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***Industrial Concentration and Competition in
Indonesian Manufacturing***

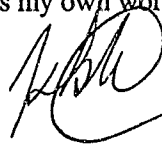
Kelly Bird

A thesis submitted for the degree of
Doctor of Philosophy
of The Australian National University

January 1999

Declaration

Unless otherwise indicated this
thesis is my own work

A handwritten signature in black ink, appearing to read 'Kelly Bird', written in a cursive style.

Kelly Bird
January 1999

Dedication

To my wife,
Liliana Iskandarsyah

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Abstract

This thesis examines the interrelationship between market structures, firm rivalry, and government intervention in the Indonesian manufacturing sector over the period 1975 to 1995. Two empirical methodologies are used in this study. First, the Structure - Conduct - Performance (S-C-P) approach to industrial organisation provides the basic framework for our analysis in the first part of the study. The second research methodology is industry case studies. Two industry studies presented in this study are cigarettes and cement.

The study begins with an overview of the evolution of Indonesian trade and industrial policies and the salient features of the manufacturing sector. An analysis of the trends in seller concentration over the period 1975 to 1993 is also provided. The descriptive analysis on seller concentration shows that there is a long-term declining trend in industrial concentration, particularly in those industries that were highly concentrated in the mid-1970s. This provides the backdrop into subsequent statistical analysis of the interrelationship between concentration and other aspects of structure and performance. For this purpose, we specify and estimate a simultaneous equations model of industry structure, conduct and performance. The interrelationships among six key variables (concentration, profitability, foreign ownership, export intensity, import penetration and trade policy) are estimated for two different policy periods; (1) pre-1986 period of heavy trade and industry policy intervention, and (2) post-1986 period of trade and industry liberalisation.

A number of interesting findings emerged from the analysis. Trade protection, interacted with seller concentration, was a major determinant of high profitability in concentrated industries in the pre-liberalisation period. This relationship significantly weakened as a result of the late 1980s trade liberalisation. High concentration had a positive influence on effective trade protection, providing some support for the interest group model, which asserts that highly concentrated industries find it easier to lobby government for protection. However, the level of concentration had no

significant influence on export intensity or import penetration over and above the other variables considered in the analysis. Finally, our results suggest that market structure factors (economies of scale, capital costs, product differentiation, market size and regional market segmentation) are the major determinants of industrial concentration in Indonesian manufacturing. We could not find a direct relationship between trade policy, regulation and concentration. These insignificant results probably arise due to limitations inherent in cross-sectional tests of the effect of trade policy and regulation on market structure. We tested the effect of international influences (export intensity, import penetration and foreign ownership) on concentration. However, the results turned out to be statistically insignificant in both the pre - and post-liberalisation periods. The study extends the analysis to include the determinants of changes in leading firms' market shares. Changes in market shares are a good indicator of firm rivalry. The results show that regulations in several industries are associated with stable market shares, suggesting that they have reduced competition in these industries.

The second part of thesis presents two industry case studies. The focus of the case studies is on the nature of competition among firms, and the influence of regulation on this process. In cement, until the industry was deregulated in 1998, government regulations – distribution and price controls – had created a market structure that closely resembled a cartel. The second case study is cigarettes. This study estimates the effect of advertising expenditure on seven leading firms' market shares, using monthly advertising and market share data. Our results show that advertising competition reallocates sales between leading firms. An important finding of our study is that an equal percentage increase in advertising by all firms will change the distribution of market shares in favour of the more successful, larger firms in the long-run. This arises because larger firms have an 'image advantage' over the smaller firms. This image advantage is an asymmetry that constitutes a barrier to upward mobility of smaller, less-favoured existing firms.

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Glossary and Abbreviations

AII	Absolute Instability Index
ASEAN	Association of Southeast Asian Nations
ASI	<i>Asosiasi Semen Indonesia</i> , Indonesian Cement Producers Association
ASIC	Australian Statistics Industry Classification
BAPEKSTA	<i>Badan Pelayanan Kemudahan Ekspor dan Pengolahan Data</i> , Agency for the Administering of Import Duty Drawback and Exemptions
BIES	Bulletin of Indonesian Economic Studies
BKPM	<i>Badan Koordinasi Penanaman Modal</i> , Capital Investment Coordinating Board
BPPC	<i>Badan Penyangga dan Pemasaran Cengkeh</i> , Clove Trading Agency
BPS	<i>Badan Pusat Statistik</i> , Central Bureau of Statistics
BULOG	<i>Badan Urusan Logistik</i> , the government's food procurement agency
CR4	Four-Firm Concentration
ERP	Effective Rate of Protection
FDI	Foreign Direct Investment
GAPPRI	<i>Gabungan Perserikatan Pabrik Rokok Indonesia</i> , Indonesian Cigarette Producers Association
GDP	Gross Domestic Product
HC	Human Capital
HPS	<i>Harga Pedoman Setempat</i> , Reference Retail Price For Cement
HJP	<i>Harga Jual Pabrik</i> , Reference Ex-Factory Price For Cement

