal of Chloride in Australia was its relatively modern plant and extensive distribution network. The access to the US market offered by Chloride was considered vital for the success of Pacific Dunlop's Pulsar battery.

By and large, the merger resulted in the realisation of the expected benefits to GNB. It was able to combine the State warehousing and distribution functions of the merged companies, with consequent savings in overheads and labour costs. An investment program and reorganisation at the former Chloride plant has further reduced unit costs.

Access to Chloride's US distribution network for the Pulsar battery was also obtained. There are a number of ways access might have been obtained and the later acquisition by Pacific Dunlop of the US firm GNB Corporation suggests that the merger with Chloride might not have been the most effective.

The automotive battery industry has undergone considerable change in recent years.

- The number of firms in the industry has decreased.
- The optimum size of plant has increased.
- Imports have played an increasing role in supplying the domestic market since 1984-85.

Assessment of the economic benefits to Australia depends on what would have happened in the absence of the merger. The most likely counterfactual to the merger is an industry structure similar to that which eventuated: one or two domestic firms, with plants of optimum size, facing substantial import competition.

There was substantial improvement in GNB's productive efficiency in the post-merger period. The evidence also gives little indication of any increased exercise of market power by the company. As well as merger-induced economies, these outcomes reflect the impact of import competition on increasing productivity and as a source of market competition.

There are also the shorter term adjustment costs of the merger to consider. If the merger had not proceeded, the main adjustment costs would result from the closure of the Chloride plant. In the main these costs would be borne by the displaced labour. It seems likely that adjustment costs would have been greater had no merger taken place.

To sum up: the merger appears to have achieved the benefits expected by GNB. A definitive answer to the more important question of whether the merger resulted in net economic benefits is made difficult by the lack of knowledge of the appropriate counterfactual. However, it appears that the merger brought net economic benefits, mainly through lower adjustment costs.

Conclusions

The outcomes of the mergers have been remarkably similar. In each case it is not at all clear that the merger made a great deal of difference to the structure of the industry in the long run or to the degree of competition faced by the firm in the industry. There

have been many changes in demand and supply conditions affecting the structure of the industry. The impact of the mergers appears to be relatively small in comparison with all these other factors.

Since the roofing tiles mergers, for example, on the demand side there has been a shift away from concrete tiles towards terracotta tiles and steel roofing. On the supply side there has been a new entrant in the terracotta tile market, new terracotta tile technology, advances in steel roofing technology and a broadening of the geographic boundaries for roofing materials as transport costs have fallen. Few of these factors could have been foreseen at the time of the mergers, yet each has had a substantial impact on the structure of the industry, the pricing and other behaviour of the firms, and the degree of competition in the industry.

The main benefits expected by the firms were in the form of economies in production, distribution and administration. These expectations were not always fully realised, mainly because of the unforeseen changes in market conditions noted above. Changing demand patterns, changes in barriers to entry and increasing competition from imports all had an impact.

Another reason expectations were not always achieved was that the difficulty involved appears to have been underestimated. All the mergers have taken longer than anticipated to settle down.

To sum up, two main points arise from this study. Firstly, mergers are just one of the many forces acting on industry structure and the degree of competition. The impact of mergers in the industries studied appears to have been relatively minor. In particular, the batteries case study showed that import competition can play a role in minimising market power and inducing increased productivity in a traded goods industry with few domestic producers. Secondly, for the same reason, expectations about the effects of mergers which are made at the time of the merger are unlikely to be fully realised. So many of the forces which will affect industry structure cannot be foreseen by the firms involved.

For industry policy, the case studies suggest that mergers may not produce all the efficiency benefits expected. They may generate benefits to the economy by bringing forward inevitable changes in industry structure but there are many other factors which determine the international competitiveness of an industry. One of the most important of these factors is the presence of competition. In the case studies the main influences on competition were found to be changes in demand patterns, technology and barriers to entry.

The major implication for competition policy appears to be that estimates of potential costs in terms of increased market power and claims regarding expected benefits made at the time of the merger should be treated with considerable caution.

1. Introduction

1.1 Objective

The broad objective of this study is to provide an analysis of the impact of mergers[1] on economic efficiency in Australia. Unlike previous studies which focused on broad indicators, such as changes in profitability or share prices (see BIE, 1989), this study examines the costs and benefits to the economy in three industries in which mergers took place in the 1980s.

The emphasis of the study is on the impact of horizontal mergers, that is, mergers between firms selling closely related products in the same geographic market.

The project arose out of concerns that:

- merger activity in recent years is having a detrimental impact on the economy; and,
- there is potential for conflict between industry policy and competition policy.

The report primarily addresses the first of these issues and in doing so provides some guidance to the extent of the conflict between industry and competition policies.

1.2 Background

Mergers are a relatively high profile activity and an increase in their incidence tends to attract substantial public interest in their consequences. An apparent increase in recent years has focused attention on the ramifications for the Australian economy of the changes in market structure that inevitably result from mergers.

Concern that mergers might be having an adverse impact on the economy motivated an examination of the mergers and market power provisions of the Trade Practices Act by the House of Representatives Standing Committee on Legal and Constitutional Affairs (Griffiths Committee). One of the findings of the report of the Committee (HoR, 1989) was that there was little empirical evidence available about the economic effects of mergers.

The emphasis of Government industry policy in recent years has been on the promotion of industry restructuring and rationalisation. The objective of the policy is to increase the efficiency of Australian industry, thereby improving its international competitiveness. One of the consequences of this industry policy can be greater firm size, increased concentration in some domestic markets and market power.

The efficiency benefit arising from industry rationalisation needs to be weighed against the potential cost of increased market power. The Trade Practices Commission (TPC), which administers competition policy, has outlined its approach as follows:

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[1] The term 'mergers' is used throughout this report as a generic term which includes takeovers and acquisitions.

> The merger provision of the [Trade Practices] Act, s.50, is based on prohibition of dominance in a relevant Australian market. In its administration of s.50, the Commission seeks to ensure that ... any merger approaching dominance is fully tested to ensure that prospective public benefits, including enhanced efficiency, are sufficient to outweigh any potential public detriment resulting from a more concentrated market structure (TPC, 1988, p3).

The TPC has argued that the current industry policy is consistent with its practice and policy because the Commission is able to take account of potential efficiency gains when weighing up the prospective public benefits of mergers (TPC, 1987, p2). However, the Department of Industry, Technology and Commerce has claimed that the TPC has sometimes acted to the detriment of industry policy objectives[2]. The potential for conflict between the objectives of industry policy and competition policy was recognised by the Griffiths Committee Report (HoR, 1989, pp16-18) and was the subject of the minority reports by Committee members (HoR, 1989, pp107-23).

This report is set out as follows. The next chapter canvasses the economic issues involved in any assessment of the effects of horizontal mergers on the economy. It also sets out in detail the methodology adopted in this study. In Chapter 3 trends in aggregate merger activity[3] over the last several decades are examined and in Chapter 4 the linkages between horizontal mergers and concentration are discussed. Chapters 5 to 7 provide results of the inquiry into the case study industries and Chapter 8 contains the conclusions.

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[2] The two instances cited in the Department's submission to the Griffiths Committee were the forced divestiture of some General Jones food processing plants after that company was acquired by Petersville in 1984 and the ruling against the acquisition by News Ltd of an interest in Australian Newsprint Mills (DITAC, 1988, pp11-12).

[3] That is, including vertical mergers, which involve firms at different stages of production, and conglomerate mergers, which are between firms with unrelated activities, as well as horizontal mergers.

2. Issues and Methodology

2.1 Introduction

The usefulness of mergers policies has been the subject of debate for some time. The arguments are surveyed in George (1989) and Littlechild (1989).(See also Trautwein, 1990). Those who question these policies point out that both costs and benefits to society are likely to be involved in any given merger and it is difficult to assess the balance between the two. It is suggested that industrial structure is constantly adjusting to changes in demand and supply factors and the prevention of a given merger will only temporarily alter industrial structure which, in the longer term, reflects more fundamental forces.

Some also argue that only the more efficient firms grow (whether by merger or by internal expansion) and market dominance merely reflects their relative efficiency. In this view, the prevention of a merger would only stop a demonstrably more efficient firm from acquiring the resources being utilised by a less efficient one.

The policy prescriptions of this school emphasise the control of anti-competitive conduct, such as price-fixing or collusion, rather than the desirability of any particular market structure. There is also an emphasis on minimising barriers to entry and exit, especially those which flow from government regulation.

The alternative school argues that there are strong links between market structure, pricing and output behaviour and allocative efficiency. It favours the retention and active implementation of a mergers policy, arguing that prevention is better than cure. This school also points to the intrinsic difficulty in identifying abuses of market power and the conspicuous lack of successful prosecutions in this area.

These divergent views capture the essence of the debate about the economic implications of mergers. In this chapter, the debate is examined by setting out the most important potential costs and benefits of merger activity. In addition, the methodology employed to examine the impact of mergers in the case study industries is outlined.

2.2 Potential Benefits of Merger Activity

The benefits of merger activity to individual firms can arise from the adoption of more efficient production, marketing, distribution and management methods. Some benefits outside the firm can also be identified for other firms in the industry, other industries or consumers. These benefits are discussed below. They relate mainly to horizontal mergers, although in many cases the same costs and benefits apply to other types of merger activity.

More efficient production methods

Gains from more efficient production methods can arise in a number of ways. The most obvious efficiency gains from the merger process are economies of scale. At the plant level, an increase in the scale of production resulting from a merger may allow production processes to be rationalised and thus lessen the input needed to produce a unit of output. At the firm or multi-plant level, a merger may allow increased specialisation between plants.

Economies of scale can be the result of several factors.

- Specialisation. Greater output can allow both labour and machinery to be allocated to more specialised and less complex tasks, thereby increasing productivity.
- Physical laws. In some industries, for example, those involving storage, an increase in the size of the plant will increase volume more than proportionately. This allows the unit costs of storage to fall.
- Reserve capacity. Larger size means that fewer reserves of machinery, labour, raw materials and outputs are needed to meet unexpected variations in production.

Nieuwenhuysen (1982) has argued that the achievement of economies of scale through merger is largely dependent on the rate of growth of the industries in which the merger takes place. He cites a British study which found that:

> ... scale advantages have more impact in high growth businesses because the future investments to be undertaken by the combined companies are relatively more important than those already in place. In contrast, [in the absence of growth] the problems of rationalising two large capital intensive companies with different plants, engineering and management styles are considerable and may require many years to resolve (UK, 1978, quoted in Nieuwenhuysen, 1982, p27).

This suggests that the benefits of economies of scale are likely to be achieved only after a considerable period, as firms take time to reorganise their production and administration following the merger.

There are a number of other benefits which can arise from an increase in the size of operations. These benefits can be of two kinds: real economies, where less resources are used and the result is a benefit to society as a whole; and pecuniary economies, where the firm alone benefits by obtaining a better price for itself, without any real saving in resources. In many cases the benefits are a mixture of both kinds and it is difficult empirically to distinguish between the two.

Greater size of the firm may enhance the viability of introducing more technologically advanced plant and equipment because design and set-up costs can be apportioned between a larger output. This might also allow the firm to become proficient with new

technology before competitors and so have lower unit costs by being further down the 'learning curve'.

Research and development and other investment activity may also become viable if the greater size of the merged firm increases its ability to absorb the risk and cost of long-term projects. Moreover, if the merger reduces competition, the merged firm can be more confident of capturing the full financial benefit of any successful innovation.

However, it could be argued that without competitive pressure there will be less incentive for a firm to take advantage of this scope or, if there is incentive, the firm can influence the pace at which change takes place. Empirical evidence on the relationship between firm size and innovation has not shown that large firms, per se, are more innovative than small firms. Nor has it been shown that a concentrated market structure is better at promoting innovation. The most desirable firm size and market structure appear to depend on the industry and the type of innovation involved (See Coombs *et al*, 1987, ch 5).

Increased output can lead to lower unit costs in administration, promotion, distribution and product development. This can occur through the elimination of duplication, specialisation of tasks, and spreading fixed costs, such as advertising, over a larger output.

The benefits outlined above are, in the main, real economies, involving savings in resources to the whole economy. Cost savings for a larger firm can also arise in purchasing and capital raising but these savings can be largely pecuniary economies in that they involve only a transfer of income to the larger firm. The pecuniary economies will arise where the greater bargaining power of the larger firm allows it to obtain its inputs or its capital at a lower price than otherwise. At the same time, however, real economies can result if there are savings for suppliers in tasks associated with filling large orders, or if costs of raising capital are reduced because larger firms attract a lower risk premium than smaller, less established firms.

Benefits might also arise if an increase in the market power of the merged firm gives it a countervailing effect which offsets the market power of suppliers, customers, or other competitors. Whether these are real or pecuniary economies will depend on the relative market power in each case. Moreover, when the increased market power of a merged firm allows it to obtain imports at a lower price, this provides both a pecuniary economy to the firm and a benefit to the economy as a whole.

Even if all these benefits exist, they are unlikely to all be maximised at the same level of output and some trade-offs might be necessary to minimise total unit cost. For example, transport costs will be a large part of unit cost when value to weight ratios and the market density are low. In these cases, the high transport costs might offset any economies of scale and lead to a series of regional plants which are sub-optimal in production terms but optimal in terms of total unit cost, including transport.

Improved managerial skills
Efficiency improvement can also be achieved by installing a better management team which can exploit existing resources more productively or sell underutilised assets.

> 'Super managers' do not simply devise new and better production processes (if they do at all), or ensure that economies of scale are fully exploited. They may close factories, change the research budget or redesign organisational structures and procedures. The separate effect of each of these changes is not measurable with any accuracy (Cowling *et al*, 1980, p56).

These improved skills can be specific to particularly gifted 'super managers' or management teams, which will make a merger work even in the absence of any fundamental advantages from economies of scale or size.

Failing firms
Mergers may also result in enhanced management of resources if the alternative is a disruptive dislocation of production facilities resulting from bankruptcy of the target firm. If this is the case, the merger will not reduce competition in the industry. These failures seem most likely in industries with falling demand and excess production capacity.

Dynamic effects
Mergers can be the catalyst for greater dynamism and efficiency. As mergers are a formal process of change of control they provide the framework within which more detailed changes can take place. Changes which would be difficult in a stable organisation may be easier when the environment is already in flux.

Benefits extending beyond the firm
Mergers can provide a demonstration effect of benefits which other firms can adopt. Better management practices and production efficiencies can be observed by other firms or learnt through the hiring of staff with the required knowledge. Thus, it is possible that benefits can flow beyond the activities of the merged firms.

Merged firms may also force other firms to produce economies to match their own lower costs or prices, either by pressure from shareholders or from customers. On the other hand, the merged firm may increase its demand for, and consequently the price of, scarce resources, such as labour and materials, to the detriment of other firms, but to the benefit of the suppliers of those resources.

Consumers will also benefit to the extent that any cost savings arising from the merger are passed on through lower prices.

2.3 Potential Costs of Merger Activity

There are a number of potential costs discussed below. Firstly, there are the costs to consumers and to the economy as a whole resulting from any increase in market power

of the new entity. These costs stem from reductions in allocative efficiency. Secondly, there are the effects on the technical efficiency of the new entity following the takeover.

A separate category of costs are those associated with the merger activity itself. There are the costs of the intricate financial and legal process of conducting a takeover transaction. They include both offensive costs borne by the acquirer and defensive costs incurred by the target.

Effects on allocative efficiency

Porter (1990), in his recent research on factors which contribute to a nation's competitiveness, found that a strong anti-trust and pro-competition policy resulted in firms which were likely to be better able to compete internationally as a result of their vigorous competition for a share of the domestic market. He considers that the benefits of strong domestic competition can often outweigh the scale economies derived from mergers.

Merger activity may increase market power, leading to lower output levels and excessive prices. This, in turn, has two effects: a distributive effect, involving the transfer of income from consumers to producers; and an allocative efficiency effect, involving changes in the allocation of resources in the economy.

The allocative influences arise through the effects of price changes. As a result of the price increases and lowered output, a 'wedge' is driven between what consumers are willing to pay for the last units produced and the value of the resources used in producing those units. Consumers value the output forgone more than the value of the resources that would have been used in its production. The resources not used will flow from the industry in question to other industries, but a misallocation will have occurred as the resources will now be utilised in producing output not as highly valued by consumers[1].

The extent of these allocative influences is largely dependent on how much demand and supply change in response prices changes. Demand changes are influenced by the ease of substitution between products. The larger the number of substitutable products in a market, the less able is any one producer to exercise market power.

Supply changes in the short term are influenced by barriers to entry. These can be divided into five types:

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[1] This assumes that no misallocations exist elsewhere in the economy. This is unlikely to be the case and an increase in market power resulting from a merger may not result in declining allocative efficiency when distortions in other parts of the economy are taken into account. For example, where pollution or other negative externalities are present, a decrease in output can be beneficial for the economy. Alternatively, the economy may benefit if an increase in the market power of the merged firm allows it to draw resources away from firms with even greater market power.

- Product-differentiation barriers. Product-differentiation gives a firm some control over the price of its product. It is the reason for advertising and other promotional expenditure intended to maximise the perceived differences between products.
- Absolute cost advantage. These can come about from having skilled personnel, patents or superior techniques, control of key raw materials, or a lower cost of capital.
- Initial capital requirements. A new firm without any reputation may have to pay a higher interest rate for finance than an established firm.
- Economies of scale. These allow an incumbent firm to lower prices below the price available to a new firm which does not have as much market share.
- Government regulations. These can reduce competition by restricting the activities of firms. Some regulations, for example, with respect to statutory monopolies, patents and copyrights, can be absolute barriers.

There is considerable debate about the effect of these barriers on competition over time. Advertising, for example, while being a barrier in some cases, can be an effective means for a new entrant to establish itself in an industry (see Littlechild, 1989, pp313-15). Nevertheless, the categories provide a useful framework in which to examine the potential for changes in the structure of an industry.

Allocative inefficiency can also arise if the taxation system and capital markets encourage mergers beyond an optimal level. If this occurs, income will be transferred from taxpayers or borrowers to firms engaged in mergers and there will be a resource cost to the economy.

The effects on technical efficiency

Any increase in the market power of the merged entity need not be translated into monopoly profits. Rather, the lack of competition might result in management and production inefficiencies, including inadequate investment in technology and R and D, or a dissipation of the gains to suppliers of inputs In such cases, the available resources will not be being put to their most productive uses and technical inefficiency will occur[2].

Transaction costs of the takeover process

The consummation of a merger may be an expensive process. There are costs incurred by the acquiring firm, any unsuccessful bidders and by existing managements. These include:

- costs of raising finance;
- costs of meeting regulatory requirements;

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[2] This assumes not only that there can be a divergence between the interests of management and shareholders, but that there are no forces which ensure that management acts in the latter's interests. This view is not acceptable to many observers who argue that the 'market for corporate control' ensures that shareholder's interests are paramount.

- costs incurred by target managements, especially if the takeover is defended; and
- costs incurred by acquiring managements.

It is important to note that some of these costs are incurred by unsuccessful bidders in the market for corporate control. This point is pursued further in the next section

2.4 The Threat of Takeover

A benefit for the whole economy that can arise from merger activity comes from the stimulation to efficient management provided by the threat of takeover. This threat can be a means of ensuring that the management of all firms in the economy operate at an efficiency nearing optimality.

The notion of the threat of takeover is formalised in the theory of 'The Market for Corporate Control'. The theory states that a discrepancy must exist between the market valuation of the firm, given the existing management, and the valuation that a purchaser believes can be generated under alternative management. Consequently, those firms that are taken over are inefficient, in that they are not maximising profits and thereby share prices, and the threat of takeover is extinguished by pursuing efficiency. The theory implies that the pursuance of interests other than those of shareholders is not possible with an efficiently operating market for corporate control.

As a means of explaining takeover activity the theory has a number of problems. Firstly, not only inefficient firms are subject to takeovers and the extent to which firms will work to improve efficiency on the basis of the threat of takeover is open to question (see Singh, 1971 and Mueller, 1980). Secondly, a takeover threat may lead to measures which reduce the efficiency of the firm, for example by diverting the focus of management towards defensive rather than mainstream activities (Treasury, 1986). Thirdly, the perception that share prices are an accurate measure of relative efficiency is questionable. There is evidence of undervaluation of successful firms (see Edey and Elliot, 1988 and Pesaran, 1988).

2.5 Methodology

Introduction

The circumstances surrounding merger activity are largely unique to the firms and industry involved. As a result, firm and industry data need to be analysed in some detail. In this study, all the firms directly involved in and affected by mergers were interviewed. To make the project manageable, the case studies have been confined to largely horizontal mergers in the manufacturing sector.

Three case study industries were examined: roof tiles; pastry products; and automotive batteries. This spread of industries allowed a wide range of experiences to be obtained.

The mergers are mainly horizontal but also have elements of a conglomerate merger. The Monier/Wunderlich and the Petersville/Herbert Adams mergers involved an

extension of product lines, while the Boral/Clark Tile and the Dunlop/Chloride mergers extended the geographic market for their products.

The information sought from the firms directly involved in the mergers was collected in two stages. The firms were asked to complete a questionnaire seeking detailed information on conditions in the firm and industry before and after the merger. This was supplemented by interviews to explore the questionnaire responses in more depth. Information on the industry before and after the merger was also sought from competitors, suppliers and customers.

To complement the information collected at the industry level, aggregate data on merger activity and industry concentration in Australia were also collected and analysed.

The Williamson model

The theoretical background to the quantitative analysis in the project is discussed in Williamson (1968) and Cowling *et al* (1980). The methodology employed contrasts the efficiency gains from industry rationalisation with the costs from the exercise of market power. In principle the positive and negative welfare effects of these factors can be summed to give a net result which will indicate whether a merger has net benefits or net losses to the economy. In practice there are considerable difficulties to this approach.

The basic principles of the Williamson model are shown in Figures 2.1 and 2.2. In Figure 2.1 there is no pre-merger market power, that is, there is perfect competition, and the pre-merger price p_1 equals average and marginal cost c_1. After the merger, costs fall from c_1 to c_2. However, because market power has also been obtained through the merger, price rises from p_1 to p_2 and output is reduced from q_1 to q_2. At the new equilibrium point, N, there is a saving in resources equal to the area A_2, arising from the fall in costs. At the same time, the price rise and reduced output mean that resources, in the form of income, equal to the rectangle MNEF are transferred from consumers to producers. In addition, some resources are no longer assigned to their highest value use by consumers. Unlike the transfer of income rectangle, this loss (A_1) represents a loss of welfare to society.

Figure 2.2 depicts a more realistic situation where some market power existed prior to the merger so that the pre-merger price, p_1, is already above the pre-merger cost, c_1. The merger has resulted in resource savings, area A_2, but also further welfare losses to the economy, shown by area A_1.

In both cases, the welfare loss attributable to the merger can be compared with the decrease in the resources needed for production. If $A_1 > A_2$ the merger does not yield net benefits and conversely for $A_1 < A_2$. Note that market power only enters the framework through a consideration of the effects of price rises and quantity restrictions. Market power may also affect consumers through reductions in product quality, and suppliers of inputs to the firm through the exercise of monopsony power. In addition, the transaction costs incurred by firms involved in the merger are not taken into account.

Figure 2.1 Effects of merger, no pre-merger market power

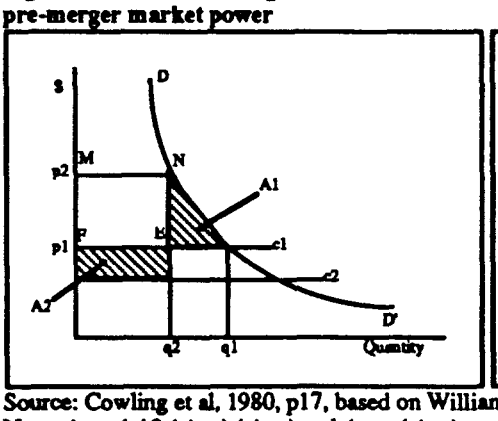
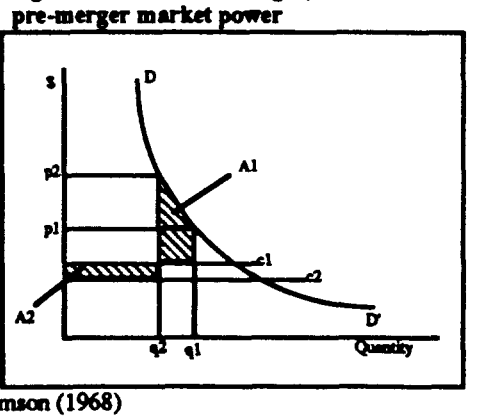


Figure 2.2 Effects of merger, some pre-merger market power



Source: Cowling et al, 1980, p17, based on Williamson (1968)
Note: $A_1 = 1/2(\Delta p)(\Delta q)$ and $A_2 = (\Delta c)q_2$

This pre-merger - post-merger dichotomy is an example of comparative statics analysis. A dynamic analysis would discount past and future costs and benefits of the merger and arrive at a net present value, or even net future value, to the community of the merger. The approach taken in this study is essentially to consider costs and benefits over several post-merger years and from the trends, if any, revealed in this time frame come to conclusions regarding likely past and future costs and benefits.

Cowling and others (see Cowling *et al*, 1980) argue that the Williamson model may not capture the full social costs of an increase in market power as it fails to take account of the costs incurred by unsuccessful bidders. It is argued that each would-be acquirer has an incentive to incur costs to the point where the costs equal the expected value of the private gain associated with any increased market power. The resources expended by unsuccessful bidders are considered social costs because they represent resources diverted away from welfare-improving activities.

An alternative argument is that the resources expended are a necessary and unavoidable investment in the operations of the market for corporate control and therefore provide an offsetting benefit. For the purposes of this study the latter interpretation will be adopted.

The quantitative estimates

Cowling's measure of productive efficiency

Cowling developed a method of estimating changes in a firm's productive efficiency for use within this framework. Such changes can be equated with changes in a firm's cost level if constant returns to scale technology is assumed. Consequently, Cowling's method allows the area A_2 in Figure 2.1 to be estimated.

By productive efficiency Cowling means efficiency in the process of turning given inputs into given outputs. An increase in efficiency was defined as a reduction in the ratio of inputs used to outputs produced.

The most direct way of measuring changes in this efficiency is to add up all the inputs used up each period and compare this with the outputs produced. Adding up diverse factors requires a set of prices to use as weights. The method actually used by Cowling, and used in this study, differs slightly from this ideal. Instead of using prices as weights, the proportion of total unit cost that each input represents is used. Efficiency changes are deduced from changes in prices and expenditures, rather than changes in quantities[3].

Details on the derivation of Cowling's measure of productive efficiency are given in the appendix to this chapter. The result is Cowling's 'k' measure, a measure of the total factor requirement per unit of output. 'k' may vary with the scale of production, technical progress, or the efficiency with which a particular technique is used. It is inversely proportional to 'efficiency' as Cowling defined it.

Any analysis of mergers in terms of this methodology carries with it the implied counterfactual that, in the absence of the merger, the pre-merger situation would have continued indefinitely. In many cases this is misleading. For example, the choice may not be between the merger and no change, but between the merger and the closing down of the target firm. The end result of either path may be the same: a smaller number of firms in the industry, each with potentially greater market power. Great difficulty arises in constructing the counterfactual and it can only be based on the best available information.

Other measures of efficiency change
Because of the limitations of the Cowling approach, data were also sought from the firms to enable productivity estimates to be made. In the main, these were labour productivity measures but, in some cases, data were available which allowed materials productivity to be estimated.

The qualitative estimates
The efficiency effects
The Cowling approach does not capture the full impact of the merger on the efficiency of the firm. Consequently, other information obtained from the firms, on technological change, investment, product quality, and innovation, was used to supplement the quantitative estimates and to provide a fuller picture of the changes in efficiency since the merger.

The welfare effects
The estimation of changes in productive efficiency provides only a part of the story about the impact of the merger. The counterpart to efficiency gains in the Williamson trade-off model is welfare losses due to the exercise of market power. In the static analysis of the Williamson model these losses are captured by the area A_1 in Figures 2.1 and 2.2.

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[3] Cowling argued that provided there were few fluctuations in either: the proportions in which inputs are used and outputs produced; or, the relative prices of inputs and outputs, the required information on inputs and outputs can be deduced from a knowledge of expenditure on inputs and their prices, and revenue from sales of outputs and their prices.

Market power may affect consumers through price increases or reductions in product quality and associated services. Suppliers of inputs to the firm may also be affected by the merged firm's power in factor markets. The Williamson-Cowling approach attempts to capture only the price effects on consumers. Even this is difficult, as competition is a dynamic process and the effects of market power are only manifested through time.

The full effects of market power are difficult to capture quantitatively. Nonetheless, it is to be assumed that firms fully exploit whatever market power they derive from mergers. For this reason, qualitative information was collected from a range of industry participants, including customers and suppliers, on the extent of changes in market power following the merger. In the case study chapters this information is used to estimate the likelihood of significant welfare losses following the mergers.

Appendix 2.1 Derivation of the Cowling 'k' measure

The following draws heavily on Cowling *et al* (1980) pp. 55-69. Consider a production process that produces one output and uses N factors of production, denoted by the subscript *i*.

Let C = total cost of production
f_i = quantity of factor i consumed
p_i = unit price of factor i
Q = number of units of output produced
π = total profits from production
P_O = revenue from unit of output
R = total revenue from output produced

The following identities are implied:

$$\pi = R - C \quad (1)$$
$$R = P_O Q \quad (2)$$
$$C = \Sigma f_i p_i \quad (3)$$
$$\pi = P_O Q - \Sigma f_i p_i \quad (4)$$

It is assumed that the factors of production are consumed in fixed proportions. This can be written

$$f_i = k a_i Q \quad (5)$$

a_i, assumed constant, is the relative quantity of factor i required to produce one unit of output. 'k' is a measure of the total factor requirement per unit of output, or unit factor requirement.

If equation (5) is substituted into equation (4) the following is obtained

$$\pi = P_O Q - \Sigma k a_i Q p_i$$
$$\text{i.e. } \pi = P_O Q - kQ\Sigma a_i p_i \quad (6)$$

$\Sigma a_i p_i$ is the correct form for a fixed weight price index of inputs, which can be called P_I.

$$P_I = \Sigma a_i p_i \quad (7)$$

Substituting (7) into (6)

$$\pi = P_O Q - kQP_I \quad (8)$$

$$k = P_O / P_I (1 - \pi / P_O Q)$$
$$= P_O / P_I (1 - \pi / R) \quad (9)$$

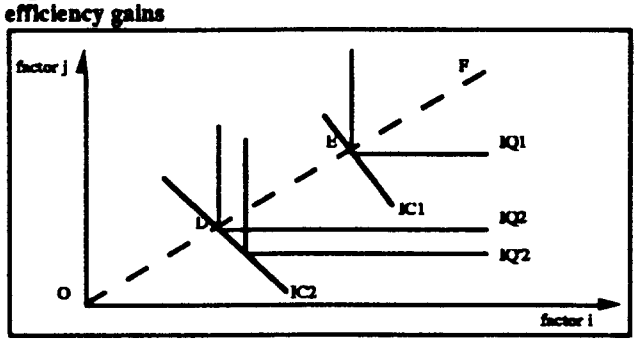
If the assumption of a single output of fixed input proportions is correct, equation (9) will give an exact measure of the change in unit factor requirement from observation to observation. Unit factor requirement is inversely proportional to efficiency as defined by Cowling. The extension of the argument to a multiple output produced in fixed proportions would make P_O a price index of output rather than a single price.

Intuitively, the model can be understood as follows. If the weights a_i are regarded as a recipe for the production of units of output, 'k' describes how many units of output will be produced from a set quantity of inputs. Alternatively, 'k' describes the quantity of inputs, combined in accordance with the weights, required to produce one unit of

output. 'k' may vary with the scale of production, technical progress, or the efficiency with which a particular technique is used.

Changes in 'k' are illustrated in Figure A2.1. The isoquant IQ1 shows how much of factor i and factor j are required to produce *one unit of output* in the initial period. IQ2 shows the same information, but for a subsequent period. The firm produces at point E in the initial period, and point D in the subsequent period. Production at any other point on the isoquants would require more of one factor but the same quantity of the other factors and so would be technically inefficient (and more expensive).

Figure A2.1 Fixed factor proportions. Neutral and biased efficiency gains



The slope of the ray ODEF represents the assumed factor proportions, or the weights a_i. As the distance from O increases the per unit cost of production increases as a greater quantity of inputs is required to produce one unit of output. Conversely, a shift from E to D represents a fall in the quantity of inputs needed to produce a unit of output. Therefore, a shift from E to D involves a fall in 'k' and a rise in productive efficiency. IQ2 can also be understood as representing a more efficient process because the *cost* of producing the same output is smaller than at IQ1.

In comparing the two time periods it is necessary to deflate actual costs by a price index. Therefore, PI appears in the denominator of equation (9).

As long as the factors are used in fixed proportions it does not matter if the relative prices of factors move divergently. If factor proportions change, however, as in the case where the new isoquant is IQ'2, a bias is introduced into the measurement.

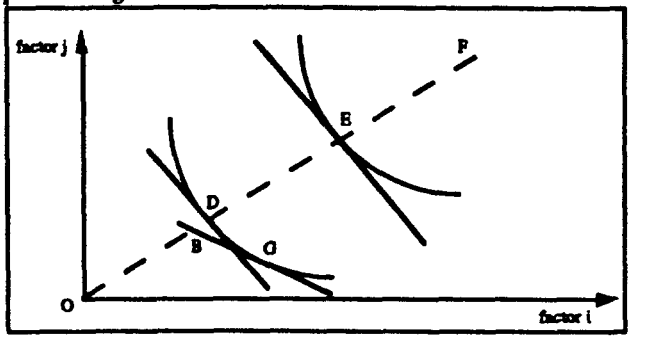
Cowling's focus on efficiency gains when factor proportions are held constant is designed to capture only those gains that might be attributable to the actual merger event, and not to subsequent changes in production technology. This approach may not fully capture the economic implications of mergers and market power.

Changes in factor proportions
Several reasons for changes in factor proportions can be offered. Technical progress may induce the firm to replace workers with capital goods. Improvements to the

production process may result in less waste and so smaller quantities of the affected inputs are required. However, to illustrate the directions of the bias in 'k' brought about by changes in factor proportions it will be assumed that the changes are brought about by changes in relative factor prices

Changes in relative factor prices can induce the substitution of one factor for another. This case is illustrated in Figure A2.2. Again the firm initially employs the input combination represented by point E. However, in the subsequent period the price of factor i has fallen relative to the price of factor j. The firm will maximise profits by using less of factor j and more of factor i, and by moving to the input combination G.

Figure A2.2 Substitution of factors induced by relative price changes



'k' in the subsequent period will be calculated by applying the old factor proportions to the new relative prices. This will generate a cost figure represented by point B. The calculated value of the ratio of factor proportions before and after the change, k1/k2, will correspond to OE/OB. Those efficiency gains brought about by improvements in the production process would be captured by OE/OD (Other efficiency gains would arise from the substitution towards the relatively cheap factor i). If OE/OD is regarded as the 'true' ratio of factor requirement then k1/k2 will overstate the savings in factor requirements by the ratio OD/OB. Put simply, measured 'k' is biased downwards and the implicit measure of productive efficiency (the inverse of 'k') is biased upwards. The greater the degree of factor substitution the greater will be the bias.

The same method of analysis shows that changes in factor proportions when end period weights are used bias 'k' upwards.

'k' may also vary with the degree of capacity utilisation. This is an extension of the point that 'k' may vary with the scale of production. When demand falls, capacity utilisation and hence productive efficiency will also fall.

'k' and economies of scale

The Williamson trade-off model assumes constant returns to scale technology. Where 'k' is used to show changes in costs faced by the merged firm this assumption introduces a further restriction into the analysis. Changes in 'k' can no longer be

attributed to changes in the scale of production (or the degree of capacity utilisation), but only to technical progress, or the efficiency with which a particular technique is used. This removes from the analysis one type of efficiency improvement conventionally thought likely to result from mergers: economies of large scale production.

The model, therefore:

- excludes the possibility of changes in costs due to changes in the scale of production;
- does not fully account for gains from changes in factor proportions;
- assumes that productivity and price increases are directly attributable to the actual merger event.

There are other factors, separate from the merger, which may affect performance and the quantitative results from the methodology need to be supplemented with qualitative information about what else has been occurring in the firm and the industry.

Other sources of bias in 'k'
Accounting measures of profitability may differ from economists' estimates due to differences between accounting and economic depreciation. This means that, over time, measured 'k' can vary from true 'k'.

A more basic problem affecting the interpretation of 'k' as a measure of total factor requirement is that since the profit figures used are before interest and tax, they do not represent pure economic profit, but contain elements of the cost of capital.

If these elements remain the same as a proportion of total costs, the measure of 'k' will not be affected. However, if there is a substitution of capital for other inputs, such as materials and labour, the apparent cost of production as measured by 'k' will decline due to an increase in accounting profits necessary to cover the increased interest costs. In other words, this will result in a downward bias in the trend of 'k' over time. Cowling suggested that the magnitude of this bias would be very small.

A further difficulty is that the choice of the sample to be analysed can bring about significant bias in the results. This difficulty is largely a function of data availability. Merger studies invariably analyse publicly listed companies as those firms are obliged to publish some details of their performance. Very little is known about private acquisitions and their effects so it is difficult to generalise the results of merger analyses across the whole economy.

Similarly, the definition of an 'industry' can often be too broad or too narrow to reflect properly the economic conditions experienced by the acquirer (Cowling, 1980, p57) and the diverse nature of many firms can make it difficult to extract relevant information from reported accounts. The effect of merger upon an acquired activity may be swamped by other activities.

3. Trends in Merger Activity

3.1 Empirical Studies in Australia

There are no readily available data on merger activity in Australia. However, a number of studies have used proxies to provide an indication of trends over particular periods. By bringing together the results of these studies and adding other data where possible, a broad picture of merger activity in Australia since 1946 can be established.

Published data on merger activity relate either to takeover bids, regardless of their outcome, or to estimates of successfully completed takeovers. The data in each case are subject to a number of limitations and it is not possible to determine which is the better measure. In addition, the data are aggregated, so that no distinction is made between horizontal, vertical or conglomerate mergers.

The main studies are Bushnell (1961), Stewart (1975), Bishop, Dodd and Officer (1987), Treasury (1986), Reserve Bank (1974 - 1986), and NCSC (1988). These studies are outlined in Appendix 3.2. A study of mergers was also undertaken by McDougall and Round (1986) but no data on trends in merger activity were included (see also BIE 1989c).

In response to the patchwork of data available from these studies, the BIE generated a data series of company disappearances due to takeover covering the period 1946 to 1987. The series was based on Stock Exchange data showing delisted public companies (STATEX, 1987). There were two types of delisting that were considered to be the result of takeovers:

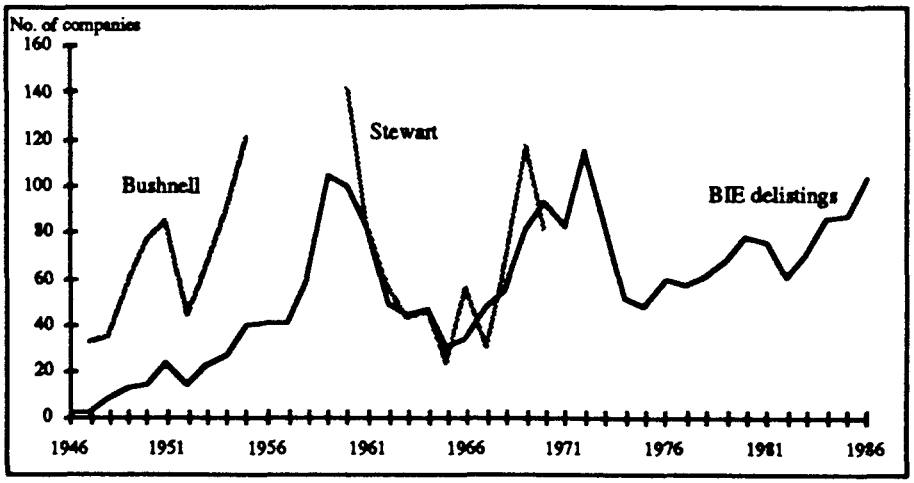
- a 'standard' delisting where a firm became a wholly owned subsidiary with no individual corporate identity;
- a 'renaming' where the firm reappeared on the Exchange lists with a new identity reflecting its changed ownership (for example, Waltons became Waltons Bond).

The results, and those of Bushnell and Stewart, are shown in Figure 3.1. The BIE measure has the advantage of providing a long time series but is more narrow than those of Bushnell, Stewart and the Reserve Bank as it includes only publicly listed companies. In the other studies all businesses where there was evidence of disappearance through takeover were counted, irrespective of their corporate status. The Reserve Bank survey indicates that takeovers of private companies could account for half the total number of takeovers.

There is a broad correspondence in the trends shown in Figure 3.1. Takeover activity rose in the 1950s but declined in the early 1960s before rising until the early 1970s. From the mid-1970s there was a steady increase until the end of the series in 1986.

In Figure 3.2 the available measures of takeover activity for the period 1974 to 1984 are shown. Data on bids for public companies are compared with the Reserve Bank measure of firms taken over by public companies and the BIE data on delisted public companies.

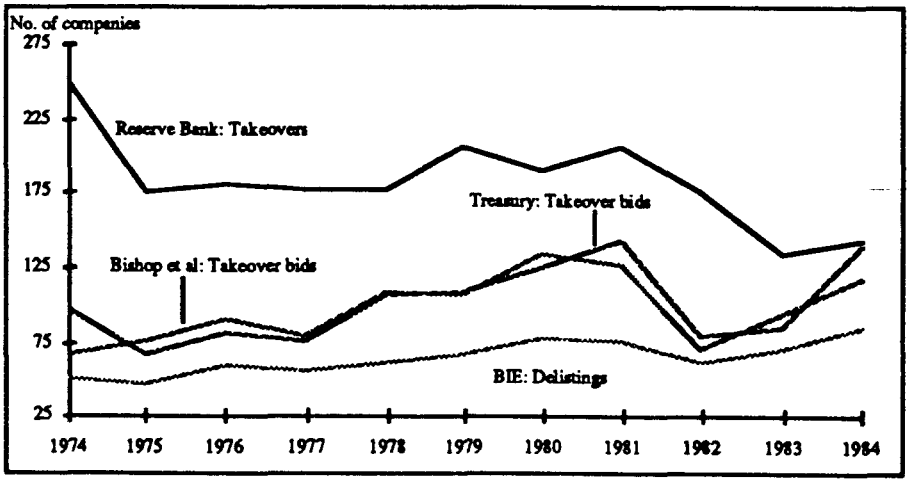
Figure 3.1 Estimates of merger activity, 1946 to 1986



Source: Table A3.1 in Appendix 3.1

The three lower paths have generally the same trend but this is not the case with the Reserve Bank data. The differences reflect the disparate focuses of the measures. While the data on bids and delistings refer to public companies, the Reserve Bank data cover takeovers by public companies of both public and private companies. Private company targets normally constituted over half the total in Reserve Bank surveys and the convergence of these data with the other measures suggests that either their attractiveness or availability as a target declined over the period. In 1974, 185 private companies were acquired but only 76 were acquired in 1984.

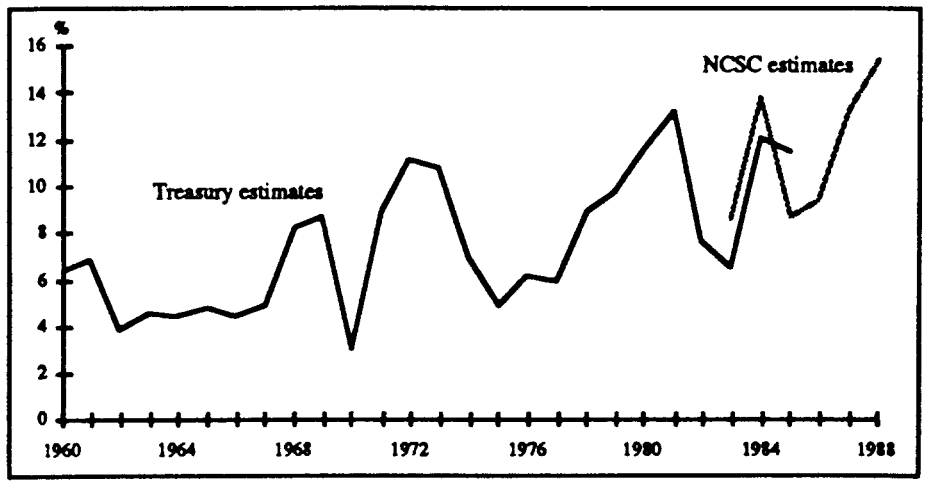
Figure 3.2 Different measures of takeover activity, 1974 to 1984



Source: Table A3.2 in Appendix 3.1

A further indicator of merger activity is the measure of bids as a percentage of listed companies. These indicators are shown in Figure 3.3 for the period 1960 to 1988.

Figure 3.3 Number of takeover bids as a percentage of listed companies, 1960 to 1988



Source: Table A3.3 in Appendix 3.1

From these data, it appears that mergers were uncommon in the late 1940s. Activity gathered pace during the 1950s, rising sharply in 1958 and 1959. The activity then came off its peak rapidly, probably in response to the stagnating economic conditions of the early 1960s. Activity was generally low and stable through the 1960s until 1967, in a pattern similar to manufacturing investment at the time. Since 1967 the fluctuations have become more marked but the long term upward trend has continued.

3.2 Some Features of Merger Activity

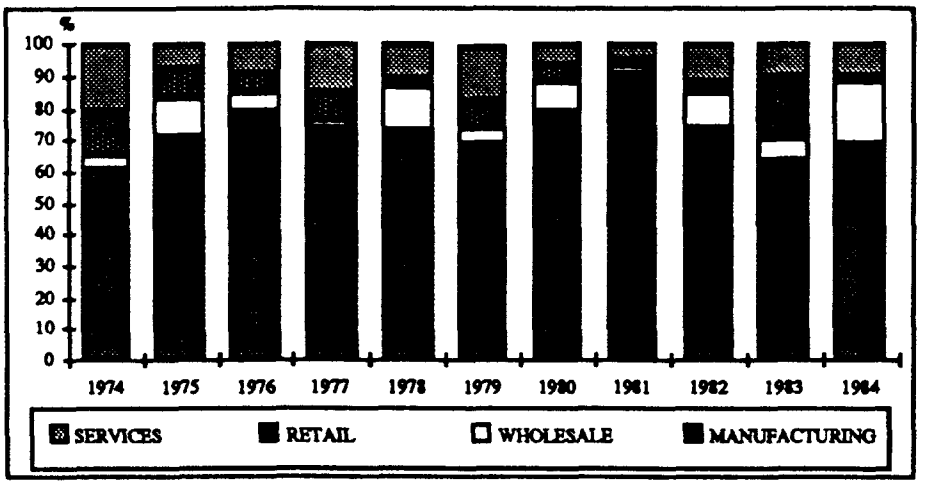
There has been little analysis of the characteristics of merger activity. Reserve Bank data are the most disaggregated but it only covers the period 1974 to 1984. It can be compared with information collected by Bushnell, Stewart and Bishop, Dodd and Officer.

Sectoral distribution of activity
Using Reserve Bank data, Figure 3.4 presents the distribution between industry sectors of the value of assets acquired through mergers between 1974 and 1984.

Manufacturing dominates the distribution, while the wholesale and retail sectors have experienced sporadic activity. During 1983 and 1984 these sectors combined reached historically high levels of activity, constituting 20-25 per cent of total value acquired. Services sector activity has also fluctuated, averaging around 10 per cent of the total.

In general, these results match those of Stewart for the 1960s. Stewart had included estimates of the contribution of the primary and financial sectors but this does not alter by much the overall picture of the dominance of manufacturing in this distribution.

Figure 3.4 Share of total merger activity, by value, by sector, 1974 to 1984

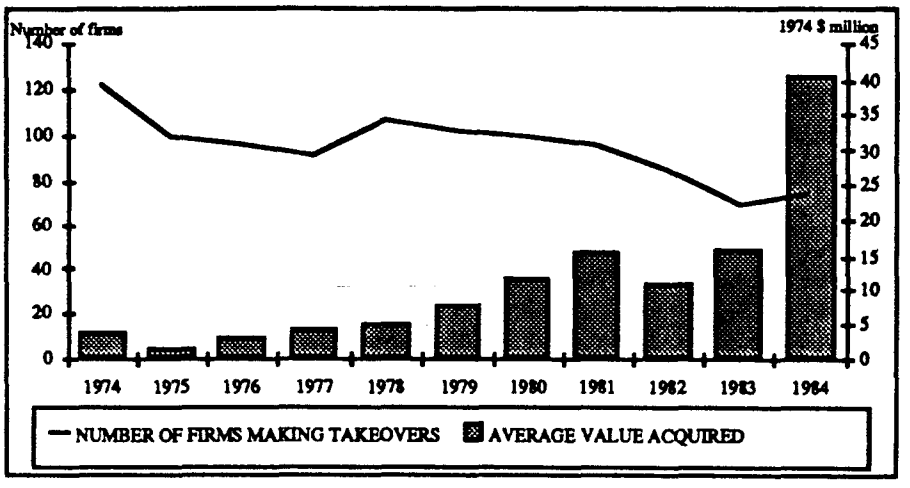


Source: Table A3.4 in Appendix 3.1

Value of the merger activity

Figure 3.5, based on Reserve Bank data, shows the number of firms making takeovers and the average value of acquisitions over the period. The number of acquirers declined by about 30 per cent. At the same time, the total value of acquisitions significantly increased, thereby causing a substantial rise in the average value of each acquisition.

Figure 3.5 Average value acquired and number of acquirers, all industries, 1974 to 1984



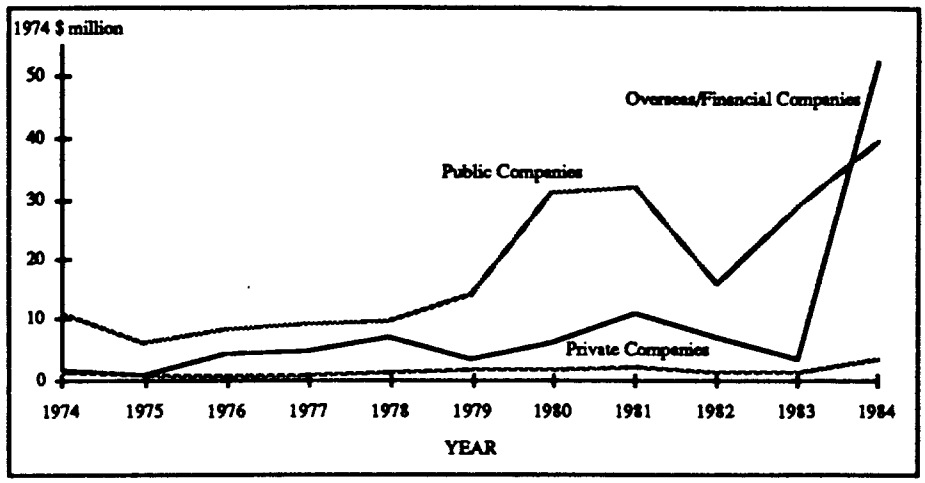
Source: Table A3.5 in Appendix 3.1

Reserve Bank data in Figure 3.6 show the average value of takeover targets differentiated on the basis of the three categories of corporate status used by the Bank: private companies, public companies, and companies based overseas or involved in the finance industry. Private company targets maintained a very low average value

throughout the period, even though these companies normally constituted over half of the target population.

The average value of public company targets more than doubled in 1980 although it was not until 1984 that it moved above that level. Overseas or finance companies generated a fairly constant amount of interest, with the number which were targets varying little. The average value of these companies as targets rose significantly in 1984.

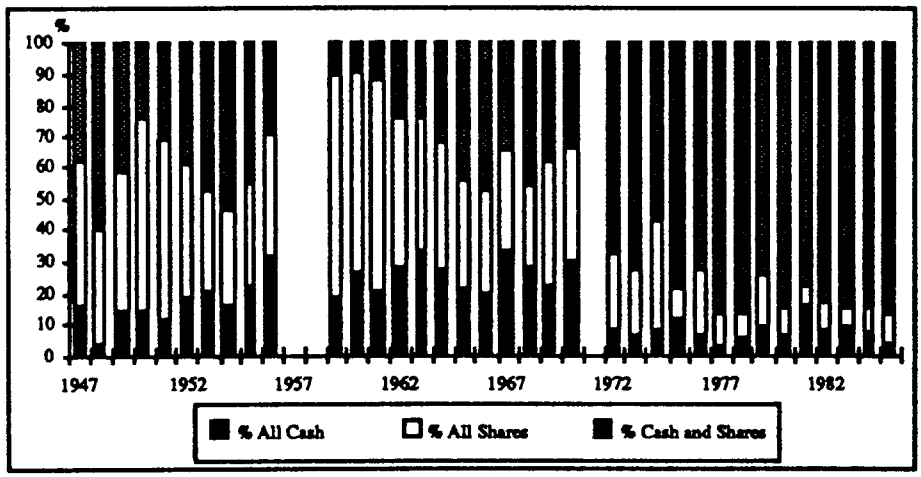
Figure 3.6 Average value of companies acquired, constant 1974 prices, 1974 to 1984



Source: Table A3.6 in Appendix 3.1

Forms of payment in takeover transactions
Figure 3.7 shows the form that payment for takeovers has taken since 1947.

Figure 3.7 Forms of payment for takeovers, 1947 to 1985



Source: Table A3.7 in Appendix 3.1

The majority of transactions have taken the form of either pure equity swaps or cash offers. Cash offers have steadily risen over the period to dominate other forms of payment. The decline of the exchange of equity suggests that the freeing up of financial markets might have allowed cash to be more easily obtained.

3.3 Conclusions

Overall, the trend in merger activity in Australia over the last four decades appears to have an irregular wave effect. The peaks tend to coincide with generally acknowledged speculative surges, particularly 1969 and 1972, 1980-81 and the mid to late 1980s. These surges provide no hint of any rhythm.

The most recent peak appears to differ from earlier peaks in two ways:

- the historical trend is noticeably upward; and,
- previous peaks have had characteristics dissimilar to those which are now apparent.

The peaks of 1959-60 and to a lesser extent 1969-72 had a greater focus on private companies, which tend to be smaller than public companies. Moreover, the earlier activity was financed by the pure exchange of equity to a much greater extent than in the recent period. Both of these characteristics are consistent with the concept of non-hostile absorption, that is, the proprietors of the target maintain some equity in the new operation.

Merger activity now seems to be performing a different function. The current period is better characterised by the accumulation of outright control. Targets have become larger and cash payment is now the dominant form of exchange, consistently taking up over 80 per cent of all transactions during the early and mid 1980s.

Appendix 3.1 Data on Merger Activity

Table A3.1 Estimates of merger activity, 1946 to 1986

Year	BIE Delistings No. of companies	Bushnell No. of companies	Stewart No. of companies
1946	2	...	...
1947	2	32	...
1948	7	34	...
1949	12	59	...
1950	14	76	...
1951	23	84	...
1952	13	44	...
1953	21	63	...
1954	27	90	...
1955	39	121	...
1956	40	...	...
1957	40	...	...
1958	58	...	...
1959	104	...	...
1960	99	...	141
1961	82	...	83
1962	49	...	55
1963	44	...	42
1964	46	...	45
1965	29	...	23
1966	33	...	55
1967	47	...	30
1968	54	...	66
1969	81	...	117
1970	92	...	81
1971	82	...	...
1972	114	...	...
1973	85	...	...
1974	51	...	...
1975	47	...	...
1976	59	...	...
1977	56	...	...
1978	60	...	...
1979	67	...	...
1980	77	...	...
1981	75	...	...

Table A3.1 Estimates of Merger Activity, 1946 to 1986 (Cont.)

Year	BIE Delistings No. of companies	Bushnell No. of companies	Stewart No. of companies
1982	60	...	...
1983	70	...	...
1984	85	...	...
1985	87	...	...
1986	103	...	...

Sources: Bushnell (1961); Stewart (1975); BIE database

Table A3.2 Different measures of takeover activity, 1974 to 1984

Year	BIE Delistings No.	Treasury No. of takeover bids	Reserve Bank No. of takeovers	Bishop et al No. of takeover bids
1974	51	97	252	65
1975	47	65	174	74
1976	59	81	180	90
1977	56	74	176	80
1978	60	106	176	107
1979	67	108	206	106
1980	77	124	188	132
1981	75	141	206	126
1982	60	78	174	70
1983	70	64	132	94
1984	85	121	142	118

Sources: Reserve Bank (1984), Bishop et al (1987), Treasury (1986), BIE database

Table A3.3 Number of takeover bids as a percentage of listed companies, 1960 to 1988

Year	Treasury %	NCSC %
1960	6.3	...
1961	6.8	...
1962	3.7	...
1963	4.5	...
1964	4.4	...
1965	4.7	...
1966	4.4	...
1967	4.8	...
1968	8.2	...
1969	8.7	...

Table A3.3 Number of takeover bids as percentage of listed companies, 1960 to 1988 (Cont)

Year	Treasury %	NCSC %
1970	3.0	...
1971	8.8	...
1972	11.1	...
1973	10.7	...
1974	7.0	...
1975	4.8	...
1976	6.1	...
1977	8.9	...
1979	9.7	...
1980	11.5	...
1981	13.1	...
1982	7.6	...
1983	6.4	8.5
1984	12.1	13.8
1985	11.4	8.7
1986	...	9.3
1987	...	13.2
1988	...	15.4

Sources: Treasury (1986), NCSC (various years)

Table A3.4 Share of total merger activity, by value, by sector, 1974 to 1984

Year	Manufacturing %	Wholesale %	Retail %	Services %	Total %
1974	61	5	14	21	100
1975	71	12	10	7	100
1976	79	7	5	9	100
1977	74	3	8	16	100
1978	73	14	3	11	100
1979	68	6	9	17	100
1980	80	9	5	6	100
1981	90	3	2	5	100
1982	74	11	3	12	100
1983	64	7	19	10	100
1984	69	19	2	10	100

Source: Reserve Bank (various years)

Table A3.5 Average value acquired and number of acquirers, all industries, 1974 to 1984

Year	Average value acquired (1974 $ million)	No. of firms making takeovers
1974	3.80	122
1975	1.41	99
1976	3.32	95
1977	4.01	91
1978	4.90	107
1979	7.63	101
1980	11.66	99
1981	15.41	96
1982	10.75	85
1983	15.70	69
1984	40.41	74

Source: Reserve Bank (various years)

Table A3.6 Average value of companies acquired, constant 1974 $ million, 1974 to 1984

Year	Public Companies $m	Private Companies $m	Overseas/Financial Companies $m
1974	10.96	0.83	1.32
1975	6.08	0.57	0.62
1976	7.95	0.63	3.95
1977	8.79	0.75	4.37
1978	9.40	1.02	6.44
1979	14.05	1.27	3.11
1980	30.64	1.16	5.94
1981	31.50	1.62	10.70
1982	15.62	0.94	6.58
1983	28.64	0.99	3.18
1984	39.27	3.07	52.18

Source: Reserve Bank (various years)

Table A3.7 Forms of payment for takeovers, 1947 to 1985

Year	All Cash %	All Shares %	Cash and Shares %
1947	38	47	15
1948	59	38	3
1949	41	46	13
1950	24	63	13
1951	31	58	11
1952	39	43	18
1953	48	33	19
1954	45	34	21
1955	53	32	15
1956	29	40	31
1957	...	...	...
1958	...	...	...
1959	9.7	72.6	17.7
1960	9.6	65.4	25.0
1961	11.8	68.6	19.6
1962	23.9	48.7	27.4
1963	23.8	43.8	32.4
1964	32.3	41.4	26.3
1965	43.8	35.9	20.3
1966	47.7	33.9	18.4
1967	34.6	32.7	32.7
1968	46.0	27.0	27.0
1969	38.2	41.0	20.8
1970	33.9	36.9	29.2
1971	...	...	...
1972	67.7	25.3	7.0
1973	72.6	22.2	5.2
1974	56.9	35.4	7.7
1975	78.4	10.8	10.8
1976	72.5	22.0	5.5
1977	86.3	11.3	2.4
1978	86.0	9.3	4.7
1979	74.5	17.0	8.5
1980	84.8	9.1	6.1
1981	77.8	6.3	15.9
1982	82.9	10.0	7.1
1983	85.1	6.4	8.5
1984	84.7	8.5	6.8
1985	85.9	10.9	3.2

Sources: 1947 to 1956 - Bushnell (1961), 1959 to 1970 - Stewart (1975), 1972 to 1985 - Bishop, *et al* (1987)

Appendix 3.2 Studies of Merger Activity

Bushnell (1961). He presented data for the period 1947 to 1959. His proxy for merger activity was the number of firms which 'disappeared' as a result of *takeovers* in each year. Disappearances were defined as the loss of corporate identity. He obtained his data from the records of the Sydney and Melbourne Stock Exchanges and company and newspaper reports. Non-public takeovers were covered only if public companies were involved but he believed he covered most merger activity (p8). His data are presented in Figure 3.1.

Stewart (1975). His data covered the period 1960 to 1970. Like Bushnell he used the number of firms which disappeared as a result of *takeovers* as a proxy. His primary sources were the Australian Financial Review and similar publications so he obtained published data on private companies. He was confident he covered most merger activity (p27). His data are shown in Figure 3.1.

Bishop, Dodd and Officer (1987). Their data covered all takeover *bids* for public companies from 1972 to 1985. Because bids were included irrespective of their eventual outcome, direct comparison with takeover statistics is difficult. The data are shown in Figure 3.2.

Treasury (1986). This study provided data on takeover *bids* for public companies for the period 1960 to 1984. It also showed these bids as a proportion of listed companies over the period. The data are shown in Figure 3.2.

Data without analysis are available from:
Reserve Bank (1976 to 1986). The Reserve Bank collected data on the number of *takeovers* of public and private companies made by public companies as part of its annual 'Company Finance' survey. Like Bushnell, the Reserve Bank relied on Stock Exchange data and company reports. The data are shown in Figure 3.2.

The survey produced other data, which are in Figures 3.4 to 3.7.

National Companies and Securities Commission (1983 to 1988). Since 1983 the NCSC has published data on the number of takeover *bids* for public companies. The data only includes the activities of listed firms. The data are shown in Figure 3.2.

4. Mergers and Industry Concentration

4.1 Introduction

Industry or market concentration refers to the size distribution of firms in a particular industry or market. A high level of concentration implies relatively few firms in the industry or market. Similar measures can be used to estimate aggregate concentration, that is, the relative position of large enterprises in an industry sector or the economy as a whole.