IMF	International Monetary Fund
ISIC	International Standard Industrial Classification
JV	Joint Venture
<i>Kretek</i>	Clove-Flavoured Cigarettes
KUD	<i>Koperasi Unit Desa</i> , Village Cooperative
LDC	Less Developed Countries
LI	Labour Intensive
<i>Malari</i>	<i>limabelas Januari</i> , refers to a riot in Jakarta on January 15, 1974
MNC	Multinational Corporation
MVA	Manufacturing Value Added
New Order	Refers to the period since the commencement of President Soeharto's rule, generally taken from March 1966
<i>Non-pribumi</i>	Non-indigenous (mainly ethnic chinese)
NICs	Newly Industrialising Countries
NRP	Nominal Rate of Protection
NTB	Non-Tariff Barrier
<i>Pertamina</i>	State-Owned Oil Company
PC	Physical Capital Intensive
PT	<i>Perseroan Terbatas</i> , Limited Liability
R&D	Research and Development
RERP	Real Effective Rate of Protection
RI	Resource Intensive
SOE	State Owned Enterprise
SITC	Standard International Trade Classification
SKM	<i>Sigaret Kretek Mesin</i> , Machine-Made Kretek
SKT	<i>Sigaret Kretek Tangan</i> , Hand-Rolled Kretek
SPM	<i>Sigaret Putih Mesin</i> , Machine-Made White Cigarettes
SRI	Survey Research Indonesia
<i>Tata Niaga Impor</i>	Approved Importers System

TI	Technology Intensive
UNIDO	United Nation Industrial Development Organisation
WP	Wood-Based Products
WPI	Wholesale Price Index

Notes: unless otherwise specified, all \$ refer to US\$

Chapter 1

Introduction

1.1 Background

This thesis examines the interrelationship between market structures, firm rivalry, and government intervention in the Indonesian manufacturing sector over the period 1975 to 1995. This study covers the period prior to the financial and banking sector crisis that erupted in mid-1997, and resulted in the IMF and Indonesian government Structural Reform programme. Two empirical methodologies are used in this study. First, the Structure - Conduct - Performance (S-C-P) approach to industrial organisation provides the basic framework for our analysis in the first part of the study. The S-C-P framework is a very useful tool in industrial analysis. However, there are practical limitations in using this framework to examine competition. In particular, the approach is limited in its ability to test different forms of market behaviour that are possible for each market structure (apart from pure competition). For example, behaviour in an oligopoly can range between price collusion and price competition. This motivates the second research methodology – industry case studies. The two industry studies presented in this study are cigarettes and cement.

The study of market structures and competition is an important topic. Economic theory and experiences of many countries show that strong domestic competition brings substantial benefits to the economy, such as improved competitiveness of industry, increased consumer welfare, long-term growth in employment and incomes, and promotes adaptability of the economy. It is well established in the literature that domestic competition is one of the critical factors contributing to competitiveness of domestic markets. If firms compete with one another (and with imports) in domestic markets for consumers by offering products of lower prices, higher quality and better

services, then they are likely to be able to do so successfully in international markets. By improving competitiveness, competition fosters long-term economic growth and maximises consumer welfare. Consumers benefit from lower prices and higher quality products and services. Competition also promotes adaptability of the domestic economy. Competition prepares businesses to make structural adjustments necessary to respond to changing market conditions. There is now a growing body of evidence that economies with strong domestic competition are better placed to adjust quickly to changing global market conditions.