A distinction must be made between market concentration and industry concentration because data are only available on an industry basis. These data need not correspond to the market for goods produced by an industry as goods of other industries might compete in the same market. Industry concentration ratios ignore the impact of potential competition from these other industries. These and other limitations of the measures mean that they are only a broad indicator of the potential for market power.

Mergers are not the only way an industry can become more concentrated. It could occur, for example, through relatively higher growth of the larger firms or the exit of smaller firms. Furthermore, the causal relationship between mergers and industry concentration can work both ways so that, for example, increases in industry concentration might lead to mergers between smaller firms as a defensive measure.

The subtleties in the relationship between industry concentration and mergers reinforces the need to draw on more information about each industry before conclusions about the relationship can be reached. The case study approach adopted in this report is an attempt to provide this more detailed examination.

In this chapter, both aggregate and industry concentration data are presented. They are drawn from BIE work on trends in manufacturing concentration. BIE(1989c) provides a more detailed account of the methodology employed and the limitations of the data.

Concentration ratios are the most reliable measure of concentration using available data but they are partial indicators based on a subset of firms in an industry. Their main advantages are that they are simple to calculate and to interpret. They do not, however, provide information on the firm distribution outside the chosen subset of firms. Nor do they provide any indication of the distribution of firms within the chosen subset.

The Australian Bureau of Statistics (ABS) has published industry concentration ratios for the majority of 4-digit ASIC industries in the manufacturing sector for 1972-73, 1977-78 and 1982-83. Data for 1986-87 have been obtained by the BIE in an unpublished form. The ratios are available in terms of industry turnover, value added and employment for the four largest firms. Using these industry data it is possible to estimate aggregate concentration in manufacturing for these years.

The ABS ratios are producer concentration ratios as they refer only to the activities of domestic producers, that is, they ignore the impact of international trade. At a time when the internationalisation of the Australian economy is growing, this is a significant

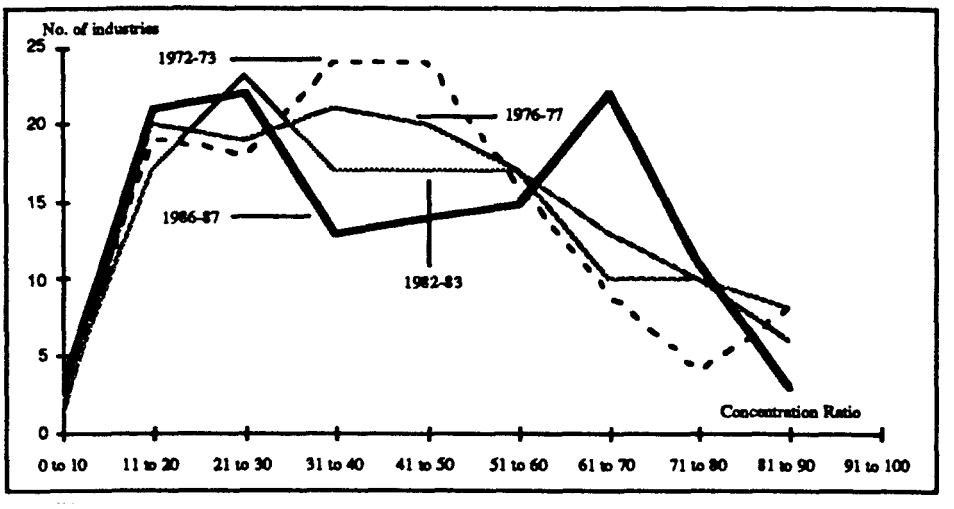
shortcoming. Adjustments made to the ABS data to account for trade provide seller concentration data, which are more comprehensive indicators of concentration.

4.2 Aggregate Concentration

ABS concentration ratios and, consequently, the trade adjustments made to them relate only to those manufacturing industries for which data are available. The trends revealed do not necessarily hold for other sectors of the economy or for the economy as a whole.

Figure 4.1 shows the frequency distributions of the industry concentration ratios for the period 1972-73 to 1986-87. There appears to have been a shift from one peak in 1972-73 to two peaks in 1986-87. The second peak, at a concentration ratio in the range 61 to 70 per cent, is associated with a continuing decline in the number of industries in the ranges 31 to 60 per cent and 91 to 100 per cent. In the latter case, a number of industries might have become more concentrated and moved into the 91 to 100 per cent range, for which no data are available. Over the whole period there has been little change in the number of industries at the lower end of the concentration ratio scale.

Figure 4.1 Distribution of concentration[a] by 4-digit ASIC industry, 1972-73 to 1986-87



Source: BIE (1989c)

Note: (a) Concentration ratio of the four largest enterprise groups calculated on a trade-adjusted turnover basis (see BIE 1989c)

Table 4.1 shows the average concentration levels in manufacturing on both an unadjusted and a trade-adjusted turnover basis. By either measure, average concentration has increased, although most of this occurred before 1982. The preferred trade-adjusted measure provides little sign of any significant increase since 1977-78.

The table also shows that while the trade-adjusted unweighted measure is well below the unweighted unadjusted measure, the same is not the case with the two weighted measures, where the difference is only one percentage point in each year. This suggests that trade is a more important influence on concentration in smaller industries, which do not contribute as much to the weighted measures, than it is in larger industries.

Table 4.1 Average concentration[a] for the manufacturing sector, 1972-73 to 1986-87

	Unadjusted [b]			
	1972-73	1977-78	1982-83	1986-87
	%	%	%	%
Unweighted	53	56	57	58
Weighted (d)	46	48	48	50
	Trade-adjusted [c]			
	1972-73	1977-78	1982-83	1986-87
	%	%	%	%
Unweighted	46	48	49	49
Weighted (d)	45	49	49	51

Sources: BIE (1989c)

Notes: (a) Of the largest four enterprise groups in each 4-digit ASIC industry. Estimates have been made for a number of ASIC classes where data are unavailable.

(b) That is, using turnover data only.

(c) That is, using turnover adjusted for the effects of trade.

(d) Using fixed 1986-87 weights based on industry share of total manufacturing turnover and trade-adjusted turnover respectively.

In Table 4.2 an indication of the changes in concentration in the manufacturing sector is given. It appears that highly and moderately concentrated industries have been increasing in significance. The trade-adjusted share of these industries in total manufacturing value added rose from 53 per cent in 1972-73 to 60 per cent in 1986-87. A similar increase is apparent in the unadjusted measure. The number of industries within each of the concentration categories has remained fairly constant over the period, so changes in their shares of value added are the result of movements in the shares of the industries within each category.

One point of difference between the unadjusted and trade-adjusted measures concerns the changes in the share of manufacturing value added accounted for by the highly concentrated industries. While the share grew in the period by 7.3 percentage points, using the unadjusted measure, it grew by only 1.9 percentage points when the trade-adjusted measure was used.

A change in the share of total value added contributed by any of these categories does not necessarily imply a change in concentration of industries within that category. Nevertheless, there have been some changes in the average concentration in all three categories which, taken as a whole, broadly reflect the increases in aggregate concentration shown in Table 4.1. Concentration in the high concentration industries has grown from 83 to 85 per cent over the period and in the moderate concentration industries from 53 to 57 per cent. The average concentration in low concentration industries has fallen from 26 to 24 per cent.

There has been little study of concentration in industries other than manufacturing. A major reason for this is the lack of data. Several studies have, however, pointed to the highly concentrated nature of some service industries. The TPC (1988) has claimed that there are oligopolies or duopolies in banking, grocery retailing, domestic airlines and department stores. Caves notes that communications and the media industries operate under conditions of monopoly or near monopoly (Caves et al, 1987, p25).

Table 4.2 Share of manufacturing value added, by concentration[a], 1972-73 to 1986-87

	Unadjusted[b]			
Industry structure	1972-73 %	1977-78 %	1982-83 %	1986-87 %
High concentration[c]	25.8	33.2	26.4	33.1
Moderate concentration[d]	25.1	25.8	30.2	29.1
Low concentration[e]	49.1	42.0	43.4	37.8
	100.0	100.0	100.0	100.0
	Trade-adjusted[f]			
Industry structure	1972-73 %	1977-78 %	1982-83 %	1986-87 %
High concentration[c]	24.0	25.8	22.6	25.9
Moderate concentration[d]	28.7	27.7	31.8	34.4
Low concentration[e]	47.3	46.5	45.6	39.7
	100.0	100.0	100.0	100.0

Source: BIE (1989c)

Notes: (a) Of the largest four enterprise groups in each 4 digit ASIC industry. The BIE estimated ratios for a number of ASIC classes where data are unavailable.
(b) That is, using turnover data only.
(c) Concentration ratio greater than or equal to 0.7.
(d) Concentration ratio between 0.4 and 0.7.
(e) Concentration ratio less than 0.4.
(f) That is, using turnover adjusted for the effects of trade.

4.3 International Comparisons of Concentration

A comparison of concentration levels across countries is particularly difficult. Industry definitions, the number of firms used in calculating the concentration ratio, varying years of compilation and different bases (employment, value added, whether trade-adjusted, etc) may all differ from one country to another.

In addition, where the comparison is being made with Australia, the relatively small domestic market and the artificial and natural trade barriers must be borne in mind. In industries where scale economies are important, demand may be sufficient to support only a few firms of optimal size. Thus, other things being equal, concentration could be expected to be greater in Australia than in larger economies.

Some broad comparisons can be made, as Table 4.3 shows. It can be seen that average concentration in the manufacturing sector in Australia is generally higher than that in the UK, with the differences being most marked for the trade-adjusted data

The trade-adjusted data also show that average concentration in UK manufacturing has been declining as a result of trade. This contrasts with the Australian experience, which has shown no such downward trend in the trade-adjusted data.

Similar results have been shown by Dixon (1989, pp7 and 19) in comparisons between Australia and Canada and between Australia and the UK. He concluded that while aggregate concentration in Canadian and UK manufacturing has been generally

declining, that for Australia, using unadjusted data, increased over the period 1968-69 to 1982-83.

Table 4.3. Average concentration in manufacturing[a], UK and Australia, 1970 to 1986-87.

	Unadjusted			Trade Adjusted		
	Australia (b)		UK (c)	Australia (b)		UK (c)
	% (d)	% (e)	%	% (d)	% (e)	%
1970			49.0			41.3
1972-73	53.0	46.0		46.0	45.0	
1973			50.9			40.9
1977			48.9			38.1
1977-78	56.0	48.0		48.0	49.0	
1979			48.5			36.5
1979(f)			51.4			39.3
1981			50.9			37.6
1982-83	57.0	48.0		49.0	49.0	
1983			50.9			35.9
1984			49.1			33.8
1986-87	54.0	50.0		49.0	51.0	

Sources: Ferguson (1988b) p39
United Kingdom, Department of Trade and Industry (1988) pp30-1
BIE (1989c)

Notes: (a) In terms of turnover for Australia and gross output for the UK.
(b) Australian data are for the four largest enterprise groups in 4-digit industries.
(c) UK data are for the five largest producers in 3-digit industries. It is not stated in the source documents whether these are weighted or unweighted figures.
(d) Unweighted.
(e) Weighted.
(f) A change in 1980 in industry definitions led to a change in the concentration. measure.

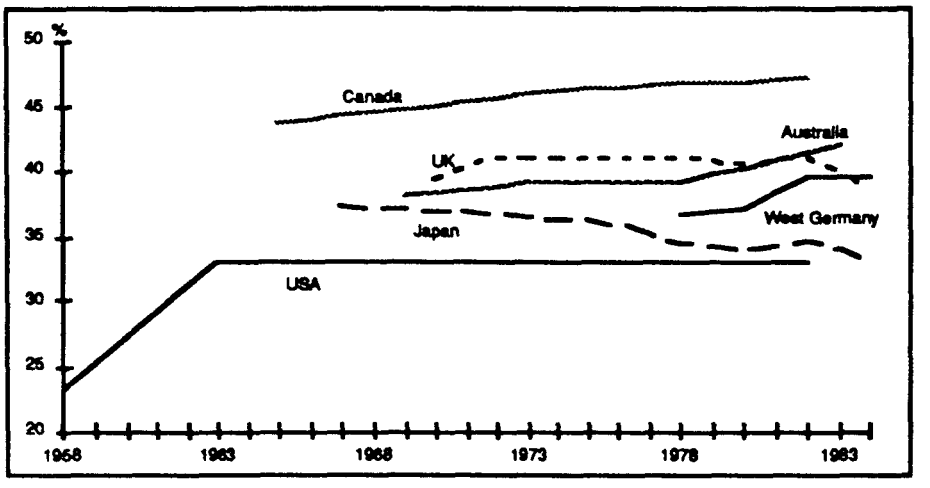
This finding by Dixon that aggregate concentration in Canada has been generally declining contrasts with data presented by Marfels (1988) in a comparison between Canada, West Germany, the US and Japan. The trends from these data are shown in Figure 4.2. UK and Australian data have been added to Marfels' data. The data are composed on different bases for each country so the results should be considered indicative only. It can be seen that, on these measures, while aggregate concentration has remained steady or fallen in the US, the UK and West Germany, it has risen in Japan, Canada and Australia. In absolute terms, Canada appears to have a more concentrated manufacturing sector than the other countries, with Australia at or just above the average for the group.

Caves (1984) found that Australian industry was considerably more concentrated than industry in the US. He also found that the average plant size in Australia was considerably less than optimal so he concluded that it was not the exploitation of economies of scale to achieve optimal plant size in a small market that was the cause of the high concentration.

The reasons he gave for the sub-optimal plant size were the small national market, artificial and natural trade barriers, product differentiation between local and foreign producers and fragmentation of the market caused by an inefficient transport system and State Government policies of industry support. Recent moves to reduce some of these

impediments would be expected to result in firms operating plants which are closer to optimal size and an increase in concentration in some industries

Figure 4.2 Share of manufacturing activity[a] by the 100 largest manufacturing firms, various countries



Sources: Marfels (1988)
BIE (1989c)

Note: (a) The bases used are: Canada, value added; West Germany, sales; Japan, assets; UK, net output; Australia, value added. Data for Australia on a turnover basis are 3 to 5 percentage points higher over this period (See ABS, 1990).

In other industries, however, the use of flexible manufacturing systems and microelectronics has reduced the importance of scale economies (BIE, 1988). Increases in efficiency and movements towards optimal plant sizes in these industries will not necessarily lead to increased concentration. Overall, the effect on aggregate concentration of any reductions in these impediments is not clear.

4.4 Industry Data

Industry data are presented in detail in BIE (1989c). Table 4.4 summarises some of these results by showing the trade-adjusted concentration ratios for 3-digit ASIC industries in the period 1972-73 to 1987-88, for those industries where data were available. Industries with increases in concentration outnumber those with decreases and the average increase is considerably larger than the average decrease.

A greater level of disaggregation is given by Table 4.5, which shows the distribution of changes, since 1977-78, of concentration calculated on a trade-adjusted turnover basis for ASIC 4-digit industries. It can be seen that, for those industries where data are available, changes in most industries fell in the range plus 10 to minus 10 percentage points. An increase occurred in 59 industries, while 59 industries showed a decrease. There was, however, a large number of industries for which data were not available.

Table 4.4 Concentration ratios for 3-digit ASIC industries[a], 1972-73 to 1986-87

ASIC	industry	Year ending June: 1973 %	1978 %	1983 %	1987 %
211	Meat products	25	21	22	23
212	Milk products	26	32	29	34
213	Fruit & vegetable products	29	35	30	34
214	Margarine, oils & fats nec	59	61	71	90
215	Flour mill & cereal products	38	44	51	58
216	Bread, cakes & biscuits	44	59	47	52
217	Sugar & other food products	23	26	20	24
218	Beverages & malt	36	33	39	43
219	Tobacco products	90	86	88	88
234	Textile fibres, yarns & woven fabrics	43[b]	26	26	26
235	Other textile products	30[b]	20	22	22
244	Knitting mill products	23	16	16	17
245	Clothing	12	13	12	12
246	Footwear	28	29	27	26
253	Wood & wood products	8	7	11	16
254	Furniture & mattresses	14	13	12	9
263	Paper & paper products	42	41	43	50
264	Printing & allied industries	25	29	28	27
275	Basic chemicals	36	39	39	43
276	Other chemical products	21	19	19	18
277	Petroleum refining	64	72	84	76
278	Petroleum & coal products nec	56	63	72	65
285	Glass & glass products	na	na	na	76
286	Clay products & refractories	33	28	32	30
287	Cement & concrete products	69[b]	38	44	40
288	Other non-metallic mineral products	68[b]	67	61	47
294	Basic iron & steel	77[b]	79	80	74
295	Basic non-ferrous metals	na	55	63	50
296	Non-ferrous metal basic products	43[b]	60	64	59
314	Structural metal products	18[b]	22	23	21
315	Sheet metal products	34	34	36	35
316	Other fabricated metal products	16[b]	12	12	14
323	Motor vehicles & parts	55	45	46	44
324	Other transport equipment	26	29	34	40
334	Photographic, professional & scientific equipment	32	33	34	26
335	Appliances & electrical equipment	15	14	14	14
336	Industrial machinery & equipment	6	7	8	8
345	Leather & leather products	19	18	21	23
346	Rubber products	56	50	52	48
347	Plastic & related products	19	1	18	18
348	Other manufacturing	10	9	8	7

Source: BIE (1989c), Table A.1

Notes: (a) For the four largest firms, on a trade-adjusted turnover basis

(b) ASIC definition was changed in 1978

Table 4.5 Changes in industry concentration[a], 4-digit industries, 1977-78 to 1986-87

Change in concentration Percentage points	No. of industries
Greater than +10	18
+6 to +10	13
+1 to +5	28
No change	3
-5 to -1	28
-10 to -6	17
less than -10	14
Data not available	51

Source: BIE (1989c) Table 1
Note: (a) Concentration ratio of four largest firms calculated on a trade-adjusted turnover basis

As is shown in Table 4.6 and Figure 4.3 there were seventeen industries where the increase in concentration was greater than ten percentage points. Of these, performance of ASIC industries 3233 and 2635 are not significant because they are miscellaneous categories. As such, it is unlikely that the industries represent any collection of highly substitutable products. An exception is ASIC 2140, Margarine, oils and fats nec, which appears to cover a small number of homogeneous and largely substitutable products.

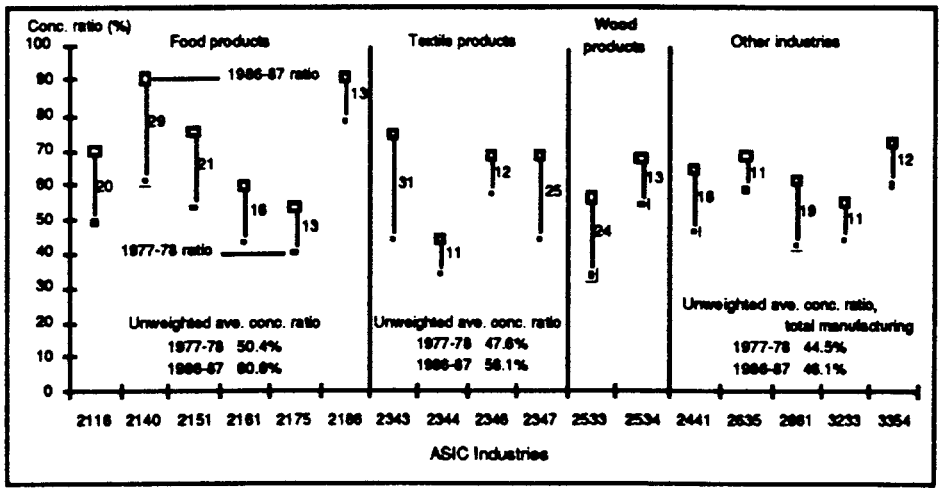
Table 4.6 Industries with the largest increase in concentration[a], 1977-78 to 1986-87

Rank	ASIC		Concentration Ratio 1977-78 %	1986-87 %	Change 77-78 to 86-87 %age pts
1	2343	Man-made fibres & yarns	44	74	31
2	2140	Margarine, oils and fats nec	61	90	29
3	2347	Woollen yarns & broadwoven fabrics	44	68	25
4	2533	Veneers & manufactured boards of wood	33	56	24
5	2151	Flour mill products	53	75	21
6	2116	Poultry	49	69	20
7	2861	Clay bricks & clay refractories	42	61	18
8	2441	Hosiery	46	64	18
9	2161	Bread	43	59	16
10	2175	Prepared animal & bird foods	40	53	13
11	2186	Beer	78	91	13
12	2534	Joinery & wooden structural fittings	54	67	13
13	3354	Water heating systems	60	72	12
14	2346	Worsted yarns & broadwoven fabrics	57	68	12
15	3233	Motor vehicle instruments & elec equip nec	44	55	11
16	2635	Paper products nec	58	68	11
17	2344	Man-made fibre broadwoven fabrics	34	44	11

Source: BIE (1989c)
Note: (a) Concentration ratio of the four largest firms on a trade-adjusted turnover basis

Figure 4.3 shows more clearly that the food, textiles and, to a lesser extent, wood products industry groups dominate the table. Twelve out of the seventeen industries are in these groups. On the face of it, these industries appear to have little in common except relatively high levels of natural or artificial protection.

Figure 4.3 Changes in concentration[a], 1977-78 to 1986-87, industries with largest increase



Source: BIE (1989c)
Note: (a) Concentration ratio of four largest firms calculated on a trade-adjusted turnover basis

A further point in Figure 4.3 is that the concentration ratios for the industries shown are generally well above the average concentration ratios for their own industry groups and for manufacturing as a whole in 1986-87, even though this was not the case in 1977-78.

Industries with the greatest fall in concentration over the period are shown in Table 4.7. They are grouped into 3-digit ASIC industries in Figure 4.4.

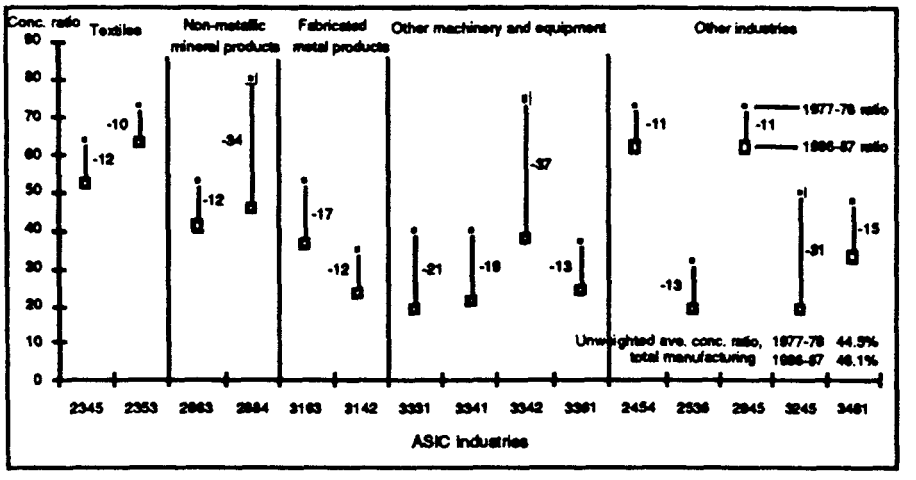
Table 4.7 Industries with the largest decrease in concentration[a], 1977-78 to 1986-87

Rank	ASIC		Concentration Ratio 1977-78 %	Concentration Ratio 1986-87 %	Change 77-78 to 86-87 %age pts
1	3342	Photographic film processing	75	38	-37
2	2884	Concrete pipes & asbestos cement products	80	46	-34
3	3245	Transport equipment nec	50	19	-31
4	3351	TVs, radios, audio equipment	40	19	-21
5	3341	Photographic and optical goods	40	21	-19
6	3163	Nuts, bolts, screws & rivets	53	36	-17
7	3481	Ophthalmic articles	48	33	-15
8	3361	Agricultural machinery	37	24	-13
9	2536	Wooden containers	32	19	-13
10	2345	Cotton yarns & broadwoven fabrics	64	52	-12
11	3142	Architectural aluminium products	35	23	-12
12	2863	Ceramic tiles and pipes	53	41	-12
13	2454	Foundation garments	73	62	-11
14	2945	Steel pipes & tubes	73	62	-11
15	2353	Rope, cordage & twine	73	63	-10

Source: BIE (1989c)
Note: (a) Concentration ratio of the four largest firmson a trade-adjusted turnover basis.

Of the fifteen industries, four are in the Other machinery and equipment category and there are two in textiles, fabricated metal products and non-metallic mineral products. Textile industries feature prominently in both the list of industries with the greatest increases in concentration, Table 4.6, and this list.

Figure 4.4 Changes in concentration[a], 1977-78 to 1986-87, industries with largest decrease



Source: BIE (1989c)
Note: (a) Concentration ratio of four largest firms on a trade-adjusted turnover basis

4.4 Conclusions

Concentration refers to the size distribution of firms in a particular market or industry. The relationship between horizontal mergers and concentration is not clear-cut. At the aggregate level, it appears that concentration in Australia has increased only moderately over the period 1972-73 to 1986-87 Nevertheless, the proportion of manufacturing value added accounted for by the least concentrated industries has fallen steadily over the period.

Comparisons of international data are difficult. However, it appears that, on the measures used, the level of concentration in Australia is at or just above the average for larger industrialised countries but below that of Canada.

At the level of individual industries, the largest increases in the period 1977-78 to 1986-87 have been in the areas of food and textiles. Industries in the textiles area have also featured among those with the largest decrease in concentration over the period.

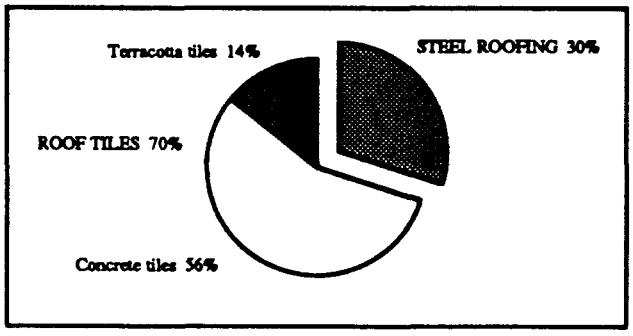
Industry concentration ratios can only provide a guide to market structure and the potential for the use of market power. The case study approach adopted in this report is an attempt to show more about some industries than is possible from the use in isolation of either concentration or merger statistics.

5. Case Study 1: Two Mergers in the Roof Tile Industry

5.1 Introduction

The production of roof tiles in Australia each year generates between $700 and $800 million in turnover. Sales of roof tiles constitute approximately 70 per cent of the total market for house roofing materials in Australia, with steel products largely accounting for the remainder. Two different materials can be used to make roof tiles: concrete, which accounts for about 56 per cent of roof tile sales, and terracotta clay, which accounts for about 14 per cent[1]. These market shares are shown in Figure 5.1.

Figure 5.1 Approximate market shares for roofing materials, Australia, 1989



Source: BIE estimates.

The aim of this chapter is to assess the outcome of two mergers in this industry:

- Boral's 1982 takeover of Blue Metal Industries (BMI), including the Clark Tiles subsidiary.
- The acquisition by Monier of Wunderlich terracotta tiles in 1983.

The Trade Practices Commission took a formal interest only in the Monier/Wunderlich merger, authorising it to proceed on the basis of demonstrable public benefit.

5.2 The Industry

Structure of the industry

ABS data on this industry are in two ASIC classes. ASIC 2863, Ceramic Tiles and Pipes, covers ceramic products as well as terracotta roof tiles. Producer concentration, shown in Figure 5.2, increased markedly over the period to 1986-87. Trade-adjusted concentration fell, especially in 1986-87, but most of this appears to be due to imports of ceramic products rather than terracotta roof tiles.

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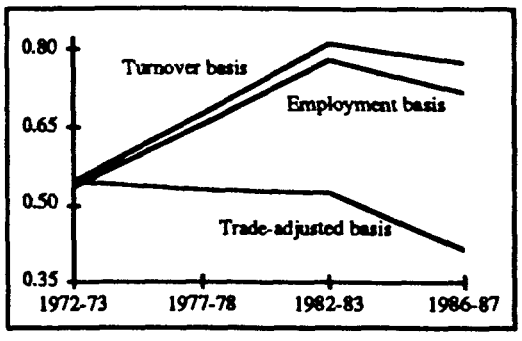
[1] Other materials used for making roof tiles include fibre cement and natural slate. These other materials make up only a minor share of the market.

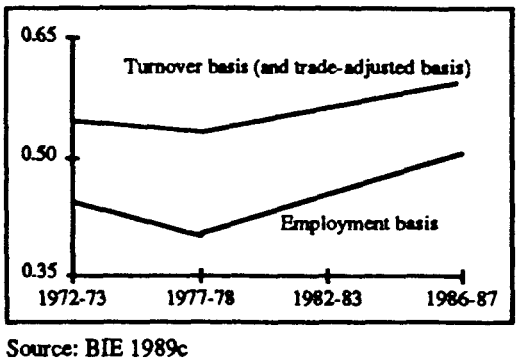
Figure 5.2 ASIC 2863 Ceramic tiles and pipes, concentration ratios, 1972-73 to 1986-87



Source: BIE 1989c

As well as concrete roofing tiles, ASIC 2874 Concrete Products nec includes concrete bricks and prefabricated mouldings. This industry is essentially a non-traded one. The concentration ratios in Figure 5.3 imply only moderate levels of concentration.

Figure 5.3 ASIC 2874 Concrete products nec, concentration ratios, 1972-73 to 1986-87



Source: BIE 1989c

The structure of the roof tiles industry is shaped by technology and demand factors:

- it is highly dependent on the level of residential building activity;
- the technology for concrete tiles is mature but terracotta tile technology has benefited from recent changes;
- there is a low value to volume ratio leading to a low level of transportability and location of factories on a regional basis.

Three companies, CSR (which owns Monier), Boral and Pioneer, produce the majority of building materials in Australia. These companies have substantial vertical linkages from the extraction of raw materials to the application of the finished product. Roof tile production is a relatively minor part of the building products sector and of the operations of these companies.

Most firms fix the tiles to roofs as well as supplying them. These 'supply and fix' operations are becoming more important to the firms relative to 'supply only' operations.

The definition of market boundaries is heavily influenced by transport costs. Market boundaries are regional rather than national but are expanding as transport costs fall. Interstate trade is still limited, however, and occurs mainly between NSW, Victoria, the ACT and Queensland. It is mainly carried out by Montoro, a recent entrant to the industry, and Brick and Pipe.

The mergers have had their greatest impact in NSW, the ACT and Victoria. Figure 5.4 shows the firms operating in these areas in 1977 and 1988, that is, pre-merger and post-merger, and ownership changes over this period. Apart from the Monier/Wunderlich merger and the entry of Boral into the eastern States, the main changes occurred when Pioneer acquired Humes, the very small terracotta tile producer, Lion, was liquidated and Montoro entered the market. More recently, Pioneer has acquired Brick and Pipe, but it is too early to estimate the long run impact of this merger on the industry.

One industry participant noted that market structures in building products industries overseas are sometimes quite different to those in Australia. In Continental Europe and the USA these industries are characterised by a large number of small, family-owned firms. The reasons for these disparities are not clear but it could be that Australian markets require a more standardised product that is easily mass produced, whereas the demand in Europe and the USA may be for greater variety including, for example, more craft-based materials.

Structure of the industry before the mergers

Prior to the 1980s, Monier and Brick and Pipe were the significant producers in NSW and Victoria respectively. The other firms were typically smaller, family-controlled operations. The present large building products conglomerates, CSR, Boral and Pioneer, had only small holdings in the industry at that time.