The motivation for the study of market structures and competition in Indonesian manufacturing is twofold. First, a popular view of the Indonesian economy is that seller concentration is relatively high and on the rise, and that the recent policy reforms have done little to reverse this trend. Consequently, highly concentrated industries are presumed to be monopolistic and therefore anti-competitive. This view is uncritically accepted and widely disseminated by authors of the non-professional (and sometimes professional) literature on the subject. However, in recent years the debate has intensified, as reflected in the extensive coverage of the subject in the Indonesian media and numerous seminars on competition policy. The World Bank added new impetus to the debate in two separate reports in 1994 and 1995. In both reports, The World Bank noted that industrial concentration in Indonesian manufacturing is very high by international standards, indicating a lack of competition at the producer level. The reports also noted that a major source of anti-competitiveness in these industries is regulatory constraints on domestic rivalry.

Recent research in Indonesia has primarily focused attention on measuring changes in industrial concentration levels over a relatively short period of time. No studies have identified the determinants of seller concentration and estimated their influence on concentration levels in Indonesian manufacturing. Simandjuntak (1991) was one of the first economists to examine concentration over time, and noted a declining trend in industrial concentration between 1983 and 1987. Econit¹ (1995) recently showed that levels of industrial concentration have increased for several industries over the period 1988-92. This attempt to examine trends is misleading because only short-run

¹ Econit is a high profile Jakarta-based economic and business consultancy founded by Dr. Rizal Ramli.

changes are examined. Little information is conveyed about the long-term trend in the levels of concentration or the pattern of change in the levels of highly concentrated industries from a four year period. A much longer time period is needed to extract more reliable information. This is important because competition is a long run phenomenon and concentration levels in the short run often fluctuate around their long-term trend. In fact, by examining concentration trends over the period 1975 to 1993, our analysis shows that there is a longer term declining trend in average concentration. The slight increase in concentration between 1988 and 1992 could either be a short-term fluctuation around the long-term trend or it could reflect the impact of trade liberalisation beginning to show up in import-competing industries.

The second motivation for the study is that Indonesia's industrialisation experience provides us with a good case study of market structures and competition in a rapidly developing economy. The manufacturing sector has expanded rapidly over the last 20 years, and many market structures are not yet "stabilised" to the degree that is found in mature industrial economies. This provides us with the opportunity to examine changes in market structures during industrialisation. In particular, we examine the direction and magnitude of the change in seller concentration in Indonesian manufacturing, the underlying forces of this process, and its relationship with other important policy and economic variables including regulation, trade policy, international influences and industry profitability.

Substantive trade and industry policy liberalisation was also introduced over the last decade. During the period 1975 to 1986, the Indonesian government's strategy of industrial deepening was given high priority. By the early 1980s there was a proliferation of tariff and non-tariff barriers and industrial licensing was widely used to protect domestic firms from both import and domestic competition. The plunge in oil prices in 1986, coupled with the persistent slow growth period between 1982 and 1986, forced the government to embark on a substantive trade, industry and financial sector liberalisation programme. Tariff rates were significantly reduced, and most quantitative import restrictions were replaced by tariffs. Deregulation of the industrial sector eliminated many of the restrictions on new investment including foreign investment. While the pace and extent of market-oriented economic reforms in

Indonesia since 1986 have been remarkable, many of the government-sanctioned monopolies and cartel arrangements, as well as other 'sensitive' regulated sectors – plywood, cement, fertiliser, processed sugar, wheat flour milling, BULOG, aircraft manufacturing, steel – remained relatively untouched. Indonesia's liberalisation experience provides us with a unique opportunity to examine the impact of past and current policies on market structures and domestic rivalry.

1.2 Methodology

As indicated above, two empirical methodologies are adopted in this study. In Part A of the study, the Structure-Conduct-Performance (S-C-P) approach to industrial organisation provides the basic framework for our analysis. In Part B of the study, the research methodology is industry studies.

Part A: Structure-Conduct-Performance Model

The essence of the S-C-P approach, in its original form, is that certain *intrinsic* structural variables (called basic conditions by Scherer, 1980) determine market structure, and that there is a unidirectional flow of causality running from market structure through conduct to performance. Recent literature has emphasised the complexity and interdependence of these three components of industrial organisation (Schmalensee, 1989). In other words, in such markets there may not be a simple line of causality running from structure through behaviour to performance; in certain circumstances, the line of causality may be reversed. Thus, the elements of structure, conduct and performance can be jointly determined in a given market.

The recognition of the interdependence of various aspects of market behaviour has resulted in the use of the simultaneous equations models rather than single equation models in recent studies (Chou 1986). Following these studies, we specify a simultaneous equations model consisting of six endogenous variables and, therefore, six equations. The endogenous variables are seller concentration, industry profitability, import penetration, export-orientation, foreign-ownership and trade policy measured by effective rates of protection. The model includes all the industry-

level variables that we deem to be relevant to the conditions of Indonesia's manufacturing sector, and are available. These are variables previously subject to investigation in industrial organisation, either because they indicate normatively important dimensions of resource allocation or because the theory of markets identifies them as important structural determinants of those performance dimensions.

The two stage least square (2SLS) technique is used to estimate the structural model under the two different policy regimes: (1) the pre-1986 heavy interventionist trade and industry policy regime, and (2) post-1986 trade liberalisation period. The 2SLS technique is an econometric technique commonly used to estimate simultaneous equations models. For this purpose a data base of 67 four-digit ISIC manufacturing industries for the years 1985 and 1993 is constructed from a variety of sources including the annual manufacturing surveys and input-output tables. The year 1985 proxies the pre-trade liberalisation period and the year 1993 proxies the trade liberalisation period. Unavailable data for some of the endogenous variables (e.g., effective rates of protection) and exogenous variables for other years restricts the estimation of the model to the use of 1985 and 1993 data.

Dynamics of Leading Firms' Market Shares

A major limitation of seller concentration statistics is that they are static measures of competition; they simply record the characteristics of a size-distribution at some particular point in time. Recent literature has shown that previous studies of seller concentration, including studies emphasising changes in seller concentration, conceal much of the nature of the underlying competitive process (Davies and Geroski, 1997). Recent studies of Canadian and the British manufacturing show that persistently high concentration ratios can be found along with considerable instability in market shares of leading firms (Baldwin and Gorecki, 1994; Davies and Geroski, 1997). Industrial organisation theory tells us that if the identity of the dominant firms were to change over time then even persistently high levels of concentration would not necessarily imply the absence of competitive forces (Schmalensee, 1989). According to Geroski and Toker (1996), turnover in firms' rankings provides at least some useful information on the 'vibrancy' of the competitive process, and turnover-based

measures of competition [i.e. changes in market shares] may reflect the dynamics of the competitive process more accurately than conventional static measures of competition.

The study extends the analysis of market structures and competition to include turnover in leading firms' rank and market shares. While there are several studies of this kind for industrialised countries, there are no such studies for developing economies known to the author. Thus, our study is the first to examine market share dynamics in a developing economy. The purpose of this exercise is twofold. First, we wish to measure the magnitude of changes in leading firms' market shares and determine whether persistently high levels of concentration can be found along with considerable instability in leading firms' market shares in Indonesian manufacturing. If so, then competition would be *prima facie* stronger in Indonesian markets than concentration ratios would suggest. For this purpose, we construct a data set for a sample of industries from the annual manufacturing surveys. The data set records the changes in firms' rank and market shares in each industry between 1985 and 1993. Our results show considerable variation in the magnitude of changes in leading firms' market share in concentrated industries. The second purpose is to identify the determinants of changes in leading firms' market shares and to estimate their influence on the observed changes for our cross-section of 67 manufacturing industries during the period of trade liberalisation, 1985 to 1993.

Major Findings of the S-C-P Model

Estimation of the structural model has produced a substantial volume of empirical results. Limited space prevents us from summarising all findings in the introduction. We do this in Chapters 7 and 8. Here we present the major findings for two equations of the model, industrial concentration, industry profitability and market share instability.

Concentration

Our major results suggest that market structure factors are the major determinants of industrial concentration in Indonesian manufacturing: the coefficients of the economies of scale, absolute capital requirements, industry size, regional market fragmentation, and product differentiation variables all have the expected significant relation with concentration. We could not find a direct significant relation between trade policy and concentration, either in 1985 or 1993. This result may arise because trade policy affects concentration indirectly through other variables such as economies of scale and capital costs. In the model we included a dummy variable for industries with regulations restricting competition. However, we could not find a significant relation between concentration and the regulation dummy variable. Like the trade policy variable, regulations may affect concentration through other variables in the model. The coefficients of the international trade variables (exports and imports) were not statistically significant. The result for export-orientation arises because export-oriented and unconcentrated industries share common structural characteristics, namely low barriers to entry, and it is the barriers to entry variables that are dominant in the concentration equation. Finally, foreign and state ownership of industry does not have significant effects on industrial concentration over and above the other variables considered in the analysis. This result can also be explained by the fact that foreign direct investment (FDI), state ownership and concentration share common structural characteristics, namely high capital costs and economies of scale. State investment in capital-intensive industries such as fertiliser, steel and cement arises from government strategic imperatives.