Roof tiles were by far the dominant material used in house roofing. Concrete tiles were enjoying widespread popularity and there was a public perception that differences between the quality of terracotta and concrete tiles did not warrant the higher price sought for terracotta. Steel roofing then had under 20 per cent of the market compared with the current 30 per cent.

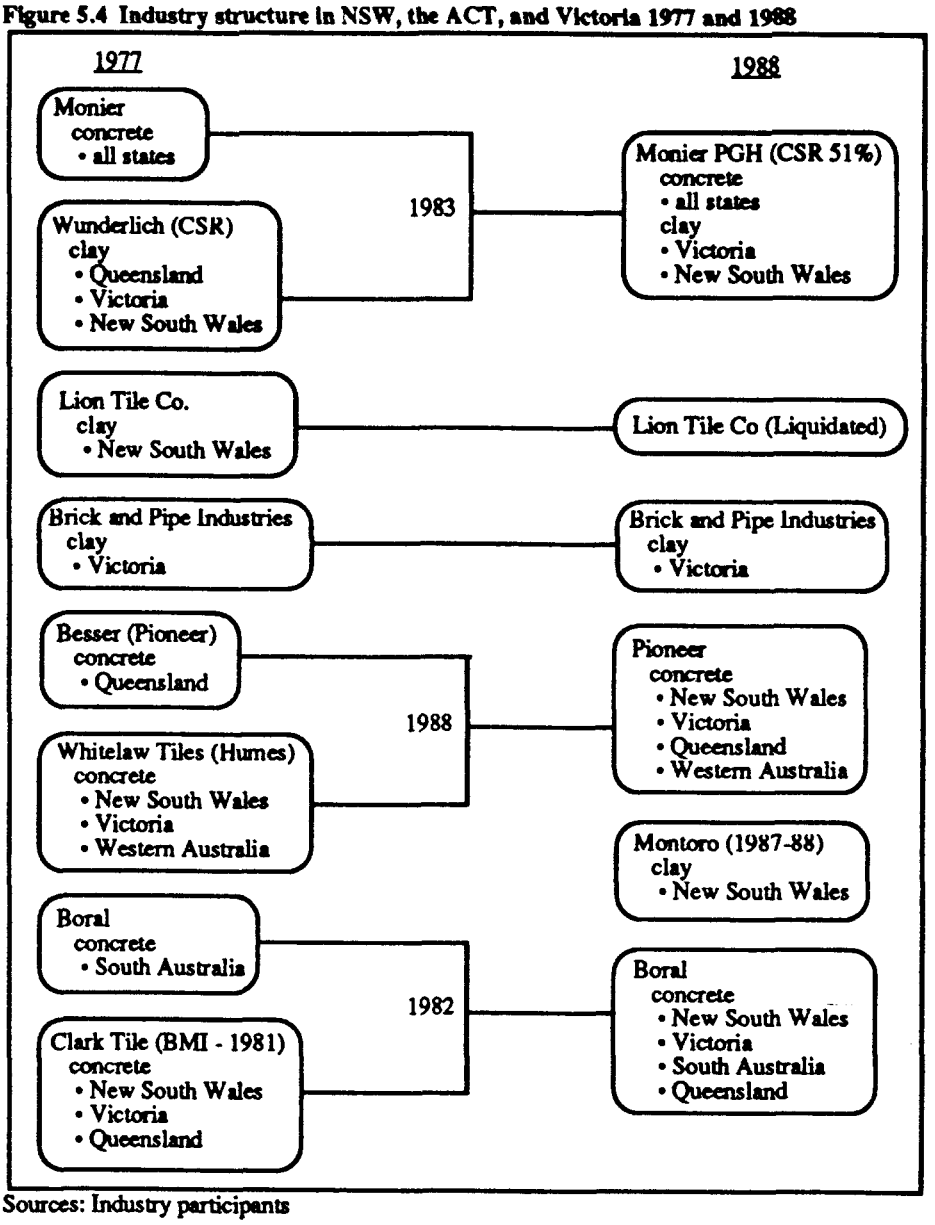
By 1980 the technology of terracotta tile manufacture had become obsolete. The process has been described by industry participants as '19th century', requiring a high level of manual operation, increasingly expensive oil for the large amount of energy required and excessive time for firing and handling. All these factors were leading to rapidly increasing costs and prices.

In recent times, however, terracotta technology has improved considerably. Newly installed facilities, such as 'flow-through' kilns and automatic handling machines, have led to faster production, reduced energy requirements and lower costs generally. The new facilities have significantly reduced the level of rejected tiles and increased the quality of finish on the tiles.

In contrast to the high cost technology of terracotta tile production before the mergers, concrete tiles could be produced much more quickly and required less capital, labour and energy. This meant that concrete tiles were cheaper to produce and could be more quickly adapted to particular jobs and to meet changing fashions. These characteristics

gave concrete tiles a distinct advantage over terracotta tiles. The speed of delivery and the lower cost of concrete tiles threatened to reduce terracotta tiles to a novelty item.

Figure 5.4 Industry structure in NSW, the ACT, and Victoria 1977 and 1988



Sources: Industry participants

Industry sources have indicated that the marketing efforts of the various firms differed considerably in the pre-merger period. Whereas Monier was an active promoter of its product, the smaller firms, including Wunderlich, did not appear to put much emphasis on this area. There is an industry view that many of these smaller firms were quite happy with their place in the market and had little desire, or incentive, to improve it.

Despite this relative complacency, there were occasional price wars, mainly during building downturns, which were aimed at maintaining or increasing sales and market share. It appears that these did not last long. The TPC received, and pursued, a number of complaints from independent tile fixers over several years about Monier withholding work and engaging in price discrimination. Charges emanating from these complaints were withdrawn by the TPC when Monier gave supply undertakings to the Federal Court as part of the authorisation of the Wunderlich merger.

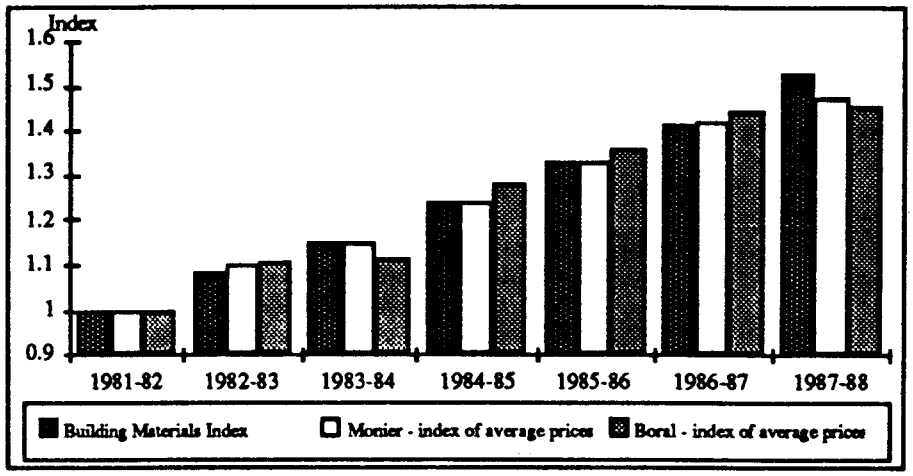
Demand and supply features

Prices

Figures 5.5 and 5.6 show the trends in the roof tile prices charged by Monier and Boral over the 1980s and compares them with general price trends in the building products sector over the same period. Some of these data are derived from list prices supplied by the companies. List prices may be subject to discounting, however, and, unless discounting policy is constant, the trends revealed may be overstated.

Figure 5.5 shows that the prices of both Monier and Boral have generally moved in line with the Building Materials index. Monier's pricing of concrete tiles has been subject to review by the Prices Surveillance Authority since 1984.

Figure 5.5 Indexes of roof tile prices, 1981-82 to 1987-88

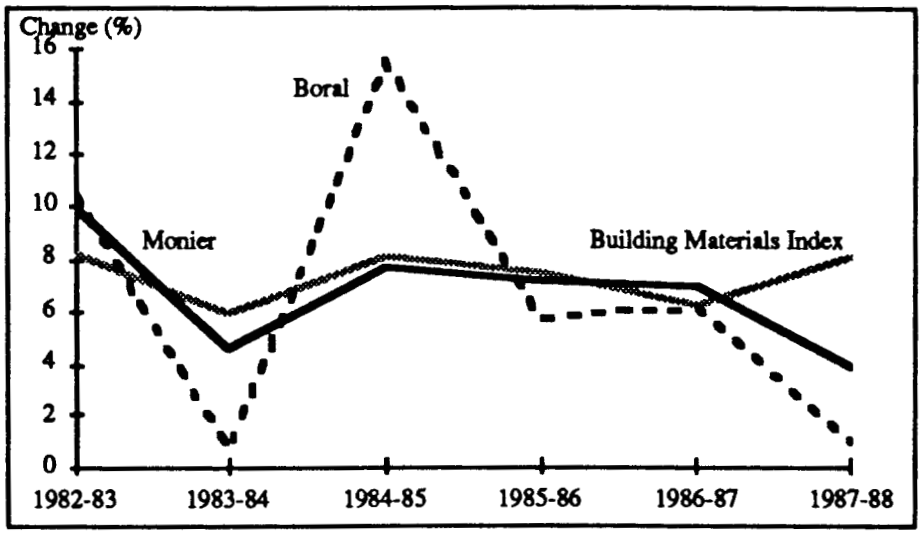


Sources: Company data and ABS Cat. No. 6408.0

Figure 5.6 gives a clearer picture of the year-to-year movements of the various price indices. Monier generally follows the movements in the general index and its prices exhibit relatively little variation over time. Its price increases range from 5 to 10 per cent. Price increases for Boral, on the other hand, have shown greater variability, with increases ranging from under 1 to over 15 per cent. Boral argues that its approach to pricing is a market driven one and that the variations reflect fluctuations in demand.

Terracotta tiles are more highly priced, and now have a substantially better quality image than concrete tiles. They are associated with higher quality houses at the more expensive end of the market. Industry participants have claimed that terracotta tile demand is not as responsive to changes in price or income as demand for concrete tiles.

Figure 5.6 Annual price changes, Building materials, Monier and Boral 1982-83 to 1987-88



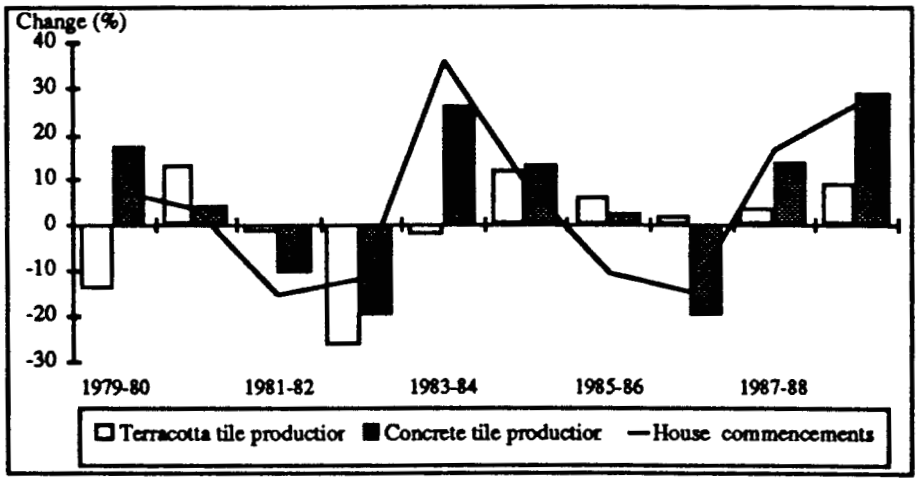
Sources: Company data and ABS Cat. No. 6408.0

Trends in demand

a) Overall demand

Figure 5.7 shows the importance of residential building activity for the level of tile production. Housing commencements have fluctuated greatly over the last decade. Thus, the market environment for roof tiles is characterised by considerable uncertainty.

Figure 5.7 Annual changes in tile production and building activity, 1979-80 to 1988-89



Sources: ABS Cat. Nos. 8752.0 and 8361.0

Using production figures as an indicator of demand, demand for concrete roof tiles has grown by an average annual rate of 2 per cent since 1980. In 1980-81, concrete tile production equalled 17.2 million square metres of flat surface area whereas in 1988-89,

probably the peak of the recent boom, production equalled 21.1 million square metres (ABS Cat. No. 8361.0). It appears that terracotta demand has grown at a substantially greater rate over the same period.

b) Resurgence of demand for terracotta
The popularity of terracotta tiles has recovered in the past few years. According to industry sources the main causes of this recovery are:

- a reduction in the price difference between terracotta and concrete tiles;
- a marketing campaign by the new entrant, Montoro, which has increased the demand for the products of all producers as well as its own; and,
- a resurgent interest in traditional styles of architecture which utilise terracotta tiled roofs.

c) Alternative roofing materials
Industry sources claim that the dominance of concrete tiles in the roofing market has been eroded over the past decade, albeit only slowly. The increase in demand for terracotta tiles is one reason but steel roofing has also been making greater inroads into the market. Improvements in design, colour ranges and flexibility in application have made steel roofing increasingly popular with architects and consumers.

In Queensland and in country areas of other States steel has around 45 per cent of the market. It has greater difficulty in metropolitan markets, normally taking up only 10 per cent of demand in the major cities. In NSW as a whole, steel has 30 per cent of the market (HIA, 1989).

Sources in the industry believe that the two products are not completely substitutable. In their view, consumers make a conscious decision as to the style of house they wish to build which, in turn, determines the type of roofing material to be used. The lack of familiarity with the structural requirements of steel roofing by metropolitan builders is also said to have increased costs to an uncompetitive level. It is also claimed that there is a resistance towards steel on the part of some municipal councils, which question its aesthetic value.

While some tile producers believe that demand for steel roofing will fall as housing tastes change, steel producers believe that it will at least maintain its share of the market. In their view, the popularity of colonial house styles which utilise steel roofing will continue and architects and other consumers will continue to be attracted by the flexibility of the product.

d) Imports and exports
As a general rule roof tiles are not imported into Australia because of high transport costs. The most significant imports are small volumes of shale shingles from the USA.

Only terracotta tiles produce the profit margins sufficient to justify expansion into exports. Factors discouraging exports include high transport costs and the potential for damage in transit, together with high marketing costs. NZ is currently the main market for export while Montoro and Bristile, a WA company, are beginning to penetrate Asian markets such as Singapore.

e) Product differentiation
Apart from differences between concrete and terracotta tiles, a high level of minor product differentiation, by means of colours and styles, has evolved in the roof tile market. This is essentially a function of the wide variety of consumer tastes faced by tile producers. A recent innovation has been the development of a new method of tile colouring. Colouring oxides are added to the body mix of the tile to give greater consistency and depth of colour than the old system of spraying slurry on the exterior of the moulded tile. To some customers the integral colour is duller and less like a glazed terracotta tile and hence is less desirable than the 'colour-on' slurry treatment. To others, the longer life and 'earthy' lustre is desirable. This innovation has contributed toward differentiation of the concrete product and provides a tile which compares more favourably with the terracotta tile.

Steel roofing has also been able in recent times to provide a greater variety of colours and styles.

Cost factors
a) Input costs
The tile operations of Boral and Pioneer are vertically integrated with cement suppliers in their respective corporations. Monier has only recently achieved such vertical integration with Australian Cement Ltd (ACL) through mutual control by CSR. There is insufficient information upon which to make a judgement on whether advantages are gained in such arrangements. The firms point out that all customers of the cement producers are charged the same price for supplies.

Most terracotta producers are also vertically integrated, owning their own clay deposits. Factories are normally located near the quarries, but any cost advantage from such proximity is minor as clay only represents about 10 per cent of the cost of tiles. Most of the expense comes from the processing of the material inputs.

b)Technology
Very few material inputs are required in the manufacture of either type of roof tile. The major materials are cement or clay, sand, oxide and energy, which is normally natural gas and electricity. Direct labour accounts for about 25 per cent of total cost.

There have been no major technological changes in concrete tile manufacture since the 1950s. However, there have been a number of improvements to automate, simplify and speed up the production process and the change-over procedure to different tile profiles. One of the most significant improvements has been the introduction in some plants of automatic racking at the drying chamber entry and automatic stacking of the finished product for subsequent transport.

Unit production costs for concrete tiles are largely determined by production runs and machine speeds. The normal rate is 100 to 120 tiles per minute. This compares favourably with speeds of 50 to 70 tiles per minute typically achieved in the 1960s[2].

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[2] A reduction in workers on a production line from between 20 and 30 to between 10 and15 has been achieved over the same period. Taken together these changes account for significant productivity improvements.

Downtime costs are incurred when dies and colours are changed, so a plant which specialises is likely to have the lowest unit costs. Small, specialised plants can therefore be viable from a production cost point of view but, for marketing purposes, a full range of profiles and colours is preferred. Monier has sought to maintain the viability of its regional plants by combining the advantages of specialisation with a full product range. It has done this by having the smaller outlying plants produce only a small number of profiles and supplementing their range with the output of larger metropolitan plants.

Recent investments in terracotta production machinery in NSW and Victoria have been:

- Brick and Pipe (Vic) in the early 1980s - change of energy requirements from oil to gas.
- Monier (NSW) in the mid-1980s - comprehensive updating of kiln technology including change over from oil to gas. The estimated value of the investment was $15 million.
- Montoro (new plant, NSW) in 1986 - estimated cost $50 million.
- Monier (Victoria) - refurbishing/replacement currently underway with new technology to reduce wastage and improve quality. The estimated value of the investment is $15 million.

The firms have indicated that, due to the substantial investment required to institute the changes, it is unlikely that any further investment in the above facilities will occur for some time.

c) Transport costs
Transport costs are relatively high due to the fragility of the product and the low value to volume ratio. This is the main reason that markets are defined on a regional rather than national basis. Improved transport facilities, such as better roads and depots, are reducing these costs.

According to industry participants, the long term future for the industry may involve a move towards specialisation. Improvements in roads and transport may give rise to a greater mobility of output. This would provide a greater opportunity than at present to rationalise cost structures by centralising production and reaping economies through common raw material storage and feeding facilities, raw material batching, and larger drying chambers. Other economies could be achieved in distribution and/or specialising production among a network of plants.

However, the advantages of centralising concrete tile production appear to be small given that production costs only fall slightly with increased plant size. Centralisation could only yield significant production economies if the resulting plant accommodated a sufficient multiple of production lines to enable specialisation of each line to a particular tile profile.

d) Research and Development (R and D) expenditure
Monier invested substantially in process research during the 1960s and 1970s. This effort provided the company with a leading edge in concrete tile production technology throughout the world. This technology has been successfully exported by Monier to the USA and Asia.

Reflecting the maturity of the product and its simplicity of manufacture, there has been little significant R and D among industry participants, except in the area of tile design and colour, in recent years. Some customers have expressed concern in this regard, claiming that greater innovation should be occurring but there was little information available with which to form a judgement about these claims.

Barriers to entry
Barriers to entry allow existing firms in an industry to charge prices above the competitive level. Several kinds of barriers were identified in Chapter 2.

a) Product differentiation
While the differentiation of products in a market may work to the advantage of new entrants by creating an environment conducive to the introduction of innovations, an entrant can incur substantial costs in persuading consumers to switch to its product. This is particularly so if the market is heavily influenced by prestige or reputation, as would be the case if the good was supported by intensive promotion. The market for roof tiles has these characteristics and it may be that new entrants would need to undertake considerable expenditure to establish their product.

The extent to which the trend towards 'supply and fix' packages constitutes a barrier is not clear because fixing is undertaken by sub-contractors. It may be that these fixers could switch relatively easily to a new entrant. Similarly, the advantages of being able to provide a complete product range of, for example, roof tiles, bricks and other building products are not clear.

b) Absolute cost advantages
A potential market entrant not experienced in the activities of the building products sector would have to compete with skills and other advantages already developed by incumbents. In particular, superior techniques and management familiarity with the industry may provide cost advantages which totally new entrants to the industry would need some time to attain.

Vertical integration within the industry might also provide absolute cost advantages. It was not possible to identify any advantages gained by the firms by vertical integration.

c) Initial capital requirements
Minimum costs of entry have been estimated by industry participants as being $3 million to $5 million to establish a concrete tile plant; and around $15 million for a terracotta tile plant. In addition, new entrants to the industry would face the costs of establishing a distribution network.

d) Economies of scale
It has been claimed that Australian producers of concrete tiles are world leaders in technology and operate plants as large and as technically efficient as any. The capital requirements for setting up a new facility are reasonably modest. However, the optimum operation of only one concrete tile plant may be at a scale of production insufficient to warrant the marketing and promotional expenditure required to provide a chance of success. In this sense, scale considerations relate not only to the production process, but also to the feasibility of undertaking support functions.

Conclusions regarding barriers to entry
The barriers to entry in the roof tile market appear to differ for totally new entrants and for those already in the building products industry. The major cost incurred by a new entrant appears to be in the form of management familiarity with the industry. Entrants from within the industry have a greater opportunity to leave the market with a smaller sunk cost in this regard, as most of the expertise gained could be more easily redirected toward other activities within the industry. Consequently, there may be less risk involved for these firms. This could explain why the majority of new entrants in the roof tiles market, for example, Humes, Pioneer and Boral, are from within the building products industry.

5.3 Benefits from the Mergers

The mergers
Boral/Clark Tiles
In 1982 the conglomerate building products group Boral acquired Blue Metal Industries Ltd (BMI). Boral owned a concrete roof tile factory in SA and BMI had, as a subsidiary, Clark Tiles, a producer of concrete tiles in Victoria, NSW and Queensland. These operations were a small part of the activities of the companies and the combination of tiling activities was not the major objective of the merger. The TPC did not intervene in the transaction.

Monier/Wunderlich
In 1983 CSR Ltd sought to divest its terracotta roof tiles subsidiary, Wunderlich Ltd, as part of its redirection into the resources sector. The only bidder willing to satisfy its requirement of absorbing all Wunderlich operations was Monier Ltd. Monier only produced concrete tiles at the time but was by far the largest producer of roof tiles in Australia.

As its market share was already very large, the TPC considered that the merger would lead to dominance of the market. Monier did not acknowledge market dominance but submitted an application for authorisation. Authorisation was subsequently granted on the basis that the Wunderlich operations would be shut down if the bid did not proceed and in return for certain undertakings to the Federal Court by Monier relating to supply to independent tile fixers. The parties agreed that the Brisbane Wunderlich plant would be closed by CSR before completion of the sale.

Expected benefits
Boral/Clark Tiles
As Boral was not required to apply for TPC authorisation, there is no public record of the benefits expected of the merger at the time of consummation. The expected benefits revealed below were identified in Boral's response to a BIE questionnaire. It is important to note that the benefits identified are likely to be private benefits to the company which would not necessarily be raised before the TPC as public benefits justifying authorisation.

The expected benefits in the Boral/Clark Tiles merger were those applicable to the Boral/BMI transaction as a whole. By providing Clark Tiles with access to improved management skills, economies in unit costs of production and administration could be achieved.

Boral did not intend to introduce scale economies by increasing the size of individual plants. Rather, it could see opportunities for the reorganisation of existing production to yield greater efficiency. This process is an advancement of technology in the sense of applying new ideas to the employment of existing inputs.

Economies can occur through the spreading of administrative costs over greater output. Greater output in Boral's case was achieved by a multiplication of plants. A greater workload in administration can also allow the introduction of new systems and procedures which a smaller scale would not warrant. Boral expected that economies could be achieved by reorganising BMI's administration.

The merger was also believed to provide the opportunity for some cost savings in purchasing, distribution, promotion, R and D and capital. Other expected benefits of minor importance were increased liquidity and cash flow and an enhanced ability to expand production.

Monier/Wunderlich

In its application to the TPC for authorisation, Monier claimed that public benefits would result from increased capital expenditure, improvements in production arising from input by Monier's R and D Branch and economies in the production and distribution of tiles (Monier, 1983).

Monier stated that the economies in production and distribution would be derived mainly from a rationalisation of administration. Specifically, this was to involve greater sharing of head office and higher level administrative overheads. Monier also indicated that the sales and commercial staff would be rationalised while production personnel were unlikely to be affected.

In answer to BIE questions, the retrospective view of Monier was that the major expected benefits were economies in the unit cost of promotion and administration and the gaining of a complete product range. Further benefits of minor importance were expected in purchasing, distribution and R and D. Also of minor importance were improved access to export markets, new technology, improved management and staff skills and reduced competition. A common view among other industry participants was that Monier was attempting to expand its product range and reduce competition.

Essentially, Boral and Monier had similar intentions: the injection of better management into the target organisation. For Boral this would be manifested in the rationalisation of production and administration. For Monier it was solely the non-production areas which would be targeted, although another significant aim of the merger appears to have been to expand its product range.

Internal expansion can be an alternative means of increasing production and therefore of obtaining the benefits a merger which has this objective. Monier has indicated that internal expansion into terracotta production was not preferred because:

- the Wunderlich name was valuable in itself as is is associated with quality;
- it was cheaper to acquire and refurbish existing assets than to build a new plant; and,
- it was an opportunity to purchase some extra market share.

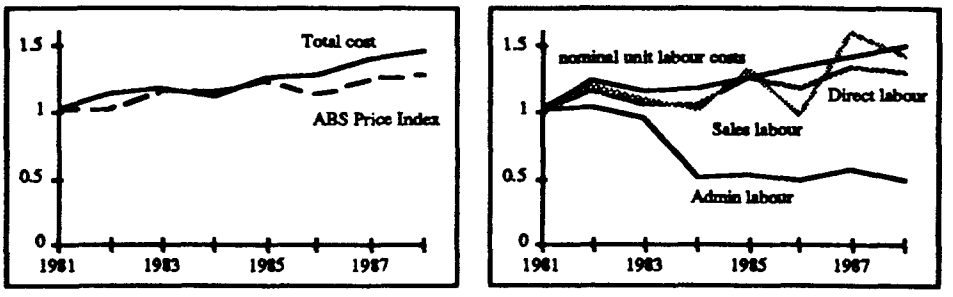
Were the expectations realised?

Boral

Boral claimed that through the injection of improved management skills into its concrete tile operations, economies in the unit costs of production and administration could be achieved. Smaller economies were also likely to arise in other areas of operation.

Data were provided for a typical plant before and after the merger. In terms of production, unit total costs have grown at much the same rate as the ABS index of the prices of articles used in manufacturing, as the first chart in Figure 5.8 shows. In contrast, as the second chart in Figure 5.8 shows, administration labour costs as a proportion of unit cost have fallen significantly in the period.

Figure 5.8 Indexes of movements in selected unit costs, Boral, 1981 to 1988



Sources: ABS Price index of Materials and Energy; unpublished data, The Treasury (nominal unit labour costs) unpublished data, Company data and BIE estimates

The remaining minor benefits expected by Boral include increased liquidity and an enhanced ability to expand production. The information available was insufficient to analyse these areas.

Monier

Due to the lack of comparable data it is not possible to assess the performance of the combined operations for the periods before and after the merger. As a result, discussion of Monier/Wunderlich's performance relates to changes between the merger in 1983 and 1987-88, the latest year for which data are available.

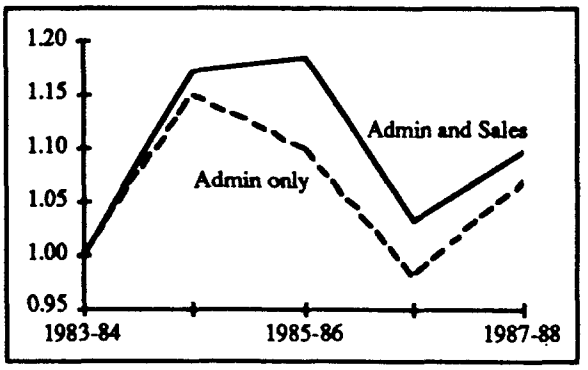
a) Economies in administration and sales

Figure 5.9 shows how output per administration employee and per sales and administration employee have moved since the merger. These labour productivity measures show considerable fluctuation, but generally remain above the level of 1983-84. They also appear to exhibit an upward trend. The movements reflect both changes in output and changes in employment but fluctuations in output have had a far greater influence on the index than reductions in employment. The large temporary decline in labour productivity in 1986-87 reflects the general downturn in the economy in that year, particularly in construction activity. Labour productivity often falls during temporary downturns because of labour hoarding by firms.

Cost data indicate that labour costs in non-production areas have improved since the merger. In the period 1983-84 to 1987-88, expenditure on sales and distribution labour

decreased by 3.2 per cent and administrative labour expenditure increased by only 0.6 per cent. As a proportion of revenue, non-labour expenditure declined by 1.7 per cent.

Figure 5.9 Indexes of output per administrative and sales employee, Monier, 1983-84 to 1987-88



Source: Company data

b) Complete product range
The achievement of a complete product range has yielded benefits greater than originally expected, helped partly by the resurgence of interest in terracotta tiles. These benefits are discussed further in the section on Monier's market performance.

c) Other expected benefits
Of the minor benefits expected, Monier gained improved access to export markets through acquiring a product, terracotta tiles, which had export potential. Export development has been interrupted by the booming domestic market which has taken up most capacity.

Wunderlich gained access to technology through an owner prepared to invest in new plant. Wunderlich also appears to have benefited from improved management and staff skills. Whether a reduction in the number of competitors in the market has benefited Monier is discussed below

Little information was available about the realised benefits in purchasing or distribution. No signs of greater innovation or other research activity resulting from the merger were apparent.

Evidence regarding the extent to which the merger achieved the benefits claimed before the TPC is equivocal. Although the quality of the Wunderlich product has improved, the role played by Monier's R and D branch is unclear. On the other hand, Monier's commitment to a program of large scale capital expenditure on a new terracotta tile plant at Rosehill has been exceeded and a comprehensive refurbishment of the Vermont plant in Victoria has also taken place.

Efficiency in terracotta production has improved as a result of the installation of more technically advanced plant. Halving of kiln-firing time and the minimisation of wastage rates arising from the installation of new plant suggest significant improvements, although there were no data available to assess the magnitude of the efficiency gain.

While Monier's investment in the Rosehill plant could be attributed to the merger, in the sense that it was part of the undertaking to the TPC, it could be argued that each of the other investment projects undertaken throughout the industry would have taken place regardless of the merger. The plants of all the producers were obsolete and needed upgrading.

Only minor investment programs have been undertaken in concrete tile production. Some plants have undergone minor refurbishing including, in some cases, installation of automated tile stackers. Boral has not expanded the production base it acquired from BMI. Its newest plant was commissioned in Queensland by Clark Tiles in 1980. Monier has not built any new plants since the 1970s and it built only two plants in that decade.

Impact of the mergers on productive efficiency

As indicated in Chapter 2, an important aspect of the question of whether the mergers had net social benefits for Australia is whether they resulted in increased productive efficiency, that is, whether the mergers led to less input being required for a given output. The Cowling methodology outlined in Chapter 2 has been applied to data obtained from Monier and Boral. Where firm specific data were not available, other data sources were used. The use of non-firm specific data of necessity involves the introduction of a degree of error. More details of the data and the data sources are in Appendix 5.1.

Put briefly, the Cowling model regards an increase in productive efficiency as a reduction in the ratio of inputs used to outputs produced. This ratio may vary with the scale of production, technical progress or the efficiency with which a particular technique is used. As the ratio increases, efficiency falls and vice versa. Movements in the ratio are presented as an index, referred to as 'k', with the ratio in Year 1 equal to 1.0.