Profitability

Our analysis of the determinants of industry profits is consistent with the well established proposition that higher levels of concentration lead to higher profitability. The results also show that it is in the more protected industries that concentration has a greater impact on industry profits. The study also provides evidence that this positive association has weakened since the 1980s policy reforms, establishing a direct link between trade liberalisation and industry profits in concentrated industries.

The reduction in protection reduces excessive profits in concentrated industries.

Changes in Leading Firms' Market Shares

Several empirical findings derived from estimation of the market share model provide invaluable insights into the competitive process, and how government policies impact on this process. First, our estimation results show that government regulations in a selected number of industries - sugar processing, beverages, cooking oil, fertiliser, cement, and steel - constrain domestic rivalry. This provides a direct link between deregulation and competition. Removing regulatory constraints on firm behaviour should trigger rivalry among firms in these industries. However, trade liberalisation (measured by changes in real effective rates of protection) does not appear to have disturbed market shares, except in export-oriented industries. Second, there is no evidence that MNCs have any impact on domestic rivalry over and above the other variables considered in the analysis. This result provides some basis for rejecting the proposition that large MNCs' business practices reduce market rivalry in the host (developing) country's markets. Finally, the results of most of the other industrial organisation factors tend to be consistent with studies for other countries. Market shares tend to be more stable in highly concentrated industries, all other things being equal. Rapid growth in industry destabilises market shares, while large absolute capital requirements constitute a barrier to entry and upward mobility, thereby insulating leading firms' market shares.

Part B: Industry Studies

The structure-conduct-performance framework is a very useful tool in industrial analysis. However, there are limitations to its practical usefulness. In particular, the S-C-P framework is limited in its ability to estimate the effects of different forms of market behaviour that are possible for each market structure (apart from pure competition). The S-C-P approach is also limited in its ability to estimate the different impacts of government policies on structure, conduct and performance. Moreover, recent theories of firm strategic behaviour and game theory are not easily amenable to testing within the S-C-P approach (Schmalensee, 1989). There are also problems

associated with cross-sectional tests of market behaviour and government policies. Generally, one should approach a cross-sectional test of the effect of protection and regulation on seller concentration cautiously, because protection and regulation may take time to affect market structures. This may partly explain the poor performance of these variables in the concentration equation. This motivates our second research methodology – industry case studies using primary time series data and applying recent advances in industrial organisation theory and statistical methods. This case study approach is now increasingly used in industrial organisation studies (See, for example, Bresnahan, 1987).

Two industry studies are presented in this thesis. They are cigarettes (advertising) and cement (cartel practices). The case studies are undertaken to explore aspects of firm rivalry and policy not adequately captured in the S-C-P approach, in addition to their general interest in the field of industrial organisation. Both industries have high levels of seller concentration (see Table 1.1). However, the two industries differ in the extent of government intervention in the industry, the nature of rivalry among firms and the competitive outcome. Data on the two industry studies, both quantitative and qualitative data, were collected during my fieldwork in 1995. The data collected from firm interviews, producer associations and various other sources are described later in the study.

Table 1.1

Characteristics of the Industry Case Studies

	Cigarettes	Cement
<i>Importance of the Industry: % Share of MVA^a</i>	9.9	1.5
<i>Market structure</i>	Oligopoly with a competitive fringe	Oligopoly
<i>Technology</i>	Both capital and labour-intensive technologies are used	Capital-intensive
<i>Product Characteristics</i>	Consumer good Product differentiation	Producer good Homogenous Regional-markets
<i>Regulations</i>	FDI entry restrictions, Import tariffs, Differential minimum retail prices and excise taxes, Clove monopoly	Distribution controls, Price controls
<i>Nature of Competition</i>	Intense advertising competition	Cartel-like practices
<i>IMF programme</i>	Cloves monopoly disbanded in June, 1998.	Distribution and price controls eliminated in February 1998

MVA indicates non-oil/gas manufacturing value added.