Boral

Table 5.1 shows that both profitability and output have fluctuated over the period to a greater extent than output prices or input prices. The 'k' measure for Boral's overall roofing operations, that is, both 'supply only' and 'supply and fix', has also fluctuated over the period. These movements are shown graphically in the first chart of Figure 5.10. The 'k' measure rose sharply in 1983, when there was a slump in building activity, but since that time the index has been trending downwards, indicating a general increase in productive efficiency. The measure is, however, still slightly above the pre-merger levels.

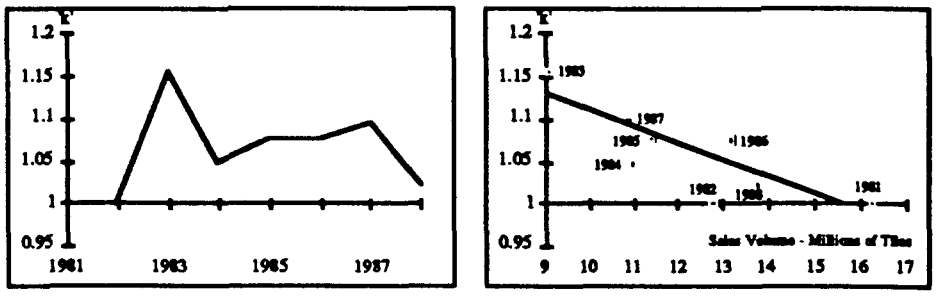
Table 5.1 Cowling's 'k' and constituent measures, Boral, total operations, 1981 to 1988

	1981	1982	1983	1984	1985	1986	1987	1988
Output	1.00	0.78	0.56	0.68	0.70	0.81	0.67	0.85
Input prices	1.00	1.11	1.17	1.28	1.35	1.41	1.55	1.67
Output prices	1.00	1.12	1.23	1.24	1.43	1.51	1.61	1.62
Profits to Revenue	1.00	1.00	0.28	0.45	0.89	0.98	0.62	0.66
'k' index	1.00	1.00	1.16	1.04	1.08	1.07	1.10	1.02

Sources: Company data and BIE estimates

The second chart in Figure 5.10 plots the 'k' measure against an index of sales. It shows a negative relationship between 'k' and sales which implies a positive relationship between efficiency and sales. This result may reflect factors such as utilisation of capital and labour resources and suggests that demand changes can have a significant influence on the value of 'k'.

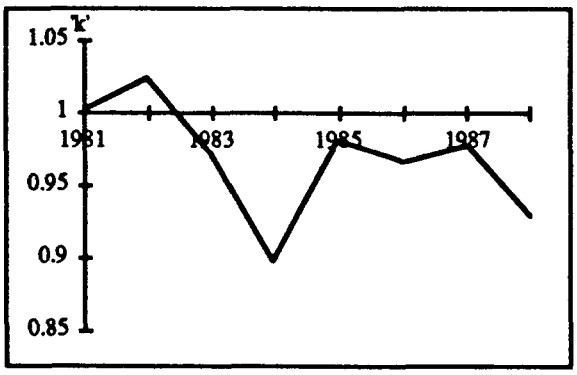
Figure 5.10 'k' index and 'k' against total output, Boral, total operations 1981 to 1988



Sources: Company data and BIE estimates

This picture can be compared with Figure 5.11 showing the 'k' measure for 'supply only' operations. It appears that the production and sale of roof tiles has experienced a significant increase in productive efficiency since 1981 and particularly since the merger. The profit margin for tiles sold on a 'supply only' basis increased significantly from 1981 to 1988. The margin increase is almost wholly explained by a reduction in real unit cost.

Figure 5.11 'k' index, Boral, 'Supply only' operations, 1981 to 1988



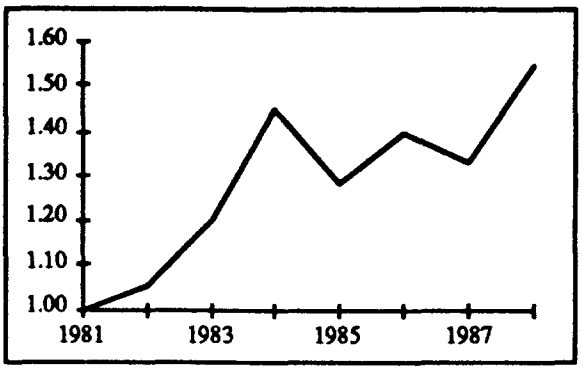
Sources: Company data and BIE estimates

In contrast, there are indications that 'supply and fix' operations have operated with low profitability and this appears to have been a major determinant of Boral's relatively poor overall result shown in Figure 5.10. The company argues that, because 'supply and fix' operations involve sub-contractors, it has less control over these operations than over 'supply only' operations. This could explain why the productive efficiency of 'supply and fix' operations have not shown the same improvement as that for the 'supply only' operations.

Movements in the index of labour productivity for the overall operations of Boral are shown in Figure 5.12. It has been increasing since 1981, although the increase is most apparent after the merger in 1982. The increases in labour productivity are similar to those in productive efficiency in the 'supply only' operations (Figure 5.11) and indicate the dominance of production labour in the total operations of Boral. A labour productivity index based on production and administration labour (not shown) tracks closely the overall labour productivity index.

In the context of Boral's overall operations it appears that greater productive efficiency has not yet been achieved as a result of the merger. This outcome may reflect high costs within the tile fixing operations, cost data for which were not available, and a 'supply and fix' pricing policy aimed at gaining market share in the long term. However, when the 'supply only' operations or labour productivity are considered, Boral has improved considerably since the merger.

Figure 5.12 Index of labour productivity, Boral, 1981 to 1988



Sources: Company data and BIE estimates

Monier

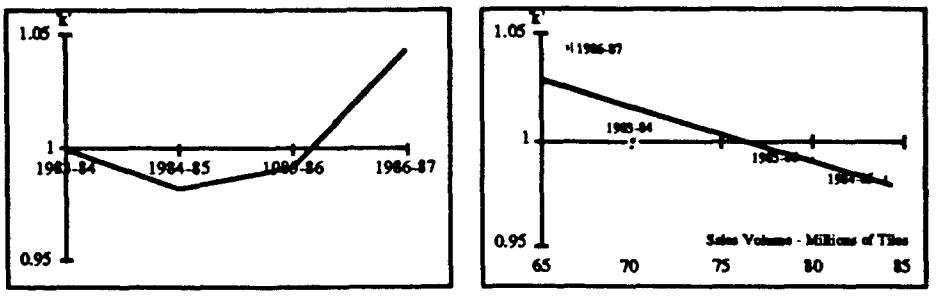
No information on production was available from Monier. However, the availability, in annual reports, of information on the profit/revenue relationship for roof tiles and the provision of information on sales volume and revenue allowed estimation of those variables in Cowling's equation which could not be obtained directly. This approach does not allow separate indexes for concrete and terracotta or for the 'supply only' and the 'supply and fix' operations. Because of the inevitable errors associated with these estimation procedures, the results should be considered indicative only. Details on data sources are presented in Appendix 5.1.

The first chart in Figure 5.13 shows the estimated trends in productive efficiency, as measured by the 'k' index, for the total operations for Monier in the period 1983-84 to 1986-87. On these estimates, after an initial increase, productive efficiency appears to have fallen marginally since the merger. However, the apparent fall in the last two years for which a measure was possible should be discounted for the downturn in building activity which occurred in those years. Overall, there is little indication of any underlying change in productive efficiency.

However, the major benefits of the merger were not expected to occur in production. Figure 5.9 shows an increase in efficiency in administration and sales, areas where benefits from the merger were anticipated.

With respect to the impact of sales, the second chart in Figure 5.13 shows that Monier's 'k' is sensitive to changes in demand. The chart confirms the need to discount for downturns in activity when considering the level of 'k' in any given year. For example, productive efficiency was at its minimum in the same year, 1986-87, that sales volume was at its lowest level.

Figure 5.13 'k' index and 'k' index against output, Monier, total operations, 1983-84 to 1986-87



Sources: Company data and BIE estimates

Conclusions on productive efficiency
The analysis of productive efficiency shows that the results are very sensitive to the volume of sales or, more broadly, the economic cycles of the building industry. The volatility of prices also suggests that the efficiency results should be treated with some caution. The methodology does not cater for price movements which temporarily distort profit margins. These sensitivities, combined with the inherent problems of using non-firm specific data in some instances, suggest that more attention should be given to trends rather than individual year results.

In sum, the analysis of Boral data since 1981 reveals mixed outcomes. Labour productivity and efficiency in production appear to have improved since the merger. However, when 'supply and fix' operations are taken into account, productivity overall seems to show little improvement.

For Monier, overall efficiency appears unchanged since the merger, although there have been improvements in the non-production areas that were expected to benefit most from the merger. Labour expenditure on sales and distribution decreased while for administration it increased only slightly. Labour productivity in the administration and sales areas shows an upward trend.

Impact of the merger on market performance
Chapter 2 identified one of the potential costs arising from mergers as an increase in market power for the merged company. This section addresses the question of whether there is any evidence of the exercise of increased market power by the merged firms.

Monier's market performance

a) Product range

The expansion of Monier's product range that resulted from the absorption of Wunderlich seems to have yielded substantial benefits for the company, some of which were not originally anticipated. A major benefit was improved market access through the ability to supply either terracotta or concrete roof tiles. Many architects prefer terracotta tiles and this has been a significant hindrance to concrete tile sales. The inclusion of the Wunderlich brand in the product stable provided Monier representatives with much greater access to architects, effectively providing a 'foot in the door' and allowing them to demonstrate the concrete product.

In joining Monier, the Wunderlich product gained marketing exposure that would be difficult to justify had it stayed independent. In Monier's view, the benefit of advertising is its ability to generate brand loyalty, thereby allowing a higher average price than its competitors to be charged. A concern was expressed by one industry participant about the company's potential to force distributors to deal exclusively with Monier by threatening withdrawal of the supply of terracotta tiles to that distributor. No explicit evidence was found to support this view, however, and given the current alternative terracotta supplies available in Victoria and NSW, it is difficult to envisage the problem of securing supply as a major concern for distributors.

One producer believed that the advantage of possessing both the concrete and terracotta products lay not so much in the marketing, but in the synergies to be gained in distribution and tile fixing.

b) Competitive environment

Monier's view of the competitive environment is that since the time of the merger there has been increased competition in the non-price areas of product differentiation, marketing, product quality, and associated services. Excessive price competition is not, according to Monier, a current characteristic of the market although price competition increases during cyclical downturns.

The bulk of the industry participants approached by the BIE indicated that there had been no change in the intensity of competition in most of the areas described above. The producers in particular held this view, conceding only some increased intensity in the area of product quality, and to an even lesser extent, in product differentiation and marketing. Some customers identified an increase in price competition but this was mainly in relation to the marketing of Boral, against which Monier appears not to have responded.

The entry of Montoro appears not to be related to the merger. Montoro was aware that its new plant would probably generate overcapacity in the domestic market. The strategy has been to develop substantial export markets, particularly in Asia, rather than necessarily eroding the monopoly of Monier in NSW terracotta production.

c) Tile fixing

As part of the TPC authorisation, Monier undertook to supply a minimum volume of tiles to independent tile fixers. The undertaking was to be binding for seven years. In 1985 the minimum was lowered upon application from Monier. In 1987 it again applied to discharge the undertaking due to a (nominal) change of ownership and a higher level of competition in the industry arising from the entry of Montoro into the NSW terracotta

market. There was also claimed to be significant overcapacity and substantial price competition.

Both Monier and Boral have been selling an increasing proportion of their tiles on a 'supply and fix' basis. This emphasis on a complete package is most evident during downturns in building activity. The importance of 'supply and fix' varies considerably between States. While in Qld the majority of sales are on a 'supply and fix' basis, in Vic the majority of tiles are sold on a 'supply only' basis to distributors.

d) Concerns within the industry
At the time of the merger there was a fear among competitors that Monier would gain an advantage in large tenders to distributors and builders by offering a 'complete range' package. It appears that this advantage did not eventuate. There is also some concern that the commissioning problems currently being experienced by Montoro are impeding it from offering the effective competition in terracotta tiles that it originally promised.

Boral's market performance
There is a general consensus within the industry that Boral lifted the market perception of Clark Tiles from a poor reputation in terms of quality and service. It is reported to have increased its market share, although this is not evident from the available information. Boral has been reported by some customers to be more attuned to the needs of the market and more responsive to those needs than are the other producers.

Boral has argued that the merger gave it more experience in managing and running tile operations and that the knowledge and skill built up in Australia have enabled it to expand further in roof tiles overseas with confidence. Boral first entered the US market in 1978, four years before the merger, but has continued to expand since that time.

Profits and profitability
Monier appears to have much more stable profitability than Boral. A possible reason for this situation is that Boral's more variable pricing policy has had a substantial impact on profits. For Monier itself, stable profitability may have arisen from a reduced need to vary prices in response to movements in demand due to possession of an entrenched network of committed customers. In a similar vein, brand loyalty generated by, among other things, comprehensive advertising campaigns, could have allowed Monier to charge higher average prices and reduced the need to drop prices to attract customers during periods when demand fell.

5.4 Summary and Conclusions

The purpose of this chapter has been to analyse the outcome of the acquisition of Clark Tiles by Boral and the acquisition of Wunderlich by Monier. The essential purpose of Boral's acquisition was to inject better management skills into the target organisation. Monier acquired Wunderlich with the objectives of expanding its product range while reducing competition. It also saw the potential for Wunderlich to be managed more effectively.

Since that time, and in addition to the mergers, the major industry developments have been:

- increased investment in terracotta plant and equipment throughout the industry;
- increased demand for terracotta tiles and steel roofing;
- a new entrant in the terracotta tiles industry, namely, Montoro;
- an increase in the quality of both concrete and terracotta tiles;
- increased movement of tiles between regions, that is, a broadening of the geographic market boundaries; and,
- greater links between tile producers and producers of other building materials.
- the expansion by Pioneer, firstly by acquiring Humes and, more recently, by acquiring Brick and Pipe

Throughout all these changes, however, Monier has remained by far the largest producer.

With respect to Monier and Boral, the main developments since the mergers have been:

- a large investment by Monier in terracotta facilities;
- marginal falls for Monier in expenditure and staffing levels in administration and sales/distribution, with a small rise in administrative labour expenditure; and,
- for Boral, greater efficiency in production arising mainly from savings in labour costs, though 'supply and fix' operations did not show the same improvement in efficiency.

Monier expected most benefits to occur through economies in administration, marketing and distribution. While positive changes have occurred in most areas, these have been marginal. Benefits were also expected to arise in purchasing, R and D and improved access to export markets. There is little evidence that any of these benefits have been realised.

Boral expected benefits to occur through the influence of improved management skills on production and administration costs. There have been savings in these areas but the effects on 'supply and fix' costs are more problematic.

The effects of the mergers on the industry depend critically on what would have happened in the absence of the merger. Although it is impossible to state the counterfactual with certainty, informed speculation can be based on the information in this chapter.

For Wunderlich, four courses of action were possible:

- Sale of all operations to Monier.
- Closure of all three plants in NSW, Victoria and Queensland (the latter being closed regardless of the outcome of merger negotiations).
- Rationalisation and continuation of operations by CSR. This could have involved attempts to increase efficiency, through the introduction of new technology, or to stimulate demand, through a greater promotional effort.
- The sale of Wunderlich to a firm not involved in the building products sector.

The merger solution adopted by CSR allowed new investment to occur at the Wunderlich sites while at the same time reducing the number of participants in the market. It is arguable, however, that additional investment in terracotta tile facilities in

the years following the merger would have occurred in one form or another, regardless of what happened to the Wunderlich plants. The resurgence of demand for terracotta tiles, the upgrading of facilities by all the other terracotta tile manufacturers and the entry of a completely new manufacturer all suggest that the merger had little to do with the timing or the extent of the investment.

For Boral, the merger with Clark Tiles was a means of entering the east coast markets. It increased the efficiency of the Clark Tile production process by bringing in improved management techniques. Among the unforeseen developments at the time of the merger was the merger between Monier and Wunderlich a year later.

There appears to have been only modest increases in productive efficiency in the total operations of Monier and Boral since the mergers. Caution is necessary in interpreting the results because the efficiency of all the operations pre-merger is not known and, for Monier, only four years of post-merger data could be estimated. Moreover, the productive efficiency measure is subject to qualification because of data inadequacies and the influence of cyclical demand factors.

As was the case before the merger, Monier has the major share of the Australian market and the most potential market power. Neither the merger nor any of the other changes that have occurred have changed this position to any great extent. The competitiveness of Australian roof tile markets appears to be based less on price and more on product quality and differentiation, marketing and services such as tile fixing and the speed and nature of delivery to the site. Product quality is widely acknowledged to have improved as a result of the entry of Boral into the market. Improvements in other areas of competition are less certain but the changes in demand that have occurred since the merger, the entry of new producers and the broadening of the market all provide scope for improvements to take place. All these other changes have meant that the mergers are likely to have had only a small effect on the development of the industry.

Appendix 5.1 Data Details

Boral

The data employed in the Boral analysis were largely supplied by the company. The information provided referred to operations of a typical NSW plant before and after the merger. A major information gap was a lack of input price data. Proxies were therefore needed to allow construction of the weighted input price index.

Labour

Boral supplied hourly rates only for the period 1984 to 1988. Therefore, data for earlier years were extracted from ABS Cat No 6304.0, average hourly earnings (male) for 'other manufacturing'. These data matched quite closely from 1985 onwards. In 1984 there was a 60c discrepancy (ABS 1984-85 = $8.60 - $9.31; Boral = $9.20 - $9.33). The two statistics were averaged, making the value for 1984 $8.90. Data for 1981 to 1983 were taken directly from the ABS publication.

Capital costs

These were proxied by implicit price deflators for non- dwelling construction and equipment (ABS Cat No 5206.0).

Materials

Boral supplied detailed information on prices in 1982 and 1989. These revealed (in aggregate) a compound annual rate of cost inflation of 8.14%. However, this figure was somewhat distorted by a 500% increase in the price for oxides imported from Germany. Consequently, an alternative price index for materials based on the movements in the price of cement experienced by Boral (for which a full series was available) was used. The two approaches to materials costs give similar results.

Overheads

The Consumer Price Index for Sydney was employed (ABS Cat No 6401.0). Figures for any one year were the rate reported for the financial year ending in that year (eg. for 1985 the CPI for 1984-85 was used).

Monier

Given the relative similarity of activities between Boral and Monier, except terracotta tile manufacture, input price movements experienced by Boral are likely to be similar to those faced by Monier. Thus, unit factor requirement was estimated for Monier using:

- The input price index calculated for Boral.
- An output price index based on average prices for Monier.
- A profit/revenue relationship extracted from Annual Reports for Monier for the period 1981-82 to 1986-87 and adjusted to discount the effect of interest payments and taxes. The information provided in these reports was presented at a national level. The interest of this study, however, is only with Victoria and NSW. The BIE was informed that the national profit to revenue relationship closely reflected that of Victoria and NSW.

The results should be qualified by consideration of the data sources employed.

6. Case Study 2: A Merger in the Pastry Products Industry

6.1 Introduction

In 1986 the pies and pastry division of Petersville Industries Limited, a subsidiary of Petersville Australia Limited, purchased the Herbert Adams group of companies from Bunge Industrial Limited. Petersville Australia already produced pastry products under the Four'n Twenty and Wedgwood brand names at Kensington in Melbourne. Following the merger the Herbert Adams site was sold and the plant and equipment moved to Kensington.

The merger brought together the fresh and frozen pastry products produced by Petersville and the frozen pies and desserts and fresh cakes of Herbert Adams. The market covered by the new entity was Victoria, the ACT and parts of NSW for fresh products and the whole country for the frozen products. The TPC raised no objections to the merger.

The merger was one of a number in the last decade that have transformed Petersville into a large food conglomerate which, among other activities, is now the largest producer of frozen vegetables in Australia. The acquisition of Herbert Adams gave Petersville another opportunity to increase its share of the frozen food market.

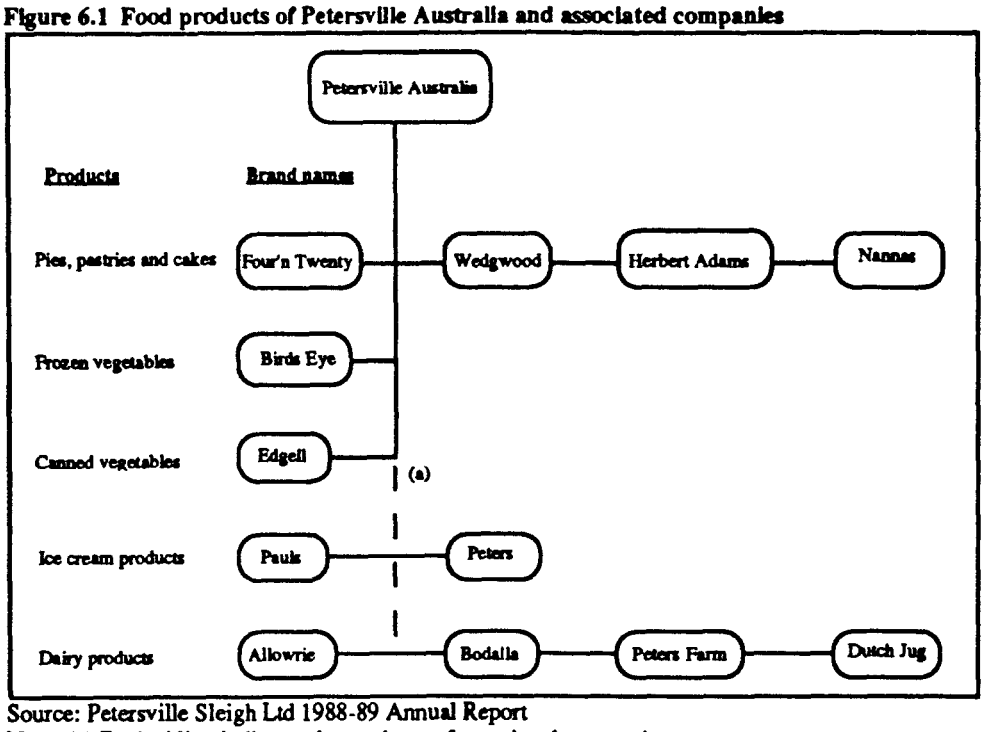
Petersville Australia is only one of the companies under the control of Adelaide Steamship Co. Ltd which are involved in food production in Australia. Some indication of the extent to which these companies are involved in the Australian food industry is shown in Figure 6.1 where the products and brand names associated with these companies are listed.

The industry can be divided into four areas of production activity:

- Fresh and frozen 'single serve' pies, pasties and sausage rolls;
- Cakes, both fresh and frozen, and frozen desserts;
- Party goods, that is, frozen party pies and sausage rolls; and
- Family pies, that is, large frozen meat pies.

Each activity has unique characteristics and each could be expected to be affected differently by the merger. It is primarily the effect on the Victorian, NSW, and ACT markets which are examined in this chapter as it was in these markets that the merger had the most impact.

Figure 6.1 Food products of Petersville Australia and associated companies



Source: Petersville Sleigh Ltd 1988-89 Annual Report
Note: (a) Dashed line indicates the products of associated companies

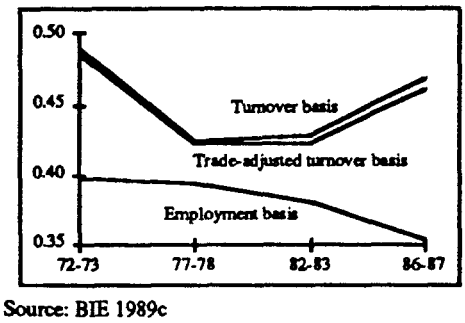
6.2 The Industry

Structure of the industry

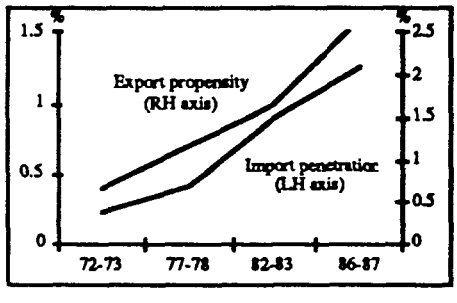
ABS provides data for the industry in ASIC 2162-Cakes and Pastries. The industry class covers the manufacture of cakes, pastries and pies, including frozen products. Small bakeries are generally excluded from the class. As Figure 6.2 shows, industry concentration of the four largest firms is not high. The fall in concentration in terms of employment suggests that the class is becoming more capital intensive.

Figure 6.2 ASIC 2162 , Cakes and pastries, 1972-73 to 1986-87

Concentration ratios



Export propensity and import penetration



Source: BIE 1989c

Import penetration and export performance, also shown in Figure 6.2, are both increasing but remain insignificant. The average effective rate of assistance is negative

and has declined since 1972-73. It is likely, however, given the perishability of some of the products involved, and the requirement for refrigeration for others, that the products enjoy considerable natural protection.

The structure of the industry can be divided into fresh products and frozen products.

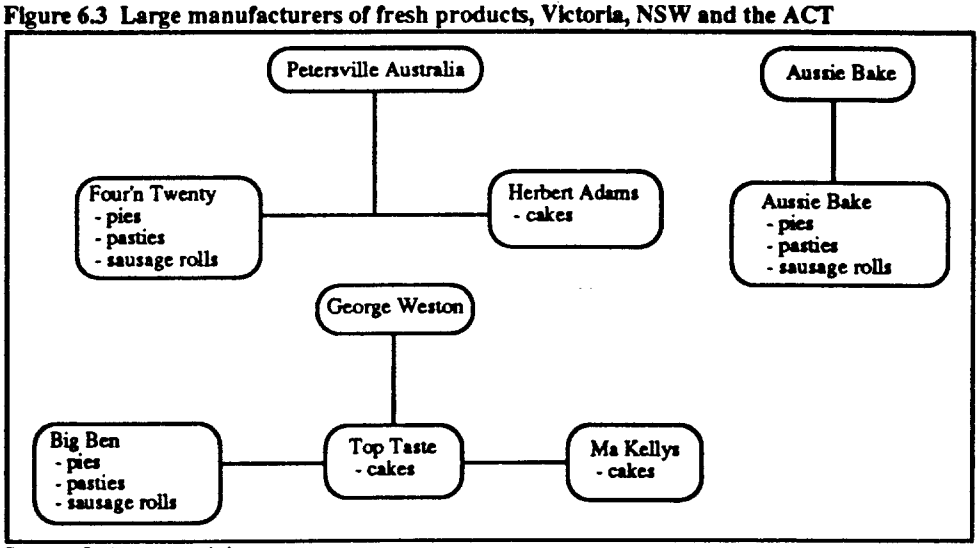
Fresh Products
Fresh products include single serve pies, pasties, sausage rolls and fresh cakes and are produced by firms of all sizes. Large scale manufacturers distribute their output to corner stores, canteens in factories and schools, milk bars, and other convenience food outlets. The geographical extent of the market is constrained by the need to deliver the product fresh.

The largest manufacturers for the fresh product market in Victoria, NSW and the ACT are shown in Figure 6.3. Petersville, through its Four'n Twenty brand, is the only large scale manufacturer of fresh products for the Victorian market. Four'n Twenty products are sold in Victoria, Sydney and the ACT. Petersville, through Herbert Adams, also produces fresh cakes for sale in Victoria and Sydney.

George Weston, with its Big Ben brand, is the largest manufacturer of fresh pies and pasties for the NSW market. Associated companies produce Big Ben products in other States. Through Top Taste and Ma Kelly's, George Weston is also Australia's largest producer of fresh cakes.

Aussie Bake is the other major manufacturer of fresh products in Sydney. Aussie Bake produce fresh pies, small cakes and doughnuts which are sold in Sydney and the ACT.

Figure 6.3 Large manufacturers of fresh products, Victoria, NSW and the ACT



Source: Industry participants

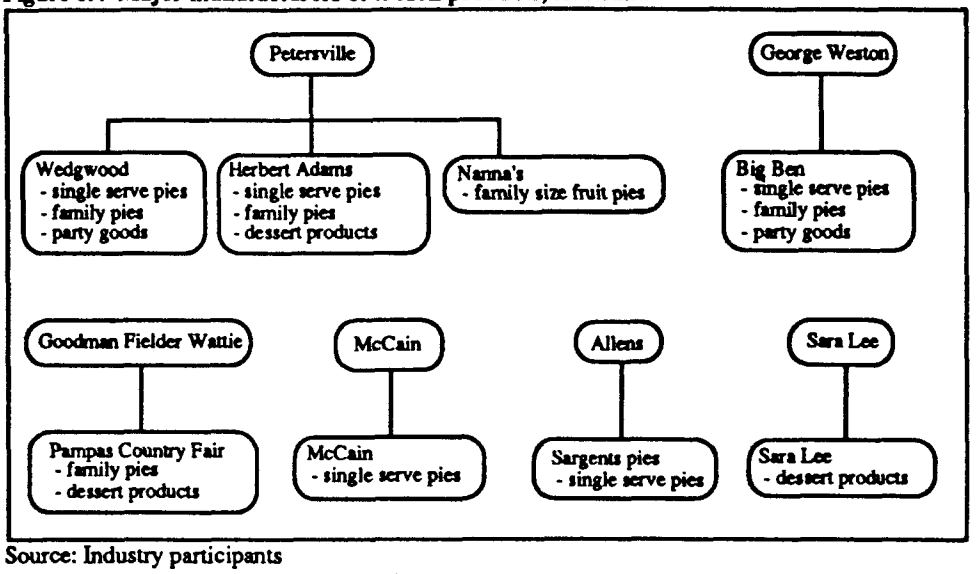
Other parts of Australia are have a mixture of national and local producers. There are also hundreds of medium and small bakeries throughout Australia which produce and sell fresh products at the one location.

Frozen Products
Frozen products include single serve and family meat pies, pastries, party goods and cakes. The frozen product market is generally contested only by large scale manufacturers. The geographical extent of the market is broader than for fresh products because transport time is less of a constraint. At least five manufacturers distribute frozen products throughout Australia.

The major firms are shown in Figure 6.4. Petersville, through its Wedgwood and Herbert Adams brands, manufactures frozen single serve meat pies, family pies, and party goods. All these are sold nationally. Herbert Adams is also a relatively small player in the national frozen cakes and dessert products market. Large manufacturers producing similar products include Nanna's, another Petersville company, and Sara Lee. The products of Sara Lee and Nanna's are also sold nationally.

Prior to the takeover of Herbert Adams by Petersville in 1986 George Weston generally sold its Big Ben frozen products only in NSW and the ACT. In 1987, in response to the merger, Big Ben frozen products were launched nationally.

Figure 6.4 Major manufacturers of frozen products, Australia



Source: Industry participants

The two other manufacturers which produce small quantities of frozen pastries sold nationally are Goodman Fielder Wattie, under its Pampas Country Fair label and McCain Foods. There are also producers of frozen products in each State which confine their sales to that State.

Linkages with other food products
Some of the large-scale manufacturers are part of diversified companies producing a range of food products. As Figure 6.1 showed, Petersville and associated companies have interests in several areas of both fresh and frozen food production. George Weston and Goodman Fielder Wattie are flour millers and bread manufacturers. McCain is a major producer of frozen vegetables. Prior to the merger, Herbert Adams was owned by Bunge Industrial Ltd, which is also a flour miller.

In the frozen cake area, Nanna's is another subsidiary of Petersville but appears to be independent of Herbert Adams. The other large national producer, Sara Lee, a subsidiary of the US firm of the same name, has no linkages with other food producers.