Industry Study 1

Advertising Competition in the Cigarette Industry

Advertising is the major instrument of competition among large firms in the cigarette industry. This study estimates the effect of advertising expenditure on seven leading firms' market shares, using monthly advertising and market share data from August 1992 to October 1995. These seven firms account for over 90 per cent of total market sales and 90 per cent of total industry advertising expenditure. Our study differs from previous research on advertising for other countries on at least three grounds. First, we employ recent advances in time-series analysis that allow us to separate the long-

run relationship between advertising and market share from the short-run impact in the estimated equation. Second, we use monthly advertising and market share data which are considered more appropriate than annual data in these kind of studies (Clarke, 1976; Landes and Rosenfield, 1994). Finally, unlike most other studies, our data set has time series sufficiently long to support a regression analysis for a single firm. This allows us to investigate whether the success of advertising differs among firms.

Our results show that advertising competition reallocates sales between leading firms. Increases in own advertising expands market share in four of the seven firms. Increases in rivals' advertising reduce market share in three of the seven firms. An important finding of our study is that an equal percentage increase in advertising by all firms will change the distribution of market shares in favour of the more successful, larger firms in the long-run. This arises because larger firms have an 'image advantage' over the smaller firms. This image advantage is an asymmetry that constitutes a barrier to upward mobility of smaller, less-favoured existing firms.

Industry Study 2

Regulation and Competition in the Cement Industry

This case study analyses the role of government policies in shaping the structure of the cement industry and the nature of competition among firms. In Indonesia, cement is considered a 'strategic' commodity because of its importance to the construction sector and the importance of that sector to economic development. As a result, there is substantial public sector investment in the industry. Five of the nine producers are government-controlled firms.² These firms produced around 38 per cent of total cement production in 1994. Until 1998, when the industry was deregulated under the IMF Structural Reform programme, the industry was heavily regulated. There were regulations governing the distribution of cement, both domestically and for exports, and the setting of reference retail prices.

The official objective of the regulatory regime was to ensure a continuous supply of

² In this study, whenever we use present tense we refer to the mid-1990s.

cement to all provinces at reasonable and stable prices. The analysis of this study shows that the distribution arrangements had limited success in ensuring a continuous supply at stable prices in the face of cyclical demand for cement. Rather, the government regulated distribution arrangements exacerbated price instability by reducing the contestability of regional markets, deterring new entry and erecting non-tariff barriers to competing imports. Administrative allocation of supplies prevented cement from other regions, including imports, entering to dampen price increases when demand rose. Under such circumstances, producers and distributors earned additional profits without the threat of other producers penetrating their regional markets. The distribution arrangements resembled a cartel. Regional markets and market shares were allocated among firms. The cement producers association and the Department of Industry and Trade monitored compliance with the distribution system by acting as 'trading posts' whereby market information – market shares, export and import data – were collected by them and widely disseminated among producers. Administered retail prices acted as floor prices during periods of excess capacity.

1.3 The Financial Crisis and the IMF Structural Reform Programme, 1998

Our study focuses on industrial structure, government policies and competition during the period 1975 to 1996. At the time of completing the thesis, the banking and financial crisis erupted in Indonesia and other countries in the region. The massive drop in the rupiah during 1997/98 and the ensuing capital flight and severe banking sector crisis led to a series of agreements between the Indonesian government and the IMF, World Bank, Asian Development Bank, and major donors for a structural reform loan programme of US\$43 billion. The programme is comprehensive, covering trade and industry, the banking and financial sectors, and commercial laws and institutions. Measures announced under the programme deal with many of the remaining restrictions on trade and industry. These include removing the statutory basis of several monopolies and cartels mentioned above including cement, cloves, and plywood. All non-tariff barriers, except for those based on health, safety, environmental and security reasons, will be eliminated by the end of the programme period (year 2003). All tariff rates, with a few exceptions, are to be reduced below 10 per cent by the end of the programme. Also relevant to competition policy, the

Indonesian government agreed to draft and to submit to Parliament a competition law by December 1998.

Successful implementation of these reforms will make the Indonesian economy one of the most open in the region, and enhance the competitive environment and overall efficiency of domestic markets. However, the events surrounding the agreements and the financial crisis in early 1998 are testimony to the powerful vested interests that resisted some of these reforms in the early stages of the programme.³ For example, shortly after President Suharto signed the second IMF agreement on January 15, the clove monopoly and plywood cartel, with the government's apparent approval, introduced measures that attempted to circumvent the agreed reforms. The plywood cartel continued to insist that exporters provide the plywood association with export documents, presumably so they could monitor firms' export shares. They also imposed a fee of US\$50 per cubic meter of plywood to cover the cost of so-called 'data collection' in place of the abolished cartel fee of a similar amount. In cloves, the Minister of Cooperatives and Small-Scale Industries overseeing the monopoly announced a new scheme that would essentially preserve the monopoly.