Demand features

Trends in demand

No reliable data are available on the trends in demand for the products which the merged Petersville division produces. Industry sources indicated that greater competition with little market growth, resulting in falling profits, has made fresh pastry products increasingly unattractive to the large manufacturers. Recent advertising by some producers has increased total demand for fresh and frozen pies, which has had a beneficial impact on the demand for Petersville pies. This is widely acknowledged to be only a short-term impact.

One response to the long-term decline in demand for pies and party goods has been a diversification into generic frozen brands. All the large producers are engaged in this but, in the early 1980s, Big Ben and Allens Pies were involved to the greatest extent. Both have now pulled back. Their experience with generics was of ceding market power to the retailers (see Foodweek's Market Watch, 1989). Competition among the producers of generic pies was fierce and most have attempted to reclaim market power by increasing production of their own brand name pies. Big Ben, for example, has now increased the proportion of branded products to 80 per cent of production.

A further complicating factor with respect to fresh pies, is the extreme seasonal nature of demand, with sales in the winter months being far greater than in the summer. This means that there can be idle capacity for a substantial proportion of each year.

In contrast to trends in fresh pastry products, sales of frozen foods generally are growing rapidly by the standards of the food industry. The frozen dessert segment is relatively small but has been rapidly expanding, with a growth in demand for some products as high as 30 per cent a year (Foodweek, 1989c). Frozen desserts are regarded by the industry as covering a range of products from fruit pies to premium ice cream products, and including the frozen pastry products considered in this report. Petersville is expanding production in the frozen pastry products area.

Petersville's export performance has, it claims, increased since the merger due to greater managerial effort and a determined export enhancement program. The key export opportunity appears to lie in selling party goods to Japan. Despite the increase, exports are still less than 2 per cent of output. This level of exports is indicative of the performance of the industry as a whole.

Substitutes

The ability of producers to raise prices is limited in markets where there is scope for substitution. The most apparent substitutes for fresh pies have been identified by Petersville as the convenience foods sold by chains like McDonalds (Foodweek, 1988b). The fresh pie is essentially a lunch product and competes with other lunch products. In this respect, fresh pies are not in direct competition with frozen pies.

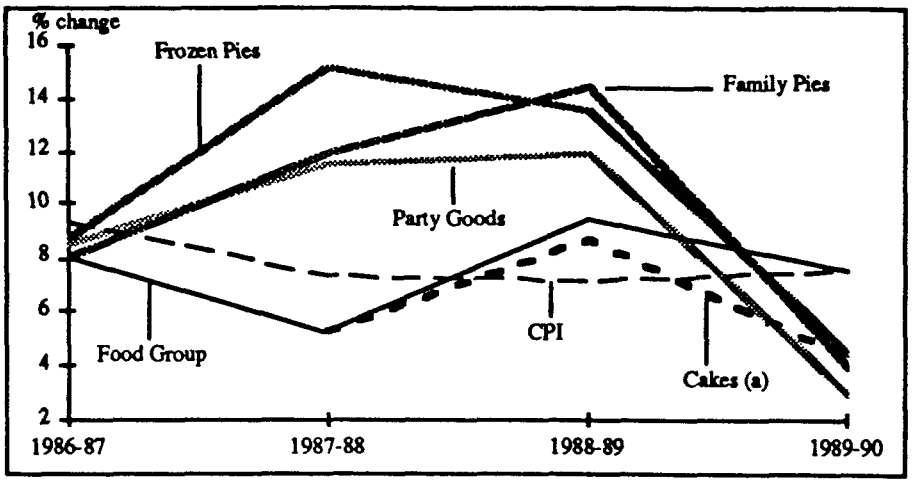
Frozen pies are sold in supermarket cabinets alongside other frozen meal products. These provide the most obvious substitutes. Frozen party products are a more isolated segment of the processed food market, and so have fewer close substitutes.

Possible substitutes for fresh and frozen cakes are cake mixes, biscuits, confectionery, and frozen dessert products including ice-cream. The frozen dessert product market is regarded as highly competitive due to the wide range of possible substitutes.

Prices

Figure 6.5 shows that recent movements in the Food Group index have been more volatile than movements in the CPI. The Food Group index is, however, a very broad measure, covering a wide mix of processed and unprocessed foods. Exact data on price movements in the products of the pastry products industry are not available but industry sources indicate that on average over the period 1986-87 to 1989-90 the prices of frozen products have risen faster than both the CPI and the Food Group, while the prices of fresh products have risen at a slower rate. In 1989 this trend was reversed.

Figure 6.5 Price movements in CPI, Food group, and Product groups, 1986-87 to 1989-90



Sources: ABS Cat. No. 6401.0 various editions, and BIE estimates based on company data
Note: (a) Insufficient data existed to calculate a percentage price rise for cakes in 1986-87

Figure 6.5 generally confirms these trends for the four product groups being examined. Using estimates based on company data, the prices of frozen pies and party goods rose faster than the CPI and Food Group between 1986-87 and 1988-89, but slower than the indexes in 1989-90. Price rises for cakes, a fresh product, were generally less than the rises in the two ABS indexes.

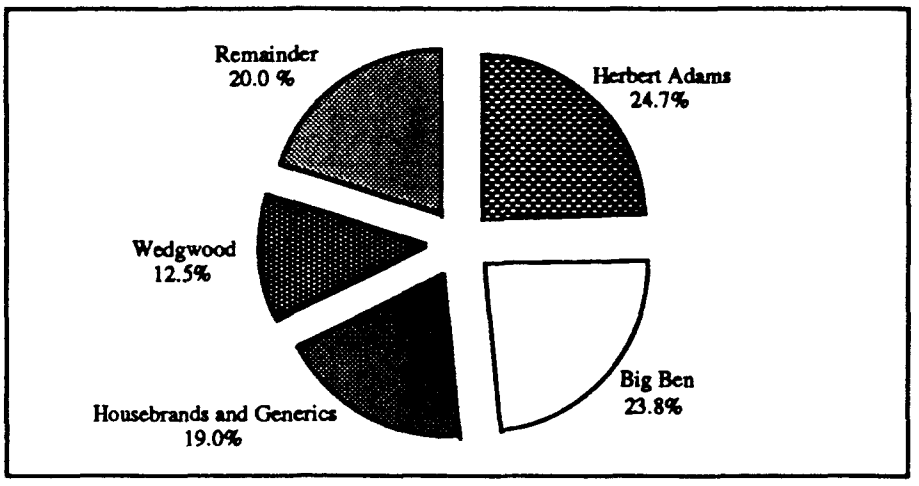
Market shares

Estimated national brand shares for frozen, single-serve meat pies in July 1989 are shown in Figure 6.6. Petersville had a combined (Herbert Adams and Wedgwood) share of over 37 per cent of the national market. The success of the entry of Big Ben into the national market is shown by its very significant market share in 1989.

Allens Pies has also had success in boosting its market share in NSW and the ACT. In May 1989 Allens Pies relaunched the 'Sargents' brand name with frozen, single-serve pies. It is planned to expand to other States and to widen the range in 1990.

The relaunch of Sargents Pies increased demand in the frozen single-serve meat pie market in NSW. Several retailers contacted by the BIE reported that Sargents Pies have replaced Big Ben pies as their biggest selling brand. Herbert Adams single serve frozen pies also have increased their market share over this period (Foodweek, 1989a).

Figure 6.6 National market shares, frozen, single serve meat pies, July 1989



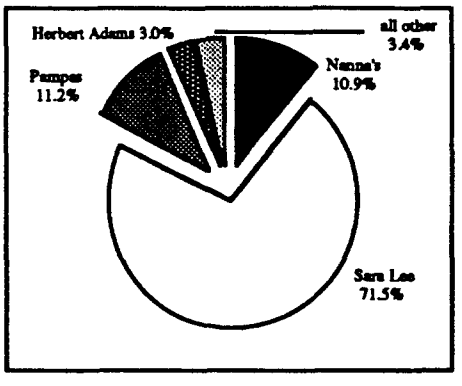
Source: Foodweek, 1989a

No data are available on market shares in fresh pies due to the large number of small bakeries involved. The sector is highly competitive and Sargents rejected the idea of entering this market because it was too risky and fragmented (See Foodweek's Market Watch, 1989).

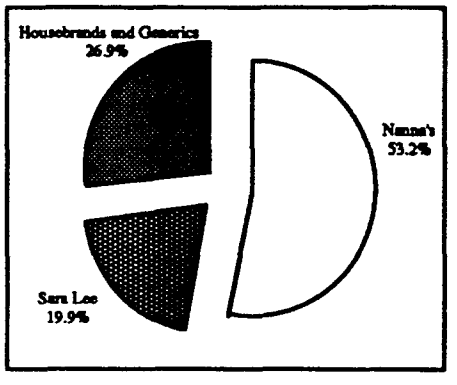
Data on market shares for the frozen cakes and pastries market are also difficult to obtain. In January 1989 Foodweek published the results of its annual survey of manufacturers on market shares. Two categories surveyed are relevant here and are reported in Figure 6.7.

Figure 6.7 National market shares, frozen cakes and pastries, 1989

Frozen sweet pastries



Frozen fruit pies



Source: Foodyear, The Foodweek Annual, 1989

The first chart in Figure 6.7 shows market shares for frozen sweet pastries. Sara Lee is the major producer and its products tend to define the market. Herbert Adams' share is very small. Frozen fruit pies are a separate category, and market shares for this product group are shown in the second chart in Figure 6.7. Nanna's is the major producer, with Sara Lee having a smaller but significant share.

The restructuring of the national producers has put pressure on smaller, regional producers. For example, in WA, the Peters Pies bakery was sold in 1986 because of increased competition from the large national manufacturers (Foodweek, 1986b).

Changing tastes
The low growth in demand for meat pies has been caused to some extent by changes in tastes towards other convenience foods (see Foodweek, 1988b, 1989b). Attempts have been made to increase sales of meat pies by changing their image (see Foodweek, 1988c) but industry observers believe that these attempts will have only a limited impact on arresting the long term decline in demand.

Product development
The major product development of the last few years has been the 'microwaveable' frozen pie. A number of producers, including Herbert Adams, have launched 'microwaveable' pies. Demand reportedly outstripped supply immediately following the launches (Foodweek, 1988a).

Other developments have been in the range and quality of frozen products available. This has been especially evident in the areas of frozen cakes and family pies and has assisted in the large growth in demand for these products in recent years.

Supply features
Inputs
Conditions in the markets for three material inputs to the products of Petersville, namely, Meat, Margarine/Shortenings, and Flour, have been examined. The importance of each of these inputs can be seen in Figure 6.8. The major factor in the different proportions accounted for by these inputs is the amount of meat involved.

a) Meat
In recent years all the major pie manufacturers, including Petersville, have diversified their sources of supply. Price competition is the major form of competition among suppliers. There does not appear to be interdependence between pie manufacturers and meat suppliers and none of the suppliers interviewed relied on Petersville for more than a small proportion of their business.

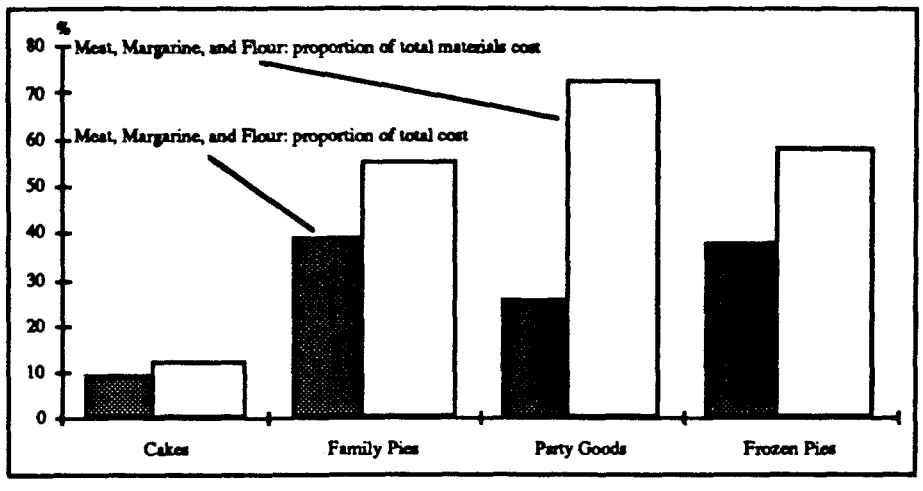
b) Margarine/Shortenings
Margarine is produced by two major manufacturers: Goodman Fielder Wattie, and the Unilever subsidiary E.O.I. Petersville also purchases shortenings from Peerless Holdings. To industrial users shortenings and margarine are generally equivalent products differentiated by price. As was the case with the meat suppliers, Petersville comprises a small proportion of the sales of the margarine/shortening producers.

c) Flour
The flour market is complicated by the preference among the largest millers to engage in internal trade with their own divisions. Goodman Fielder Wattie, George Weston and

Bunge, the major flour millers, all bake bread and produce starch products. Goodman Fielder Wattie owns White Wings, producers of family pies and other food products. George Weston owns Big Ben Pies. Bunge owned Herbert Adams before the merger.

Petersville has no ownership linkages with any of the flour millers and it sources from a number of suppliers including Water Wheel, Bunge, Goodman Fielder, and N.B. Love (George Weston). Industry sources have speculated that Bunge obtained a long term supply contract with Petersville following the sale of Herbert Adams.

Figure 6.8 Input proportions, cakes, family pies, party goods and frozen pies



Source: Company data

In summary, Petersville obtains its material inputs from suppliers operating in competitive markets. Generally, long term supply relationships are avoided, with the purchasing officer preferring to shop around for the most competitive suppliers. The other aspect of this strategy is to deal with a wide range of suppliers, sometimes even maintaining supply relations with higher cost suppliers. These suppliers are generally able to produce a higher quality product to justify their higher cost but the practice seemed to be to maintain contact with suppliers which are not at present the most price competitive, but may be at some time in the future.

Distribution

The distribution network depends largely on whether the product is fresh or frozen. Petersville claims a traditional and successful philosophy of mass distribution of its fresh products. Up to 5,000 outlets a day receive deliveries. These outlets are mostly in Melbourne, but extend into country Victoria, the ACT, and some days into Sydney. Distribution is effected through unionised contractors. Each driver owns their truck and is tied to Petersville only through delivery contracts. Petersville itself has little direct involvement in distribution.

The distribution of frozen products involves longer distances and larger and more specialised trucks. It, too, is carried out by contracted owner-drivers. Frozen products are sold in supermarkets and through agents to retailers in country areas.

Regulations
All producers are subject to food regulations with respect to cleanliness. The major producers do not consider the current regulations unduly burdensome, arguing that competitive pressures would have ensured that they met these standards even without the regulations. They claim, however, that the regulations are being applied to them more strictly than to some smaller producers and that this puts them at a disadvantage.

All packaged food is subject to food labelling controls. Small suburban bakeries generally do not package their products, preferring instead to sell them over the counter in paper bags. Therefore, labelling requirements do not affect them.

There are also statutory minimum contents requirements for meat and 'variety' pies such as 'meat and vegetable' pies (See BRRU, 1988, p112).

Profitability
The Prices Surveillance Authority has found that the food and grocery retail sector was generally competitive, and that on average food prices had not risen as fast as the CPI in recent years (See Figure 6.4). While over 90 per cent of food and grocery sales are now concentrated on four groups: Coles, Woolworths, Franklins, and Australian Amalgamated Wholesalers (Retail World, 1989), they compete strongly (PSA, 1986). The IAC has noted that fierce competition between the large food retailers for market share may be squeezing the profit margins of food processing and beverage firms (IAC, 1989, p69). The large chains have apparently proven extremely effective in using their market power to extract discounts from manufacturers (Foodweek, 1987a).

According to industry sources, profitability in the pies, cakes and pastries market is low. Herbert Adams was thought to be losing money before the merger. There is, however, a discrepancy between industry perceptions of the low profitability of Herbert Adams and the quite healthy profit results revealed in its annual returns to the Victorian Corporate Affairs Commission (see Herbert Adams, various years). It is not clear why this discrepancy exists.

George Weston's cakes and pastries division (Top Taste and Big Ben) reported losses in each of the ten years prior to 1988. Industry observers report that George Weston had been trying to sell Big Ben for some years. The division suffered particularly heavy losses in 1985-86 and 150 of its 450 staff were retrenched (Foodweek, 1987b). Since then, efficiency has been improved.

One factor in its performance has been the obligation on the division to buy all its flour from NB Love, another George Weston subsidiary, regardless of the price. This practice effectively forces any losses, due to a lack of competitiveness in the production of flour, downstream, but not out of the George Weston group. George Weston's management has taken account of this obligation when assessing the profitability of the division.

The Top Taste cake operations of George Weston were also suffering, with high distribution costs and competition from small shops, in the early and mid 1980s. Since then, sales and efficiency have increased considerably (see Foodweek, 1989d).

Barriers To Entry
Barriers to entry permit existing firms in an industry to charge prices above the competitive price level. Four main barriers to entry were outlined in Chapter 2:

a) Product differentiation
The IAC reported that much industry rationalisation in Australian food processing resulted from a perception by entrepreneurs that it is cheaper to buy brand names than it is to promote a new product (IAC, 1989, p60). Vollmers (1988, p198) claims that marketing and the development of strong brand names has created significant barriers to entry in food processing industries.

However, any competitive advantage that can be exerted by manufactures with the strongest brand names is restrained by the presence of generic and store brands. Vollmers notes that while generic brands and store brands have not become dominant forces over the past decade their presence has provided consumers with lower cost alternatives (Vollmers 1988, p199).

Allens Pies was forced to confront a product differentiation barrier in 1989 as it planned to switch from production of generic to branded pies. It managed to sidestep the problem to some extent by resurrecting the 'Sargents' brand, which was already widely known.

Product differentiation does not appear to present a serious barrier to entry for small suburban bakeries contesting the fresh pie market. However, were these bakeries to attempt to distribute their products on a larger scale they could run up against consumer preferences for the established brands.

b) Absolute cost advantage
Absolute cost advantages do not appear to be prominent in this industry. While Pampas and Big Ben are owned by vertically integrated flour millers there is no evidence that this has given those firms a competitive advantage over Petersville. Most raw materials are available in competitive markets. Absolute cost barriers can result from the difficulty of entrants in acquiring skilled managers and know-how. Not enough information was available to assess the extent of this barrier.

The absolute cost advantage loses its significance if the entrant is already established in the same or similar industry. Such entrants have their own trained managerial team, know-how, sources of supply and distribution network, access to finance, and will be already vertically integrated if this is advantageous. Allens Pies entry into the branded pie market was essentially an entry by an established firm. Its relationship with the large wholesalers and retailers could explain the ready acceptance of Sargents Pies. McCain entered the pie market from a base in other food processing activities.

c) Initial capital requirements
Initial capital requirements do not appear to be a barrier to small bakeries entering the fresh pie market. However, the cost of setting up large scale production facilities is substantial and a would-be entrant would probably require external finance.

d) Economies of scale
Small suburban bakeries have demonstrated that small scale production is no barrier to the production of a competitive product. The IAC claims that size advantages are generally important in the food industries, but that the main scale advantages lie in savings from nationally organised production, marketing and distribution, rather than in increasing the scale of production of particular establishments (IAC, 1989, p62).

Petersville has elected to locate its pastry products division at one site. One advantage it may be attempting to extract from this arrangement is economies of scale in production.

6.3 Benefits from the Merger

Expected Benefits of the Merger
Petersville has reported that the expected benefits of major importance to it through the merger were economies in purchasing, promotion, administration and production. Of minor importance were potential economies in distribution, improved management and staff skills, and the possibility of reduced competition in the market place.

Internal expansion may have been an alternative means of obtaining the same benefits. Petersville favoured the merger because it provided strong, well-known brand names and expertise in the manufacture of cakes and doughnuts. The Herbert Adams pastries range is seen by many observers as the only growth prospect for the expanded division.

Were the Expectations Realised?
Economies in purchasing
The similarity in many of the inputs required for all the products of Petersville after the merger suggests that it could have expected benefits in this area. Petersville intended to achieve these benefits through exercise of better volume buying power.

Industry sources have suggested that as part of the sale to Petersville of Herbert Adams by Bunge, Bunge obtained a major flour supply contract with Petersville. For the remainder of its flour needs, however, Petersville obtains supplies from a range of suppliers at the best possible price and the industry view was that there had been no change in the conduct of Petersville since the merger. Somewhat surprisingly, while domestic wheat prices have remained roughly constant since 1985, Petersville reports that the average price it pays for flour has risen significantly since 1987-88.

The view of firms in other industries that supply inputs to Petersville was similar. These other major material inputs prices have remained constant, or declined, over the period.

Economies in promotion
It is difficult to measure the value of these economies as they have an intangible nature. The 'Herbert Adams' brand name could be expected to have brought some of these benefits to the merged company. Competitors consider that the brand name was a valuable asset in its own right. Petersville shares this view as the 'Herbert Adams' brand is being retained as a separate entity to obtain benefits of brand loyalty through lower promotion costs.

Petersville had hoped to achieve better management of its promotion/advertising expenditure. Since the merger, Petersville claims that its brand loyalty has decreased as consumers have responded to the increased advertising of other brands. Having three separate brands was aimed at maintaining market share but might have inhibited Petersville from obtaining significant economies in promotion.

Economies in administration
These can occur as administration costs are spread over a greater output. Greater output can also allow specialisation of administrative tasks or the employment of better

management. Petersville's plans in this area were simply to reduce administration overheads. They were a minor expected benefit of the merger.

Approximately 20 administration staff have been retrenched since the merger, although some of these jobs are now performed by casual and part-time employees. Petersville reports that subsequent changes to its management structure have removed a number of positions with duties that overlapped. Some economies of administration, therefore, appear to have occurred.

Economies in distribution
These can arise through reducing the two pre-merger distribution networks to one, with savings in sales personnel, delivery trucks, storage, etc. Petersville initially intended to consolidate its freight and warehousing activities but this intention was never carried out. Few economies in distribution arose from the merger because the distribution networks were kept separate to maximise the marketing benefits of the brand names.

Economies in product development
Petersville has stated that expectations with respect to R and D/Product development were not achieved due to a concentration on improving the productivity of existing product lines. The period following the merger has seen the introduction of McCain and Sargents pies to the market and a push by Big Ben beyond NSW. Since the merger, the rate at which new products are introduced to the market has increased and the range of pastry products has expanded.

Economies in production
The mix of products before and after the merger indicates that these economies could arise in the production of pies, pasties and sausage rolls. It might have been possible to obtain multi-plant economies from both the existing plants but the company decided to consolidate production in one plant. Consequently, it appears that the company was seeking economies associated with larger plant size. Petersville expected a reduction in unit fixed factory overhead cost due to increased volume. Competitors have indicated that only recently has the merged entity been in a position to put pressure on their costs.

The Impact of the Merger on Productivity
Labour Productivity
Labour productivity can be increased by mechanising the production process, and substituting capital goods for labour. This has occurred at Petersville's Nanna's factory in Gosford where, with little increase in employment, production has gone from 35-40 pies per minute to 80-85 pies per minute (Food Manufacturing News, 1987).

No similar overhaul has occurred at Petersville's Kensington plant. The pie ovens are over 20 years old and it is estimated that the average life of the plant and equipment over the period 1985 to 1988 was ten years. Some recent capital investment, however, is likely to boost labour productivity. High speed dough mixers, a laminated product make-up board and a series of automatic packing machines have been installed. Petersville acknowledge that since the merger approximately 100 production employees have been retrenched due to capital projects.

More generally, since the merger the labour force in the pastry products division has been reduced by 285 production and 50 management staff. At the same time, production has remained fairly constant. This suggests that following the merger fewer employees

have been required to produce an equivalent quantity of output. On its own, this suggests that labour productivity has increased since the merger.

Productive efficiency
Estimates were made of changes in productive efficiency since the merger. The methodology was first employed by Cowling *et al* (1980) and is described in Chapter 2. The model regards an increase in efficiency as a reduction in the ratio of inputs used to outputs produced. This may occur with changes in the scale of production, technical progress, or the efficiency with which a production process is used. Cowling's 'k' is inversely proportional to 'efficiency' as contemplated by the model. A rise in 'k' implies a fall in productive efficiency and vice versa. The assumption of fixed factor proportions in the model means that a rise in 'k' must be because more of every input is required to produce a given output.

The discussion on labour productivity above indicates that since the merger, the amount of labour used to produce a unit of output has fallen, that is, factor proportions used in the production process have changed. Because the factor proportions used in the calculation of 'k' are those applying in 1989-90, the change in actual factor proportions between 1987-88 and 1989-90 will bias 'k' upward so that the estimated levels of production efficiency will be less than the actual levels. This bias should be kept in mind when the results are being interpreted. More details are provided in Chapter 2 and the appendix to this chapter.

The efficiency with which four product groups[1] were produced by Petersville in the years since the merger was investigated using data provided by the company The results are presented in index number form, with each series standardised at 1.0 for 1987-88, in Table 6.1. A rise in the Output prices/ Input prices ratio above 1.0 indicates that output prices have risen faster than input prices. Table 6.1 shows that output prices generally rose faster. The prices of some inputs were in fact static over the three year period. Per unit profitability, as measured by the profits to revenue ratio, declined for all product groups. In general, therefore, increases in the Output prices/ Input prices ratio were matched with falls in profitability, suggesting that productive efficiency had fallen.

Changes in productive efficiency are indicated by Cowling's 'k' measure in Table 6.1. Trends in the measure are shown in Figure 6.9. These results suggest that there has been declines in productive efficiency over the period since the merger. Productive efficiency fell sharply in 1988-89 but improved in 1989-90 for every product group except Frozen Pies. Sensitivity tests were applied to the data and these showed similar trends. With only three years of data available, and the known bias in the 'k' measure, these results must, of course, be considered indicative only.

A major reason for this finding appears to be the disruption to production caused by the integration of the Herbert Adams facilities with those of Petersville and the streamlining of management structures. The relocation was scheduled to be completed by early 1990 and is likely to have created disruption in production and diverted management resources throughout 1988-89 and into 1989-90.

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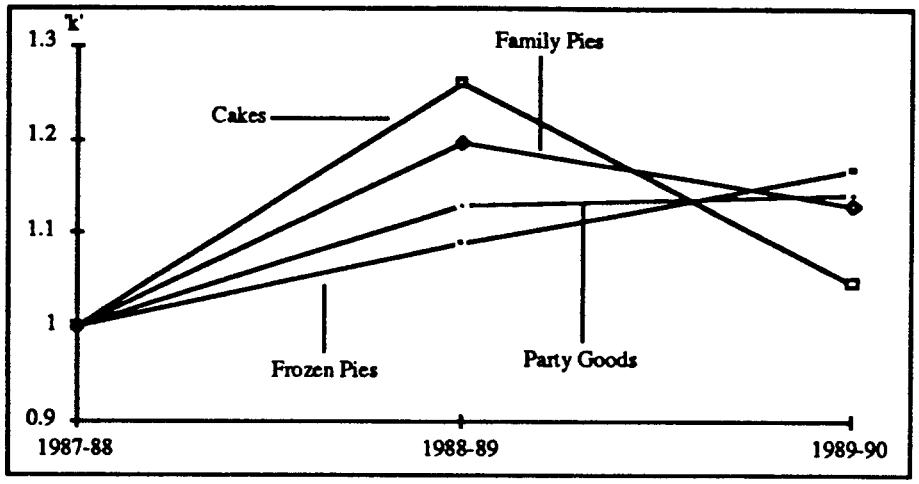
[1] These groups provide a complete overlap between the products of Petersville and Herbert Adams prior to the merger. The merger was expected to have its greatest impact in these products. In each product group, data on the largest selling product were collected.

Table 6.1 Cowling's 'k' and constituent measures, 1987-88 to 1989-90

	1987-88	1988-89	1989-90
Cakes			
Output index	1.00	1.19	1.21
Output prices / Input prices	1.00	1.07	1.03
Profit to revenue	1.00	0.70	0.98
Cowling's 'k'	1.00	1.26	1.05
Family Pies			
Output index	1.00	0.98	1.19
Output prices / Input prices	1.00	1.11	1.06
Profit to revenue	1.00	0.75	0.78
Cowling's 'k'	1.00	1.20	1.13
Frozen Pies			
Output index	1.00	0.95	1.11
Output prices / Input prices	1.00	1.11	1.05
Profit to revenue	1.00	1.01	0.93
Cowling's 'k'	1.00	1.09	1.17
Party Goods			
Output index	1.00	0.91	0.98
Output prices / Input prices	1.00	1.08	1.04
Profit to revenue	1.00	0.95	0.89
Cowling's 'k'	1.00	1.13	1.14

Source: BIE estimates based on Company data

Figure 6.9 Changes in productive efficiency, 1987-88 to 1989-90[a]



Source: BIE estimates based on Company data
Note: (a) A rise in the 'k' index denotes a fall in productive efficiency and vice versa

Impact of the Merger on Market Power

There are a number of facets to market power in addition to the ability to restrict supply so as to raise output price above the competitive level. Other aspects include product quality, product differentiation, marketing and associated services.

Petersville has indicated that the merger was a response to the competitive pressures on its existing products created by the rise of suburban bakeries and the increasing number of alternative convenience foods. The firm believed that the most profitable response was to achieve greater volume and any resulting economies of scale.

Suppliers of most inputs found that the merger had little impact on their business with Petersville. Flour suppliers, however, claimed that their access to Petersville had been restricted since the merger due to a significant flour supply arrangement that Bunge obtained as part of the merger deal. All flour suppliers contacted agreed that the merger had led to increased price competition among suppliers looking to supply Petersville.

Responses of retailers reflected the geographic nature of the market. In Victoria the merger has had little effect on the competitive climate because until recently Herbert Adams was operated quite separately. In NSW, Sargents, and before it, Big Ben, have been the driving forces in the market. One NSW retailer commented that the product must perform on its merits. These were said to include price and advertising/promotion support. The merger was perceived to have had no impact on these factors.

Competitors were more sensitive to the effects of the merger. They suggest that while the merger had little impact on them in 1987 and 1988, the picture began to change in 1989. In that year, marketing expenditure rose and product quality emerged as a greater issue; for example, the 'microwaveable' pie. Petersville has also stated that price competition has increased but competitors do not agree.

6.5 Summary and Conclusions

The pastry products industry is a fragmented one, characterised by producers of all sizes. Competition in the fresh products market, combined with little market growth has resulted in decreasing profits for the large manufacturers.

By contrast, the frozen products market is contested by large manufacturers on a national scale. Sales are growing rapidly, with the fastest growth in the frozen dessert sector. The takeover of Herbert Adams provided Petersville with entry to this sector.

Barriers to entry to the industry as a whole are generally low. Brand loyalty appears to be falling and many small local bakeries have opened throughout Australia.

Petersville expected benefits from the merger through economies in purchasing, promotion, administration and production. Its conduct with respect to purchasing appears unchanged and not promotion economies have been achieved. Some economies in administration have been achieved. Economies in production appear so far to have eluded Petersville, although labour productivity has probably risen.

The effect of the merger depends on what would have happened in the absence of the merger. Although it is impossible to be certain, four courses of action are possible in the face of the static or declining market for fresh products and low profitability:

- *Withdrawal from the market.* This would have allowed the remaining firms to compete for the abandoned market share, in the expectation of increased production and accompanying cost savings.
- *Switching of production.* Production could be switched from fresh pies to the growth areas of frozen pastries and cakes. The processes and technology involved are similar so the costs to firms would be relatively low.
- *Increasing efficiency.* This can be achieved by making existing production facilities more productive or by investing in new plant and equipment.
- *Increasing demand.* Additional advertising and other promotional activity might change consumer preferences in favour of fresh products.