These actions along, with other examples of resistance to reforms in banking and industry, were widely reported in the local media and were viewed by investors and the general public as an attempt by vested interests to resist the IMF reforms. This created doubt over the Government's commitment and administrative capacity to implement reforms successfully and, coupled with an expansionary monetary policy at the time exacerbated the rupiah's fall (the rupiah hit a low of Rp17,000/US\$ in late January, down from around Rp6,000 at the end of December, and Rp2,600 in July 1997).⁴

The deepening economic crisis – the economy contracted by an estimated 7 per cent in the first quarter of 1998 over the corresponding period in 1997 – set the stage for growing opposition to President Suharto. Widespread student protests and the killing

³ See Soesastro and Basri (1998) for a discussion on the financial crisis and implementation problems with the IMF structural reform programme in early 1998.

⁴ The money base expanded by around 60 per cent between November 1997 and February 1998, essentially financing capital flight during this period (BI Monthly Financial Report, various issues 1998).

of four Trisakti University students by security forces on May 14 culminated in violent riots in Jakarta a few days later and President Suharto's resignation on May 21.

1.4 Organisation of the Thesis

The organisation of the thesis is as follows.

Part A: Structure-Conduct-Performance Analysis, Chapters 2 to 8

Chapter 2 presents an overview of the trade and industry policy reforms implemented since the mid-1980s, and provides a backdrop to our subsequent analysis on the interrelationships between market structures, competition and government trade and industrial policies during this period.

Chapter 3 provides an overview of structural transformation in the Indonesian manufacturing sector over the last 25 years. The Chapter also describes the salient features of the manufacturing sector, including pattern of ownership, size distribution, and export-orientation of firms by ownership type.

Chapter 4 provides an overview of industrial concentration levels and concentration trends in 102 four and five-digit ISIC industries over the period 1975-93. The descriptive analysis enables one to gauge the magnitude, direction, and pattern of concentration change that has occurred among these industries and provides a backdrop for the statistical analysis of the underlying factors explaining the observed levels of concentration and its effect on other aspects of market structure and performance in Chapter 7.

Chapter 5 presents the Structure-Conduct-Performance framework adopted in the study and specifies a structural model. The salient features of the structure-conduct-performance model are discussed in section 5.2. It shows that many aspects of market structure, international linkages, government policy, conduct and performance are jointly determined. In section 5.3 a structural model explicitly incorporating these interrelations is developed for the purpose of the empirical analysis in Chapter 7.

Chapter 6 describes the database and provides a discussion of the measurement of the variables of the structural model developed in the preceding Chapter. The 2SLS

econometric procedures used in the estimation of the model are explained.

Chapter 7 analyses the estimation results of the structural model specified in Chapter 5 for a cross-section of 67 industries. The model is estimated under two different trade and investment policy regimes. The regression results presented in the Chapter are the statistically robust 2SLS results.

Chapter 8 analyses changes in leading firms market shares between 1985 and 1993. First, we measure the magnitude of changes in leading firms' market shares and determine whether it is the case for Indonesian manufacturing that persistently high levels of concentration can be found along with considerable instability in leading firms' market shares. Second, we identify the determinants of changes in leading firms' market shares and estimate their influence on the observed changes for our cross-section of 67 manufacturing industries.

Part B: Industry Case Studies, Chapters 9 to 11

Chapters 9 and 10 examine competition in the cigarette industry. Chapter 9 provides an overview of the development of the Indonesian cigarette industry over the last three decades. The descriptive analysis enables one to gauge the linkages between competition, government policy and industrial structure over time, and provides a backdrop for the statistical analysis into the effects of advertising competition on firms' market shares in Chapter 10

Chapter 11 analyses regulation and competition in the cement industry. The Chapter is divided into two sections. The first section presents an overview of the development of the cement industry over the last 30 years, and describes the demand conditions of the industry and the structure of the market. The second section presents an analysis of the impact of government policies on the structure of the industry, the nature of competition and cement prices.

Chapter 12 summarises the major findings of the study and provides a discussion on future directions of competition policy in Indonesia with reference to the recent IMF structural reform programme. Implications for future research are also discussed.