Elements of each of these possible courses are evident in the behaviour of the industry since the merger. However, it appears that the merger has played a substantial role in bringing them about and the pace at which they have occurred. The merger has allowed a major producer, Herbert Adams, to effectively withdraw from the market. It also assisted Petersville to move the focus of its production from fresh pies to the growth areas of frozen pastries and cakes, and encouraged it to make additional investments to improve efficiency.

It appears that productive efficiency has fallen since the merger. It is unreasonable, however, to expect that productive efficiency would rise in the period immediately following the merger. The integration of Herbert Adams into Petersville's pastry products division inevitably resulted in costly disruption. The two plants are only now starting to work together under one roof. Competitors have reported that Petersville has recently began to put pressure on their costs. Petersville claims that the benefits of its recent rationalisation of production facilities will accrue fully in 1990-91.

Offsetting the resource costs of the merger are the efficiency improvements in several firms following the merger. One producer was forced directly by the merger to improve its efficiency and to increase promotional expenditure in an effort to maintain or raise its market share and its profitability. It is likely that the net adjustment costs of the merger were less than would have been incurred in the absence of the merger.

The potential for the use of market power in fresh pies is kept in check by the low barriers to entry. Similar low barriers to entry exist in cakes and pastries and there appears to be little scope for the exercise of market power.

The market power of the large producers of frozen products is further constrained by the countervailing power of the large wholesalers and retailers. Attempts to regain some market power by switching from generics to branded products appears to have been successful but the extent of competition in the market means that the absolute level of market power being contested was small.

While it is too early to be certain about the overall outcome of the merger, it appears that it has produced net benefits to the economy. The major costs have been in productive efficiency while the two plants were being combined but these are now being reduced. There has been little discernible change in the limited market power of the company. The major benefits have come through the pressure it has put on the other firms in the industry to examine their own cost structures and improve their efficiency. The indications are that this pressure has already been considerable and will increase markedly when the combined plant settles down fully later this year.

Appendix 6.1 Data details

The method used to calculate the Cowling measure of efficiency is explained in detail in Chapter 2. The following comments deal with certain aspects of that methodology as it was applied in this case study.

The Weights
The methodology employed in this case study varies from that used in the other two case studies in one important respect: the input price index is calculated using weights derived from data on production in the 1989-90 year. i.e., end period weights are used, not base period weights. If factor proportions changed between 1987-88 and 1989-90, 'k' will be biased upwards. This means that rises in efficiency will be understated and falls in efficiency will be overstated. The use of end period weights was forced on the analysis by data constraints. The same constraints limit the period of analysis to the three years 1987-88 to 1989-90. Insufficient data were available to allow the tracking of changes in efficiency before and immediately after the merger.

The Data
The input categories were Labour, Materials, Overheads, and Capital. Some capital costs must be included in the analysis because their contribution to total costs is not removed by using profits before interest, tax, and dividend payments. Depreciation on buildings was one capital cost included. Data on the contributions of the respective components of these categories to budgetted per unit cost for 1989-90 were provided by Petersville. From these data were calculated the weights for the input price index.

The relative contributions of the four input categories to total per unit cost for each product group are shown in Figure A6.1. Note that each input category typically contained more than one component.

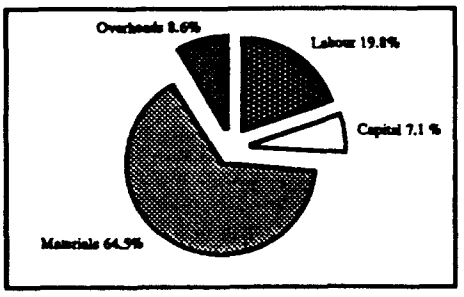
Petersville provided many of the prices used in the construction of the input price indices. The relevant wage and salary rates were reduced to per hour figures by the firm. It also provided prices on six materials (five in the case of cakes) used in its products. For each product group, two of those materials were packaging items. The remaining ingredients used were represented by a 'residuals' component whose price index was proxied by a simple average of the preceding five categories' price indexes. This 'Other' component was most significant for Cakes, and least significant for Party Goods.

The Overheads category proved more of a problem. The Victorian State Electricity Commission provided a price series for electricity. A price index for gas was constructed from the Victorian Gas and Fuel Commercial/Industrial tariff 14/22 using the assumption that the an average annual gas consumption by Four'n Twenty was 10 million megajoules. The Melbourne & Metropolitan Board of Works provided a price series for industrial users of water. The next three overheads categories nominated by Petersville were Cleaning, Repairs/maintenance, and Waste disposal. Per unit prices for these categories were proxied by the Trades Assistants and Factory Hands wage index found in ABS Catalogue No. 6312. Again, a residual category existed. Its price index was constructed from a simple average of the price indexes of the six preceding categories. For every product group its contribution to unit cost was negligible.

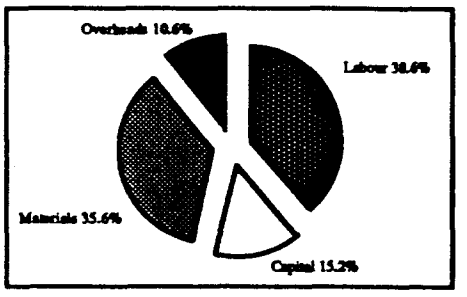
The costs of capital were proxied by two implicit price deflator series in the National Accounts for Gross Fixed Capital Expenditure; non dwelling construction and equipment (ABS Cat No 5206.0).

Figure A6.1 Budgetted 1989-90 input proportions for each product.

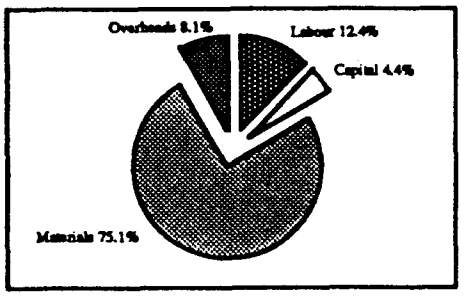
Frozen Pies



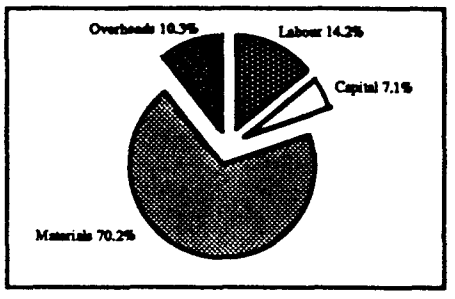
Party Goods



Cakes



Family Pies



Source: BIE estimates based on Petersville data

The Profit Estimate

Figures on profit before interest and tax, by product lines, were constructed in two stages. Firstly, the total cost of production of each product type in each year was calculated by multiplying the total cost per unit of output by the total output figures. Secondly, these results were subtracted from sales revenue figures.

Sensitivity Analysis

The sensitivity of the results given above to alternative assumptions concerning the rate of growth in prices of those materials represented by the Materials Other category was examined. The assumption employed in the results above is that the rate of growth in the price of 'Materials Other' is a simple average of the rates of growth in the prices of the other material categories.

Further assumptions about prices were employed in the analysis, however their effect on the results is small because of the low weighting that the relevant inputs have in the input price indexes. In contrast, the Materials Other category has a weighting of nearly 30 per cent in the input price index for Cakes, nearly 20 per cent in the input price index for Family Pies, and nearly 13 per cent in the input price index for Frozen Pies.

Given the generally low rate of growth in material input prices between 1987-88 and 1989-90, the first alternative assumption tested was that there was no increase in the price of the residual materials over the period.

The adoption of this assumption shifted 'k' upwards. This effect was most significant for Cakes and least significant for Party Goods. The general trends observed were unchanged: efficiency deteriorated in 1988-89 and improved in 1989-90, although not by enough to return it to 1987-88 levels.The rankings of the four product groups by 'k' value in 1989-90 was unchanged

The second alternative assumption tested was that the rate of growth in the price of the residual materials over the period was equal to the fastest rate of growth in price among the other materials.

The adoption of this assumption shifted 'k' downwards. Again the effect was most significant for Cakes and least significant in Party Goods. Efficiency deteriorated in 1988-89 but generally improved in 1989-90 although not by enough to return it to 1987-88 levels. The impact on the different product groups of this assumption was to push the 'k' value in 1989-90 for Party Goods above the 'k' value in 1989-90 for Family Pies. This is a result of the far smaller weighting that the 'Material Others' category has in the input price index for Party Goods, compared to the weighting in the case of Family Pies.

In conclusion, the results appear to be reasonably robust to the treatment of the Materials Other category.

7. Case Study 3: A Merger in the Automotive Battery Industry

7.1 Introduction

This chapter examines the impact on the Australian automotive battery market of the 1985 merger of Chloride Batteries Australia Ltd and the batteries division of Pacific Dunlop Ltd (now GNB Australia). Chloride Australia was a wholly owned subsidiary of the Chloride Group Plc of the UK and Pacific Dunlop is an Australian owned company. Pacific Dunlop is a large, diversified company involved in a wide range of activities including the manufacture and retailing of tyres.

The benefits expected from the merger with respect to the Australian market included access to Chloride's distribution network and economies through rationalisation of State offices and warehouses[1]. The merger also allowed Pacific Dunlop to close its Sandringham (Victoria) plant, in favour of Chloride's plant at Elizabeth, SA.

As part of the same acquisition, Pacific Dunlop also gained Chloride's North American and New Zealand subsidiaries. From Pacific Dunlop's perspective, the major reason for the acquisition was access to the US market via Chloride's American distribution network for its radically new Pulsar battery, then nearing final development.

7.2 The Industry

Industry Structure Before the Merger
In the immediate pre-merger period of 1983 to 1985, four major firms produced automotive batteries (See Figure 7.1). These four firms were:

- Chloride Australia, which had a plant in Brisbane as well as the Elizabeth plant. The combined capacity of these plants was about 1.2 million units per year. Chloride had about 25 per cent of the market. It was a highly geared company which had experienced low profitability for a number of years. Industry sources claim that it also suffered from poor productivity and bad labour relations.
- Besco Batteries, which had a 20 per cent market share and a capacity of 0.7 million units per year. GNB bought some of Besco's physical assets in 1986.
- Dunlop Batteries, a division of Dunlop Olympic Ltd, which had plants at Sandringham, Geelong and Sydney. Its main Sandringham plant had a capacity of 0.8 million units per year and its share of the market was about 25 per cent. Batteries were distributed mainly through Dunlop Olympic outlets: the Marshall Battery chain and Beaurepaire and Dunlop tyre outlets. It also had a major share of the original equipment market.

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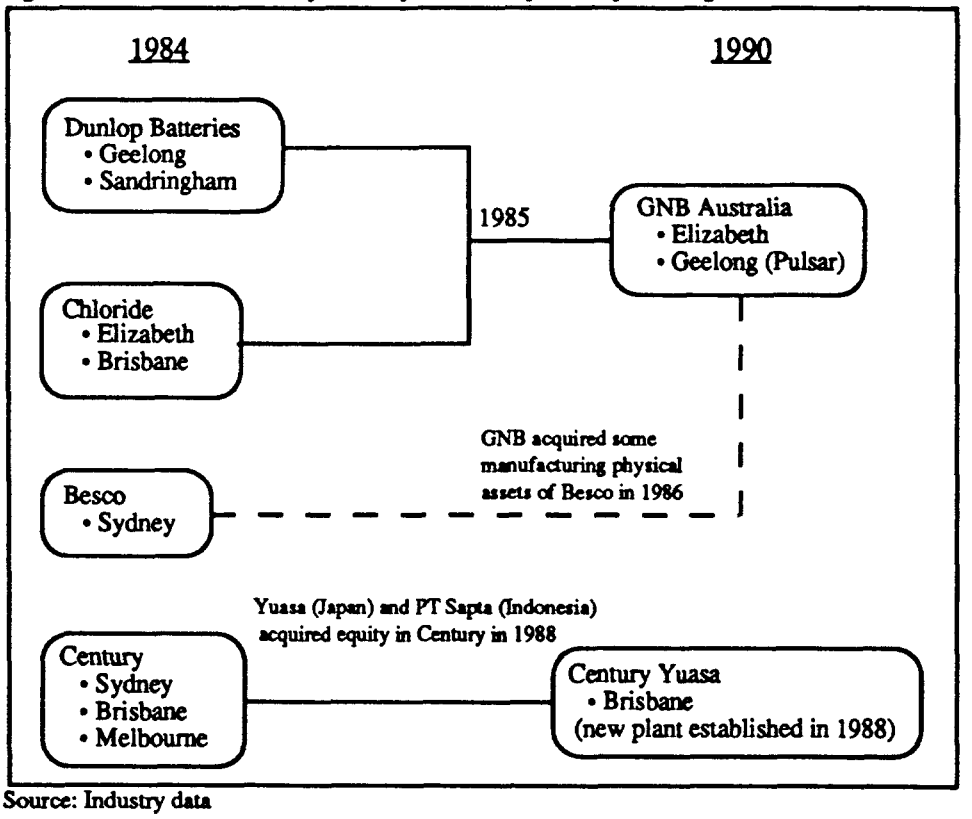
[1] It was also envisaged that there would be benefits from the closure of Pacific Dunlop's industrial battery plant at Canterbury, NSW, in favour of Chloride's plant at Padstow, NSW but this change did not directly affect the automotive batteries market.

- Century Batteries Pty Ltd, then a subsidiary of Repco Ltd, acquired the battery division of Lucas Industries Australia Ltd in 1982. Century continued to manufacture for Lucas in plants in Sydney, Brisbane and Melbourne. It had a market share of about 30 per cent and a total capacity 1.2 million units per year.

The 1970s and the early 1980s was a period of rationalisation. In 1976, the IAC estimated that, in addition to the four major firms, there were 130 small battery assembly or manufacturing firms (IAC, 1976, p1). Most of these smaller firms have since left the industry. Part of the industry rationalisation is thought to reflect the introduction of long-life, low maintenance batteries in the late 1970s. A further factor was the replacement of rubber casings with polypropylene, thereby ending the reconditioning of old batteries by small, regional businesses.

In this period, manufacturing plants were also smaller than they are today, with a capacity ranging from 0.5 to 0.9 million units per year for the larger factories. Factories were generally located near population centres and the markets for the smallest factories were local rather than national. In contrast, the present largest plant, at Elizabeth, is relatively close to Port Pirie, the source of its most significant input, lead, and some distance from the major markets.

Figure 7.1 Automotive battery industry structure, pre and post-merger



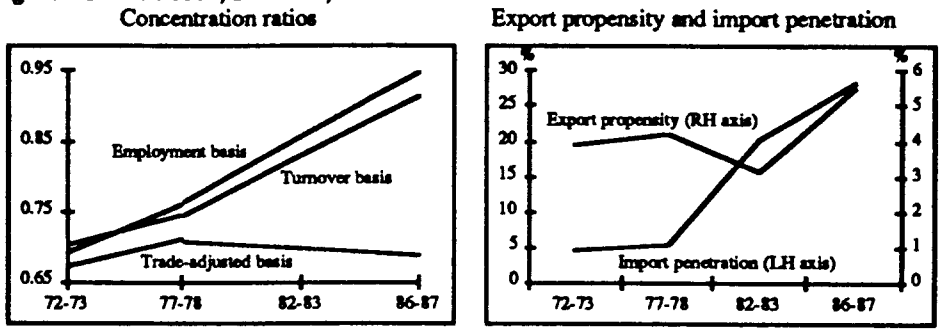
Source: Industry data

Present Industry Structure

Figure 7.1 summarises the main changes in the industry structure in the post-merger period. Production is now dominated by GNB. GNB's Elizabeth plant has a capacity of 2.1 to 3.0 million units per year[2]. Century-Yuasa has a plant with a capacity of 1 to 1.5 million units per year[3] and is the only other significant Australian producer. Both firms also import batteries but independent imports are a significant source of competition.

Automotive batteries are part of ASIC Industry Class 3356, Batteries, which also covers industrial and torch batteries. The industry concentration measures shown in Figure 7.2 increased markedly in the period 1972-73 to 1986-87, except for the trade-adjusted measure where the increase in imports, also shown in Figure 7.2, had an effect. However, much of the importing shown in these ABS data is by the domestic producers.

Figure 7.2 ASIC 3356, Batteries, 1972-73 to 1986-87

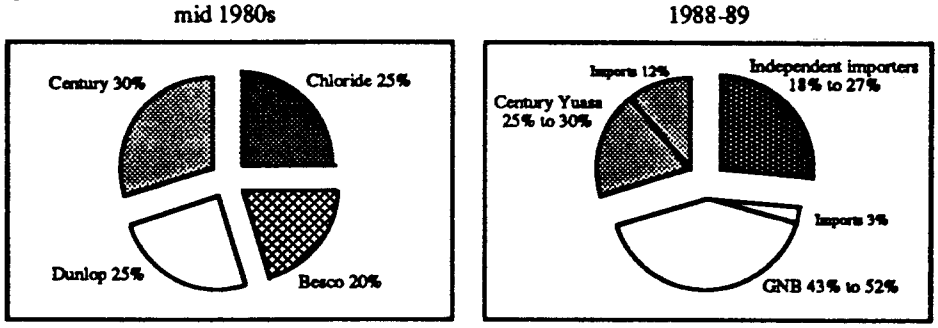


Source: BIE 1989c

Market Shares

The total market is about 3.8 million batteries and was worth about $98 million at ex factory prices in 1986-87, the latest year for which data are available. Market shares in 1988-89 are subject to considerable uncertainty. GNB's share appears to be at least 43 per cent and may be as high as 53 per cent, while Century Yuasa's share is between 25 and 30 per cent. Pre-merger and post-merger market shares are shown in Figure 7.3.

Figure 7.3 Market shares, mid 1980s and 1988-89



Source: BIE estimates

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[2] Depending on whether the company runs a five or seven day week, three shifts per day basis.

[3] Depending on whether the company runs two or three shifts per day on a five day week basis.

Figure 7.3 also shows the extent to which GNB and Century-Yuasa import batteries. In 1988-89 GNB imported 98 000 batteries (2.5 per cent of the total market) and Century-Yuasa 440 000 (12 per cent). While the independent importers tend to be more regionally oriented, GNB and Century-Yuasa market their automotive batteries throughout Australia, making the relevant market national rather than regional.

Industry Characteristics

Trends in Production

As indicated in Table 7.1, battery output by GNB fell from 1984-85, the year of the merger, to 1985-86, then increased strongly to 1987-88. This increase may reflect the recent reorganisation of the Elizabeth plant and the effects of a $10 million investment program undertaken in 1988.

Table 7.1 Output indexes for GNB and automotive battery industry, 1981-82 to 1987-88

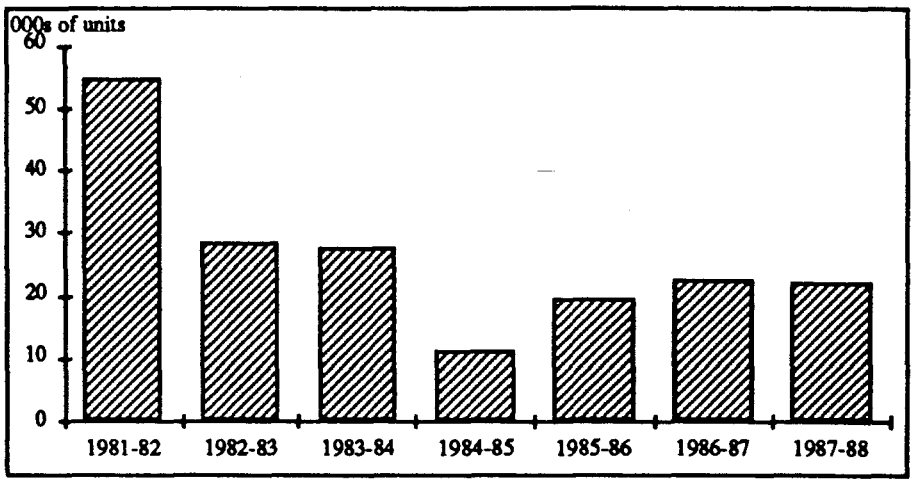
Year	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
GNB	na	na	na	1.00	0.96	1.01	1.08
Auto Battery Industry	1.23	1.14	1.32	1.00	na	1.18	na

Sources: Company data and ABS Cat. No. 8303.0.

The output index for all automotive battery production, also shown in Table 7.1, illustrates the steady decline in domestic capacity in the period to 1984-85. In 1986-87, 2.6 million batteries were produced with an ex factory value of about $71 million.

The indexes shown in Table 7.1 are for total production including exports. The latter are relatively small, however, as indicated in Figure 7.4. The exports to output ratio declined from an already low 2 per cent in 1981-82 to less than 1 per cent in 1986-87.

Figure 7.4 Industry exports, 1981-82 to 1987-88

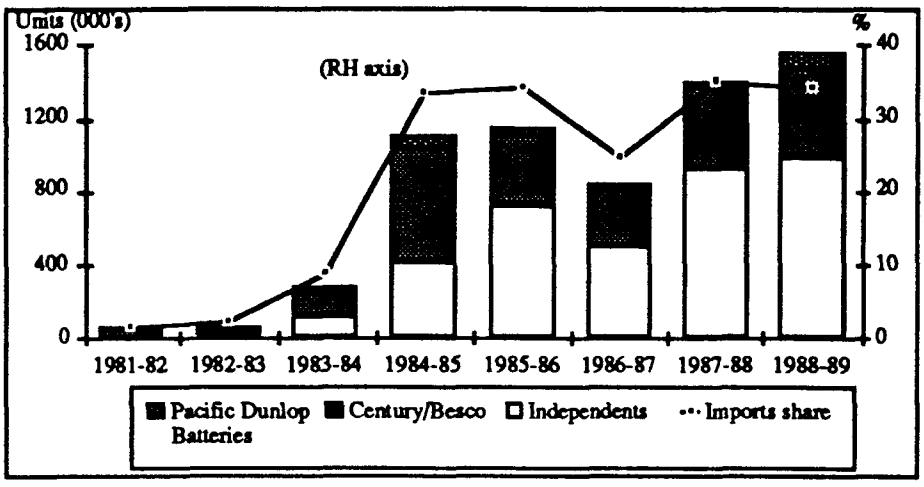


Sources: Company data and ABS data (microfiche MX04C).

Imports

The import share of the domestic market has risen sharply since 1984-85, as Figure 7.5 shows. Before the merger, imports from all sources were a small share of domestic sales, accounting for only 282 000 units, or less than 10 per cent, in 1983-84. The increase has occurred despite the real depreciation of the Australian dollar and the increase in the developing country tariff in mid-1986 from 5 to 30 per cent. Figure 7.5 also shows that the proportion of imports accounted for by independent importers has increased. Industry sources indicate that most automotive battery imports are sourced from Korea, Taiwan, Indonesia, the Philippines and Malaysia.

Figure 7.5 Imports and imports share of the domestic market, 1981-82 to 1988-89



Sources: ABS Cat. No. 8303, microfiche MM04C and MX04C and BIE estimates

The sharp upturn in imports in 1984-85 is unusual and industry observers have suggested that high labour costs and low productivity were responsible for the declining market share of domestic producers. In the main, the increase appears to have been caused by two factors:

- Lower domestic capacity accentuated by the 1986 closure of the main Besco plant. It appears that a major factor in the closure was falling labour productivity.
- A change in the size of batteries offered for export by Korea early in 1984 which made them more suitable to the Australian market.

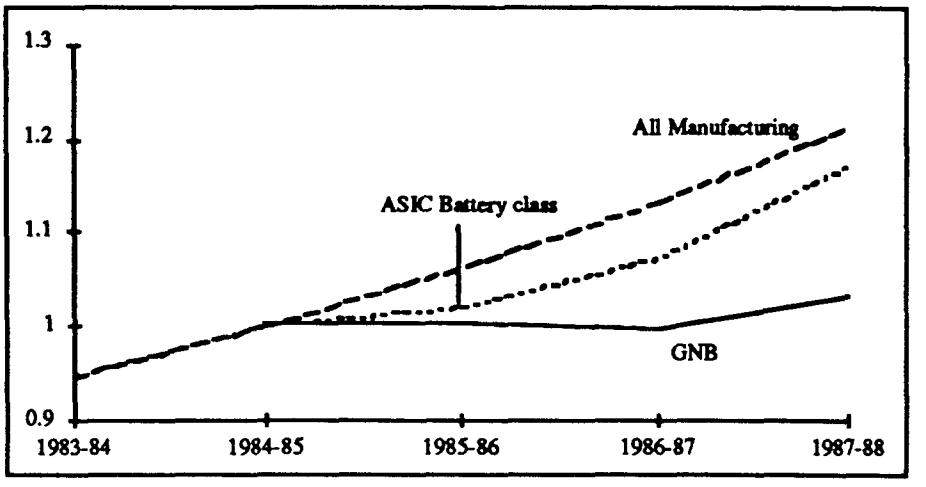
Industry sources have also noted that the increase took place against a background of tariff rates of 5 per cent and increased demand for automotive batteries post 1984-85. It has been suggested that the emerging industries in Korea, Taiwan and Indonesia received considerable government support to encourage their exports. The increase in imports also resulted in an anti-dumping application in 1983-84. The Australian Customs Service found that while a dumping margin of up to 33 per cent existed, it did not constitute material injury as defined in the relevant legislation.

Prices

Figure 7.6 shows an index of output prices for GNB for 1984-85 to 1987-88. No data are available for previous years. Indexes are also shown for the ASIC Batteries Class

and for all manufacturing output. Automotive batteries are estimated to comprise about 40 per cent of the ASIC Class, which also includes industrial and household batteries. The prices of GNB batteries have been remarkably stable over the period compared with the other indexes.

Figure 7.6 Price indexes, GNB, ASIC class, and all manufacturing, 1983-84 to 1987-88



Sources: Company data, unpublished ABS data, and ABS Cat No 6412.

Industry Demand

Total demand for automotive batteries is derived from two sources: the production of new motor vehicles and the replacement market for existing motor vehicles. Of the two sources, the replacement market is by far the more significant, comprising about 80 per cent of all batteries sold. GNB at present supplies about 90 per cent of new motor vehicles produced in Australia.

The relationship between motor vehicles and battery demand is a fixed one: each vehicle must have an initial source of energy to 'crank' its engine and there is virtually no alternative to a battery. Accordingly, small to moderate changes in the price of automotive batteries are likely to have little effect on the number of batteries sold, that is, demand is price inelastic.

Demand for motor vehicles is generally considered to increase more than proportionally as incomes increase. Demand for automotive batteries should behave similarly given the close relationship between the demands for motor vehicles and automotive batteries. As real incomes tend to increase over time, battery manufacturers are likely to have a growing market for the foreseeable future.

There is also a seasonal element to demand for automotive batteries with winter, the time of relatively greater battery failures, being the season of peak demand.

Demand for GNB Batteries

While the price elasticity of demand for automotive batteries overall may be inelastic, it does not follow that demand for GNB's production is similarly so. GNB indicated that a small decrease in the price of imports would have a significant adverse impact on its

sales. In other words, despite the considerable number of brand names, product differentiation does not appear to be sufficient in the industry to prevent imports and domestic automotive batteries from being perceived by consumers as close substitutes.

Moreover, it is likely that consumers perceive the batteries of the other domestic producer, Century-Yuasa, as being a close substitute with GNB's output. One industry observer commented that batteries are essentially commodities. That is, like wheat or coal, price is the overriding consideration in successful marketing. It appears that customers buy from a convenient outlet and, apart from relative prices, are largely indifferent between well-known brands (IAC, 1976, p11) but not between well-known and unknown brands. In general, it seems that any attempt by GNB to raise its prices unduly would result in the company losing considerable sales to well-known brands of other producers. At most, the company would seem to have only limited market power.

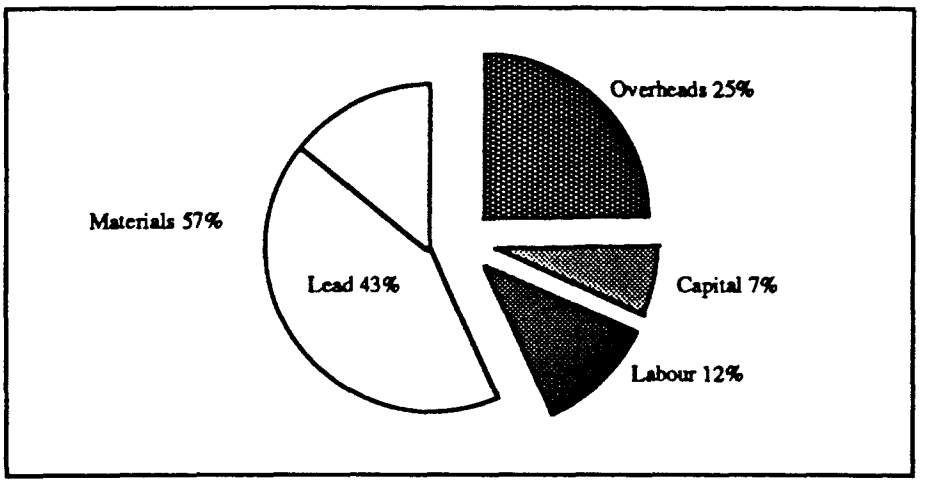
One caveat on the foregoing is necessary. For some vehicles there is little alternative to a GNB battery. Such instances appear to be rare and include Volkswagen cars and most golf carts where, it is claimed, the only alternative supplies are relatively expensive imports from Europe.

Costs

Input Costs

Production is a materials-intensive process. As is shown in Figure 7.7, materials account for about 57 per cent of unit production costs. Lead is by far the most significant material input, accounting for about 75 per cent of material costs.

Figure 7.7 Input proportions, automotive battery production



Source: BIE estimates

There is little scope in the short run for substitution between inputs in the production of automotive batteries. There is no seasonal pattern associated with input prices. Lead, the key material input, is supplied to GNB by Pasminco at prices based on those at the London Metal Exchange. There is no alternative domestic source of supply to Pasminco and the cost of importing lead, a high weight, low value commodity, is prohibitive.

Production costs
Industry observers have indicated that optimum plant size is about 2.0 to 2.5 million units per year. Production costs are sensitive to the level of capacity utilisation. GNB estimates that a reduction in output at its plant from 2.1 million units to 1.8 million units, a decline of 14 per cent, would increase unit cost by 5 to 6 per cent. One implication of this combination of optimum scale and cost penalty associated with lower capacity utilisation is that two, or at the most three, plants are sufficient to supply the domestic market.

There is no product which could be considered a close substitute in production for automotive batteries. Industry advice indicates, for example, that it is not possible for technical reasons to switch facilities readily from the production of industrial batteries to the production of automotive batteries.

Transport and distribution costs
These costs will vary depending on distance, mode of transport and other factors. Industry sources indicate that, on average, transport and distribution costs, including promotion and other marketing costs, add 30 to 35 per cent to the cost of production.

Technology
Production of conventional automotive batteries is not technologically demanding and they are produced and exported by a number of less industrialised nations. While no significant production innovations have occurred in recent years in conventional batteries, industry commentators state that the introduction of Just-In-Time practices at the Elizabeth plant of GNB, and the use of Japanese know-how at Century-Yuasa, have resulted in improved product quality and economies in production.

Most batteries produced in Australia are 'wet', that is, they require controlled formation for 24 to 36 hours. Imported batteries are 'dry' batteries which require less controlled charging for only four to six hours and are much easier to transport long distances. The use of wet battery technology by Australian producers inhibits the development of export markets.

A significant recent product development has been the development of the Pulsar or Switch battery by GNB. Initial development of the Pulsar commenced in the early 1970s and has continued since, in part with public support via a Commonwealth Government R and D grant. The grant, however, represented only a small part of total R&D costs.

The Pulsar is 30 to 50 per cent lighter than conventional batteries because of its reduced lead content. When a main and an auxiliary Pulsar battery are combined, it is possible to switch to the auxiliary battery when the main battery is discharged and to switch back when the main battery is recharged by the normal running of the vehicle. This provides a significant marketing advantage, especially in cold climates where battery failure may have serious consequences.

The Pulsar battery was launched in Australia in 1988 and in the US in 1989. GNB describes its Australian sales as outstanding and comments that American interest has been high (Pacific Dunlop, 1989, p7).

Government regulation
Automotive battery production is subject to the normal requirements of Local and State Government. The closure of Pacific Dunlop's Sandringham plant, for example, was in part due to regulations which restricted the plant from operating at all hours and at weekends.

The only mandatory requirement for all batteries appears to be that they be appropriately labelled with respect to corrosion. This requirement also applies to imports. Industry sources suggest that safety regulations for the transport of batteries may become more onerous in future.

Vertical linkages
There is a degree of vertical integration in GNB's operations in that it is able to market batteries through other arms of the Dunlop group, such as, Beaurepaire tyre outlets and the Marshall battery chain. Other outlets for GNB are major retail outlets, such as K-Mart, service stations and spare parts retailers. Most imported and Century-Yuasa produced batteries are marketed through service stations and spare parts outlets.

No battery producer has vertical links to suppliers of material inputs. Given the importance of lead in the production of batteries, the key supplier to both GNB and Century-Yuasa is Pasminco Metals which has its major refinery at Port Pirie, SA. The proximity of the smelter to GNB's Elizabeth plant is of some cost advantage to the company although this would be at least partly offset by shipment costs to major markets.

Barriers to Entry
Several types of barriers were identified in Chapter 2.

Capital barriers
One industry source indicated that a would-be entrant to the industry would need to raise about $30 million to $40 million for a plant of 2 to 3 million unit capacity per year. In addition to production facilities, an entrant may also have to establish a distribution network. This would entail a sales team to bring the new products to the attention of a substantial proportion of an estimated 15 000 to 20 000 automotive battery outlets.

Product differentiation
Product differentiation is a notable feature of battery marketing, reflecting consumer preference for well-known brand names at the expense of lesser known brands. Accordingly, a would-be entrant would either have to establish acceptance of it brand names from scratch or acquire the rights to an existing brand name. Either way, the cost of establishing brand acceptance with the public may be considerable.

Size of the market
The total Australian market is only around 3.8 million batteries per year and, to achieve minimum cost, a plant needs to achieve a throughput of around 2 million units. As the production capacity of Century-Yuasa now is about 1.5 million and the capacity of GNB is about 2 million, the incumbent firms clearly could supply almost all of the market. It would appear that domestic market demand is only sufficient at present to support two optimally sized plants. Any new entrant would need to be geared up for export, have a product or process not available to the other producers or be prepared to undercut the prices of the incumbent firms.

Conclusions
While the capital barriers to establishing production in Australia appear to be modest, the domestic market would not be sufficient to support more than two optimally sized plants (or two producers assuming one plant per producer). In addition, some expenditure may be necessary to establish acceptance of a new brand name. Accordingly, barriers to entry for a third Australian producer would seem at present to be sufficiently prohibitive as to make entry unlikely, unless the would-be entrant possessed some clear cost or marketing advantage over the existing producers or was aiming for considerable export sales.

The substantial rise in imports since 1984-85 demonstrates that entry into the Australian market is not prohibitively costly. The tariff on automotive batteries, 27 per cent from 1 July 1989, is scheduled to fall progressively to 15 per cent from 1 July 1992 (with Developing Country preference, 10 per cent). While a real depreciation of the Australian dollar, and removal of any direct or indirect government assistance to developing country imports which may be in place, would counter the decline in the tariff rate, it seems likely that entry barriers for automotive battery imports will remain relatively low.

7.3 Benefits from the Merger

Background
Before describing the merger in detail some points of background are warranted:

- The Dunlop Group has a long history of growth by merger in Australia. Some of the mergers were clearly horizontal in nature, for example, the Pacific Dunlop/Chloride merger, while others were of a vertical or conglomerate nature.
- Pacific Dunlop had had discussions with the Chloride Group Plc since mid 1983 regarding possible marketing arrangements for the Pulsar battery. In January 1985 Pacific Dunlop acquired a 14.9 per cent holding in the Chloride Group Plc from a CRA subsidiary, Australian Mining and Smelting Ltd. This holding is reported to have made Pacific Dunlop by far the largest single shareholder in the Chloride Group.
- Since the merger Pacific Dunlop has also acquired the US battery manufacturer and distributor GNB Incorporated. As a result of the two acquisitions Pacific Dunlop puts its US market share at 18 per cent and it is now one of the largest producers of batteries in the world. The Chloride merger by itself gave Pacific Dunlop an estimated 4 per cent of the US market.

The merger involved Pacific Dunlop acquiring Chloride Inc of the US (which had US, Canadian and Mexican operations), Chloride Batteries New Zealand Ltd and Chloride Batteries Australia Ltd from the Chloride Group Plc for a consideration of £34.5 sterling (then about $A69 million). The Chloride Group also gained an option to obtain a licence to market the Pulsar battery in the UK, Western Europe, Africa and the Indian subcontinent. The TPC was consulted on the merger and raised no objections.

Expected Benefits
The primary objective of the merger was access to the US market for the Pulsar battery. Accordingly, the company essentially faced five options:

- Remain solely in the Australian market, which was perceived as being too small for the development and marketing of the Pulsar.
- Export from Australia, which was considered not to be viable because of the high costs involved in transporting the batteries to the major markets.
- Enter the US market itself, which, because of the need to gain access to a large number of US outlets, was perceived as a high cost/high risk option.
- Licence an existing US manufacturer, which might have resulted in the licensee simply putting the Pulsar 'on the shelf'.
- Acquire the Chloride Group's US and Australian operations.

GNB indicated that while access to the US market was the main reason for the merger, factors involving the Australian market were also important. Foremost among these was the access it provided to Chloride's extensive service station distribution network. This was expected to result in economies through the rationalisation of State offices and warehouses and, consequently, savings through lower rents, administration and labour costs.In addition, it was considered that the merger would result in improved management and staff skills and that the merged firm would benefit from reduced competition.

The deal also gave GNB possession of Chloride's Elizabeth plant and allowed the closure of the Sandringham plant. The Sandringham plant was unable to work seven days per week because of zonal restrictions, had older plant and equipment and a capacity well below world scale.

Were the Expectations Realised?

With respect to its Australian operations, GNB estimates that its unit costs fell by about 5 per cent in the two years following the merger and have fallen a further 10 per cent since. The company considers that these falls were the result of both the merger and increased productivity and lower costs brought about by the impact of import competition. Further savings are expected to be made as a result of the merger. Estimates have been made of the factors that contributed to the fall in unit cost. These are shown in Table 7.2.

Table 7.2 Contributions to fall in unit costs since the merger

Source of benefit	%
Economies of scale and superior plant	8.5
Other economies of production, distribution and administration	4.0
Economies of purchasing	2.0
Total	14.5

Source: Company data

Economies of scale and superior plant

More than half the savings in unit costs so far have come from economies of scale and superior plant. Following the merger, GNB closed its plant at Sandringham and concentrated production at the lower cost Elizabeth plant which was not as subject to operating hours restrictions. In itself, this larger scale should have reduced unit costs to some extent. GNB has also invested $10 million to upgrade the equipment and has reorganised the layout of the plant to further reduce costs.

Other economies of production, distribution and administration
A further 4 percentage points decrease in unit costs is due to other economies in production, distribution and administration. The most significant of these was the closure of five redundant State offices in the second year following the merger. Before the merger both GNB and Chloride had administration, warehouse and other distribution facilities in five States. Closure of redundant offices is estimated by GNB to have resulted in a 1.5 per cent reduction in unit costs through a saving of 35 to 40 administration staff. Approximately $400 000 was also saved by the elimination of duplicated computer systems.

The dissemination of Just-In-Time production techniques in the Elizabeth plant and elsewhere also contributed to the 4 percentage points decrease.

Economies in purchasing
Economies in purchasing led to a reduction in unit costs of 2 percentage points. These have resulted from the increased buying power of the company and the lower transport costs for lead as a result of the plant being located close to the only supplier.

Access to the US market
As already indicated, the Pulsar is being distributed in the US. Progress in the final stages of the battery's development has not been as rapid as expected at the time of the merger and the company has since found it advantageous to acquire a more significant US producer, GNB Corporation, from which the Australian company takes its name. The acquisition of GNB suggests that the access to the US market may not have been as great as anticipated at the time of the merger with Chloride.

Nevertheless, the access to the US market gained through the Chloride merger has allowed further development of the Pulsar battery in both the US and Australia.

Conclusions regarding expected benefits.
The information supplied by GNB indicates that, on the whole, the benefits it expected from the merger have been realised. Increased import competition from the time of the merger has also had an impact on productivity and cost savings and the separate effects of the merger and increase in import competition are difficult to identify.

Nor should benefits accruing to GNB be equated with benefits to society as a whole. For example, what GNB considers to be economies in purchasing may simply represent a redistribution of income from input suppliers to GNB, with no net savings in resource use.

Impact of the Merger on Productive Efficiency
As indicated in Chapter 2 and elsewhere, an important aspect of the question of whether the merger had net social benefits for Australia is whether the merger resulted in increased productive efficiency, that is, whether the merger led to less input being required for a given output. Cowling *et al*'s(1980) 'k' provides such a measure. In the Cowling framework, an increase in productive efficiency is measured as a reduction in the ratio of inputs used to output produced. A fall in 'k' implies an increase in productive efficiency and vice versa.

An outline of the methodology used by Cowling et al to obtain the 'k' measure is provided in Chapter 2. Further details of the way in which the methodology was applied in this case study are provided in the appendix to this chapter.

Results of the calculation of 'k' are set out in Table 7.3. The measure is standardised so that 1984-85 is equal to 1.00. Clearly, as measured by Cowling's 'k', there has been an unambiguous increase in productive efficiency since 1984-85, with most of the increase occurring from 1985-86 to 1986-87. The measure incorporates all influences on productive efficiency. Accordingly, it does not necessarily follow that that increase is wholly, or even partly, due to the effects of the merger.

In addition to Cowling's 'k', Table 7.3 shows some of the constituent parameters of the measure. These indicate that output prices for GNB's products have remained relatively stable over the period, despite an increase of 22 per cent in input prices. This relatively greater increase in input prices implies a decline in the ratio of output to input prices. The latter can be thought of as the company's terms of trade.

Table 7.3 Cowling's 'k' and constituent measures, GNB, 1984-85 to 1987-88

Index	1984-85	1985-86	1986-87	1987-88
Output	1.00	0.96	1.01	1.08
Input Prices	1.00	1.04	1.17	1.22
Output Prices	1.00	1.00	1.00	1.02
Profits to Revenue	1.00	1.09	1.07	1.23
Cowling's 'k'	1.00	0.96	0.85	0.82

Source: BIE estimates based on company data

Profitability[4], as measured by the profits to revenue ratio, increased by 23 per cent from 1984-85 to 1987-88, indicating that the decline in the company's terms of trade has been offset by productivity improvements rather than reduced profitability. Most of the increase in profitability is from 1986-87 to 1987-88 when production also increased. This suggests that the improved profitability may reflect the 1988 Elizabeth plant reorganisation and investment program.

Based on the Cowling measure, there has been an increase in productive efficiency in GNB's automotive battery operations since the merger with Chloride in October 1985. This is shown more clearly in the first chart of Figure 7.8. Moreover, the increase is robust to reasonable sensitivity variations as shown in the appendix to this chapter. Unlike other case studies, there is no statistically significant relationship between 'k' and output.

How much of this increase, however, should be attributed to the effects of the merger? Caution should be exercised in this judgement. Both the increase in imports and the merger appear to have contributed to the productivity improvements which lie behind the decline in 'k'.

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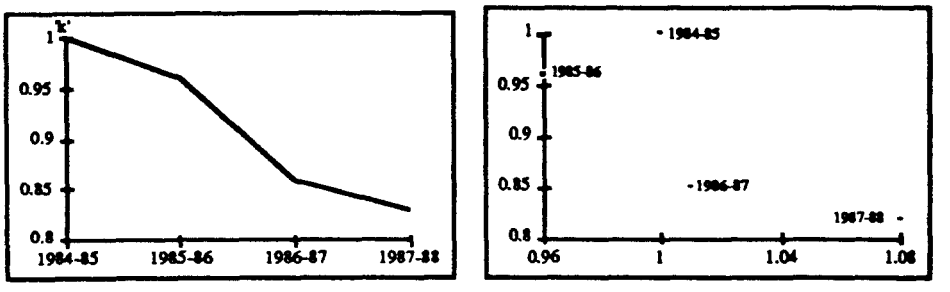
[4] Profits are measured pre-tax and without extraordinary items. Other measures of profitability more pertinent to the financial health of the company's battery activities would not necessarily show the same pattern over time.

The increase in productive efficiency also pre-dates the effect of the merger. An increase in productive efficiency was apparent in 1985-86 but GNB did not begin to integrate Chloride's marketing and distribution with its own until a year after the merger and production was not rationalised until a further year later. Accordingly, there appears to be only one year, 1987-88, in which something like the full effects of the merger would be apparent, and one year, 1986-87, which would be partially affected. As the second chart in Figure 7.8 shows, there is no direct relationship between the volume of output and productive efficiency until these last two years. Any judgement on the effects of the merger on productive efficiency will, therefore, of necessity be made with a small information base.

Figure 7.8 'k' index and 'k' against total output, GNB,1984-85 to 1987-88

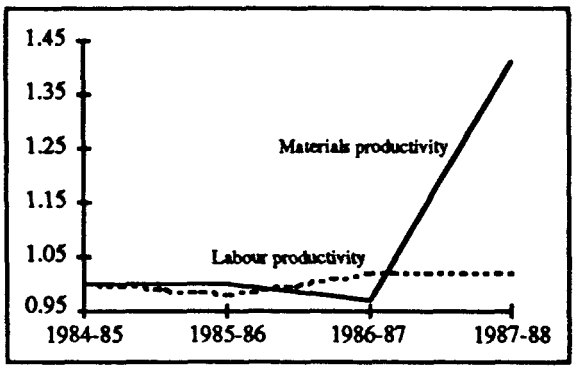


Source: BIE estimates based on company data

Nevertheless, the decrease in 'k' is particularly marked after 1986-87 and it seems reasonable to attribute at least some of this implied increase in productive efficiency to the merger. Moreover, there is no reason on a priori grounds why further increases in productive efficiency from the merger cannot be expected.

In addition to the 'k' measure, partial productivity indicators for labour and materials were calculated. The results are shown in index form in Figure 7.9. These measures broadly confirm the increases in productive efficiency implied by the 'k' measure.

Figure 7.9 Indexes of labour and material productivity, GNB, 1984-85 to 1987-88



Sources: Company data and BIE estimates

Impact of the Merger on Market Power

Chapter 2 identified one of the potential costs arising from mergers as an increase in market power for the merged company. This section addresses the question of whether there is any evidence post-merger of the exercise of increased market power by GNB.

There are a number of facets to market power in addition to the ability to restrict supply so as to raise output price above the competitive level. Other aspects include product quality, product differentiation, and marketing. The objective of this section is to discuss the qualitative evidence on all aspects of market power as it relates to GNB.

Prices

There was general agreement among industry participants that automotive battery prices, including those of GNB, have been stable since the merger. The influence of imports in this regard was noted by many.

There was a suggestion, however, that for those relatively few batteries where GNB could be considered to possess market power, prices have increased by more than the general output price index and possibly more than could be justified by cost considerations alone. It was not possible to pursue the veracity of this suggestion.

GNB is a major customer for the companies supplying lead and polypropylene. The suppliers are significant companies in their own right, however, and it is unlikely that GNB is able to use its position to obtain a favoured position. No organisation consulted suggested that GNB obtained preferential treatment.

Product quality

GNB argued that improvements in product quality flowed from the access to technical and engineering expertise it obtained as as a result of the merger. Opinions on whether Australian-made batteries were superior to imported batteries differed between industry participants but there was general agreement that product quality overall had increased since the merger. No participant contacted by the BIE, apart from GNB, considered that the merger had played a part in bringing the increase about.

Product differentiation

The most notable example of product differentiation since the merger has been the Pulsar battery of GNB. The merger was considered necessary for the battery to be developed fully.

Marketing and distribution

Since the merger, some major oil companies and GNB have entered into contracts for GNB to become the preferred supplier to the service stations of these companies. Some disquiet has been expressed that consumers may find their choices restricted but as there are many outlets other than service stations this is unlikely to be a significant problem.

In addition, one industry participant considered that Pacific Dunlop dominated the tyre market and that this, coupled with the company's position in the automotive battery market, gave it considerable power over the relatively small service station proprietors. It was argued that these smaller battery retailers were afraid of losing access to automotive tyres should they not buy GNB batteries. Again, the large number of retail outlets suggest that this is unlikely to cause problems for consumers.

Summing up, on the basis of the qualitative information provided and the stability of GNB's output prices despite considerable cost pressures, there appears little evidence that GNB has been able to exercise significant market power over prices for automotive batteries. A similar conclusion seems warranted in the markets supplying inputs in the post-merger period.

The qualitative evidence also seems to indicate that the merger has not adversely affected the quality of automotive batteries or increased product differentiation.

The evidence regarding the exercise of market power in other areas is less certain. On balance, GNB appears to have little significant market power and there has been little change since the merger. It also appears that imports have assisted significantly in improving the efficiency in the industry and maintaining competition.

7.4 Summary and Conclusions

This chapter has examined the effects of the 1985 merger of Pacific Dunlop and Chloride. At the time of the merger, the main appeal of Chloride to Pacific Dunlop in Australia was its plant, which was relatively free of operating time restrictions, and its extensive distribution network. Pacific Dunlop also considered that the access to the US market offered by Chloride was vital for the success of its Pulsar battery.

The automotive battery industry has undergone considerable rationalisation in recent years. In terms of assessing the merger, the most significant of these have been:

- The number of firms in the industry has decreased. In particular, two major firms, Besco and Chloride, left the industry in the 1980s.
- The optimum size of plant has increased, with the result that a number of plants have been closed down and the domestic market could now be almost completely supplied by two modern plants.
- Imports have played an increasing role in the domestic market since 1984-85.

By and large, the merger resulted in the benefits to GNB expected at the time of the merger. It was able to combine the State warehousing and distribution functions of the merged companies, with consequent savings in overheads and labour costs. In addition, the company's $10 million investment program and reorganisation at the Elizabeth plant has lifted its capacity and further reduced unit costs.

The main reason for the acquisition of Chloride, access to Chloride's US distribution network for the Pulsar battery, was also fulfilled. The company has benefitted from gaining access to the US market for its technology. There are a number of alternative ways this access might have been obtained and the later acquisition by Pacific Dunlop of the US GNB Corporation suggests that the merger with Chloride might not have been the most efficient.

Assessment of the economic benefits to Australia depends crucially on what would have happened in the domestic market in the absence of the merger. If the merger had not proceeded the following possibilities exist:

- Chloride could have continued its Australian operations as before. This is unlikely given its poor record of profitability in the decade before the merger.
- Another firm could have acquired Chloride's operations. Such a firm could have been already in the industry, such as Besco or Century, or a new entrant. This also seems unlikely as there were no expressions of interest other than that of Pacific Dunlop at the time of the merger.
- Pacific Dunlop could have ceased operations in Australia.
- Chloride could have ceased its Australian operations and the resulting supply shortfall filled by imports and expansion by the remaining domestic producers. On balance, this seems the most likely alternative scenario.

Accordingly, the most likely counterfactual to the Pacific Dunlop/Chloride merger is an industrial structure very much like that which eventuated: one or two domestic firms, with plants of optimum size, facing substantial import competition.

The evidence presented in Section 7.3 indicates that there was substantial improvement in GNB's productive efficiency in the post merger period. The evidence also gives little indication of any increased exercise of market power by the company. These outcomes largely reflect the impact of import competition on increasing productivity, as well as the its more direct significance as a source of market competition.

The question of whether the effects on the economy would have been different had the merger not occurred is complicated by the lack of knowledge of the role of imports in the apparent alternative outcome. If, for example, the supply shortfall in this case was largely filled by imports, and the domestic resources so released were used in industries where output had previously been restricted because of monopoly, the alternative may well have resulted in greater net economic benefits than the merger case. On balance, however, it appears likely that there would be little difference between the longer term economic benefits of the most likely counterfactual and those of the merger.

There are also the shorter term adjustment costs of the two cases to consider. If the merger had not proceeded, the main adjustment costs would have resulted from the closure of the Chloride's Elizabeth plant. In the main these would be borne by the labour displaced from the plant. On balance it seems likely that adjustment costs would have been greater had no merger taken place.

To sum up: the Pacific Dunlop/Chloride merger appears to have achieved the benefits expected by the company. A definitive answer to the larger, more socially important question of whether the merger resulted in net economic benefits is made difficult by the lack of knowledge of the appropriate counterfactual. However, it appears likely that the merger brought net economic benefits, mainly through lower adjustment costs. Import competition also appears to have played a significant role in inducing productivity increases and in minimising any market power which may have resulted from the merger.

Appendix 7.1 Sensitivity Analysis of Cowling's 'k'

In the main, the indexes shown in Table 7.3 were calculated from data supplied by GNB. The company was not able, however, to supply data for overhead cost changes. It was assumed in calculating Cowling's 'k' that these costs increased at the same rate as the CPI. As the latter had a weighting of 25 per cent in the input price index, it was thought desirable to examine an alternative assumption. A conservative, yet plausible assumption, is that there was no increase in overhead costs over the relevant period.

The adoption of this assumption resulted in a decline in 'k' that was less pronounced but still significant. For example, 'k' was equal to 0.88 in 1987-88 instead of 0.82.

It was also thought desirable to to substitute another lead price series in view of the importance of this input in total production costs. The London Metal Exchange (LME) price series for lead, both adjusted and unadjusted for exchange rate changes, was substituted for GNB price data. This test tended to confirm the basic pattern of a declining 'k' and improving productive efficiency in the post-merger period. The decline in 'k' was more pronounced when using the LME adjusted for exchange rate changes.

Implicit Price Deflators for equipment and non-dwelling construction were used as proxies for the firm's depreciation prices in the input price index. These indexes were considered to be the best available measures of the value of the firm's fixed assets consumed in producing its output. Implicit in using these measures is an assumption that the depreciation was on a replacement cost basis.

To the extent, however, that the firm's profits data are based on historic rather than replacement cost, it is likely that profitability will be overstated, Cowling's 'k' understated and, by implication, the firm's productive efficiency overstated. It was therefore thought desirable to apply a sensitivity analysis with the input price for depreciation set at unity throughout the relevant period.

The adoption of this assumption resulted in the basic pattern of a declining 'k' throughout the relevant period remaining unchanged, but with each year's 'k' measure being one percentage point higher.

8. Conclusions

This report has examined the effects of mergers on the Australian economy. The emphasis has been on horizontal mergers but features of other types of merger activity have been discussed where this was considered appropriate.

There are two main issues for examination:

- the effect of mergers on the productive efficiency and international competitiveness of Australian industry (the industry policy objective); and,
- the effect of mergers on competition in Australia (the competition policy objective)

As noted in Chapter 1, there is potential for conflict between these two policy objectives.

At every stage of the research there have been difficulties in obtaining reliable data. This qualification must be borne in mind when the results obtained are being considered. The limitations of the data mean that the results are not as robust as they ideally would be.

Associated with these two policy objectives is an interest in what has been happening to the level of merger activity and the implications of these trends for the structure of Australian industry. Because no precise data on the levels and trends in merger activity are available, they have had to be estimated. Proxies used by a number of researchers and by the BIE have enabled a picture to be built up of trends over the last four decades. This picture is set out in Chapter 3. It shows a long term growth in merger activity, punctuated by sometimes large fluctuations. It also shows a change over time in some of the characteristics of merger activity.

Growth in merger activity could be expected to influence industry structure but, because merger statistics are not available on an industry basis, it is not possible to relate changes in industry concentration to changes in industry merger activity. At an aggregate level, as is shown in Chapter 4, the concentration statistics adjusted for the effects of trade show only moderate growth over the period 1972 to 1986. This is in line with overseas experience.

Even if reliable industry concentration statistics were available, they would have many problems as indicators of the effects of mergers on industry performance. One of the most important is that the relationship between mergers and concentration is unclear. Furthermore, while concentration statistics provide information on the structure of an industry, this structure need bear little relationship to the behaviour of firms in that industry.

Because of the inadequacies of the available data a case study approach was developed to examine the effects of mergers on firms and industries. Three industries in which mergers have taken place in the last decade were examined in considerable depth. The approach adopted was to examine the expectations for the merger that were held by the acquiring firm at the time of the merger and to compare them with the subsequent

developments in the industry. In order to allocate some of these subsequent developments to the effects of the merger, however, it is necessary to know what would have happened in the absence of the merger. Two comparisons were, therefore, necessary:

- the expected benefits with the realised benefits;
- what has happened with what would have happened in the absence of the merger, that is, the counterfactual.

The industries chosen were roof tiles, where two mergers were examined, pastry products, and automotive batteries. These represent a quite diverse range of industry characteristics. For example:

- Demand for batteries is highly inelastic as there are no substitutes. At the other end of the scale, demand for pastry products is highly elastic.
- In terracotta tiles and pies the demand for the product was growing only slowly before the merger.
- In all three industries there are several very large firms but some competition exists either from imports or alternative products.
- The geographic markets for the products are a mixture of local (fresh pastry products), regional (concrete roof tiles) and national (batteries, terracotta roof tiles, frozen pastries). The geographic market barriers are being broken down as transport links improve.
- The batteries and the roof tiles industries are becoming more international in their outlook while the pastry products industry has little contact with overseas markets.
- In roof tiles and batteries, the technology of the main product was mature and the merger opened up avenues for the introduction of new technology. In roof tiles this technology was imported but in batteries, the new technology was developed in Australia for application overseas.

Despite these differences, the outcomes of the mergers have been remarkably similar. In each case it is not at all clear that the merger made a great deal of difference to the structure of the industry in the long run or to the degree of competition faced by the firm in the industry. There have been many changes in demand and supply conditions affecting the structure of the industry. The impact of the mergers appears to be relatively small in comparison with all these other factors.

Since the roof tiles mergers, for example, on the demand side there has been a shift away from concrete tiles towards terracotta tiles and steel roofing. On the supply side there has been a new entrant in the terracotta tile market, new terracotta tile technology, advances in steel roofing technology and a broadening of the geographic boundaries for roofing materials as transport costs have fallen. Few of these factors could have been foreseen at the time of the mergers, yet each has had a substantial impact on the structure of the industry, the pricing and other behaviour of the firms in the industry, and the degree of competition faced by firms in the industry.

Moreover, the Monier/Wunderlich merger was possibly the least costly means of allowing Wunderlich to leave the industry.

Only in the pastry products industry did the merger have any widely acknowledged direct impact on the behaviour of firms. The merger was seen in the industry as an attempt by Petersville to become more efficient. This has put pressure on other firms to improve their own productive efficiency.

It is arguable, however, that changes similar to those now occurring in this industry were inevitable and that the merger merely brought forward this adjustment. The industry was facing low growth in demand for fresh products and several firms had been in difficulty for some time. Had the merger not occurred, it is likely that one or more of these failing firms would have left the industry, leaving the way open for the remainder to increase their market share and their productive efficiency.

Similarly in the batteries industry, the trend towards larger plants and increasing imports were making change in the structure of the industry inevitable. The merger between Pacific Dunlop and Chloride brought these adjustments forward, possibly making the adjustments more efficiently than would otherwise have been the case.

The main benefits expected by the firms to arise from the mergers were in the form of economies in production, distribution and administration. These expectations were not always fully realised, mainly because of the unforeseen changes in market conditions noted above. Changing demand patterns, changes in technology, changes in barriers to entry and increasing competition from imports all had an impact.

The effects of these unforeseen changes was least apparent in the automotive batteries industry, where the technology and the demand patterns were well established and have changed little since the merger. Nevertheless, imports have increased and a new domestic producer has become established in the period since the merger.

Another reason expectations were not always achieved was that the firms appear to have been overly optimistic or underestimated the difficulty involved. All the mergers have taken longer than anticipated to settle down. The roof tiles mergers were the easiest in this respect as only administrative and marketing changes occurred. Nevertheless, it was more than a year before the operations of Monier and Wunderlich were fully integrated. In pastry products, the plant from one factory had to be moved to another site and integrated with existing equipment. In batteries, a factory had to be closed and another refurbished and two quite different distribution networks integrated. In pastry products it has taken three years and in batteries it took at least two years for the operations to begin to provide benefits.

All the merged firms, except Boral, have had to undertake considerable investment since the merger to begin to achieve the expected benefits. Much of this investment has been unanticipated. Monier, for example, upgraded the technology at the Wunderlich plant to an extent that it had not considered would be necessary before the merger. Pacific Dunlop had not anticipated that it would need to refurbish completely the Chloride factory. Nor had it anticipated that it would make another acquisition, the GNB Corporation, for it to achieve is expectations in the US.

No precise measure of changes in the productive efficiency of the operations of the firms was possible because of the inadequacies of the data. The estimates that were made support the findings outlined above, that is, it was found that there was a substantial lag between the merger and any apparent increases in productive efficiency

and that other factors have had at least as great an impact on productive efficiency as the mergers. For example, the greatest increase in productive efficiency was in the automotive batteries industry but a major cause of this increase appears to have been competition from imported batteries.

Indications of changes in market power since the mergers were sought from other industry participants, and customers and suppliers of the merged firm. The overall impression was that any change in the market power of the merged firms since the mergers has been towards a reduction. As was noted above, changing demand patterns, changes in technology, changes in barriers to entry and increasing competition from imports have all worked to reduce any market power the firms might have gained from the mergers.

One of the implications of the automotive batteries case study is that a reduction in barrier protection can have a considerable impact on both the degree of competition in the domestic market and the productive efficiency of domestic firms in traded goods industries. The trade-adjusted concentration data also suggest that import competition can have a significant effect on industry structure.

To sum up, two main points arise from this study. Firstly, mergers are just one of the many forces acting on industry structure and the degree of competition. The impact of mergers in the industries studied appears to have been relatively minor. In particular, the automotive batteries case study showed that import competition can play a role in minimising market power and inducing increased productivity in a traded goods industry with few domestic competitors. Secondly, for the same reason, expectations about the effects of mergers which are made at the time of the merger are unlikely to be fully realised. So many of the forces which will affect industry structure cannot be foreseen by the firms involved.

For industry policy, the case studies suggest that mergers may not produce all the efficiency benefits expected. They may generate benefits to the economy by bringing forward inevitable changes in industry structure but there are many other factors which determine the international competitiveness of an industry. One of the most important of these factors is the presence of competition. In the case studies the main influences on competition were found to be changes in demand patterns, technology and barriers to entry.

The major implication for competition policy appears to be that estimates of potential costs in terms of increased market power and claims regarding expected benefits made at the time of the merger should be treated with considerable caution.

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