Chapter 2

Overview of Trade and Industry Policy

2.1 Introduction

This Chapter presents an overview of the trade and industry policy reforms implemented since the mid-1980s, and provides a backdrop to our subsequent analysis of the interrelationships between market structures, competition and government trade and industrial policies during this period.

The plunge in oil prices in 1986, coupled with the persistent slow growth between 1982 and 1986, forced the government to embark on a substantive trade, industry and financial sector liberalisation programme. Tariff rates were substantially reduced, and most quantitative import restrictions were replaced by tariffs. Deregulation of the industrial sector eliminated many (but not all) of the restrictions on new investment, including foreign investment. Two broad indicators of the evolution of trade policy during this period are the various estimates of real effective protection, and the incidence of non-tariff barriers. The average real ERP estimate for non-oil manufacturing sector declined from 59 per cent in 1987 to 16 per cent in 1995 (see Table 2.3 below). Equally important, the dispersion of real ERPs in non-oil manufacturing narrowed considerably: the standard deviation of real ERPs declined from 102 per cent in 1987 to 39 in 1995, indicating a considerable reduction in trade policy distortions based on this measure of protection. The coverage of NTBs fell from 77 per cent of non-oil/gas manufacturing value added in 1986 to 17 per cent in 1995.

Prudent fiscal management, the rupiah devaluation in 1986 and decisive trade and industry reform together resulted in a strong economic recovery beginning in 1987. Between 1987 and 1995 annual economic growth averaged around 6.5 per cent,

approaching that of the 1971-81 period. However, the sources of growth between the two periods were different. Recent growth was achieved without buoyant oil revenues. For the first time in its history, Indonesia became a significant industrial exporter.

The remainder of this Chapter is divided into the following three sections. Section 2.2 provides a background discussion on the different economic and policy episodes in the last 30 years. Section 2.3 discusses the trade and industry liberalisation programme implemented between 1986 and 1995. Finally, section 2.4 provides a summary of the main findings of the Chapter.

2.2 Shifts in Economic Policy in the Last 30 Years

In the last 30 years, the Indonesian economy has experienced a number of exogenous shocks, principally from fluctuations in oil prices. According to Hill (1996: 14-15) these shocks have generally resulted in a flexible policy response. Consequently, the sources of economic growth and economic policy have changed frequently over the past 30 years. At the risk of simplification, it is possible to divide the period since 1966 into four identifiable economic and policy phases. These phases are discussed below.

2.2.1 Rehabilitation and Economic Recovery, 1966-70

By the mid-1960s many observers despaired of any prospect of significant economic advance in Indonesia. Economic growth was low and in some years negative rates were recorded. There was hyperinflation, such that by 1965 inflation was 594 per cent. Part of the economic malaise can be traced back to Soekarno's economic policies and political instability at the time. In 1959, President Soekarno introduced his 'Guided Democracy' and its corollary 'Guided Economy'. The foundation of this 'guided economy' was socialism (*socialisme a la Indonesia* in the President's words) with its emphasis on 'self-reliance' and 'self-sufficiency'. During this period there was a proliferation of controls on economic activities, including price controls, import licences, investment restrictions, foreign exchange controls and a rapid expansion of

the state enterprise sector.

In March 1966 Soeharto became Indonesia's second president, and he declared the 'New Order'. Over the next four years, the government's priorities were to control inflation, re-establish ties with the international, non-communist donor community, and to rehabilitate physical infrastructure. The introduction of orthodox monetary and prudent fiscal policies brought inflation down quickly, from 594 per cent in 1965 to 19 per cent in 1969. The policy shift away from heavy intervention to a more market-oriented economy was demonstrated by the government's dismantling of the complex import licensing system, removal of controls on foreign exchange, and the introduction of a new 'export bonus' scheme in 1967. A new foreign investment law was enacted in 1967. This law constituted the basis for opening up the economy to foreign investment and it also provided various incentives to foreign investors. These included a 30 year guarantee of non-nationalisation, a two year tax holiday, duty and sales tax exemption on imports of machinery and equipment, accelerated depreciation, and guaranteed repatriation of capital and profits (Pangestu, 1996). The same incentives were extended to domestic investors one year later under the Domestic Investment Law of 1968. In 1970, the government introduced a major policy reform package. This included the unification of the multiple exchange rate system, devaluation of the rupiah, simplification of the export and import procedures and elimination of all capital controls. These reforms resulted in significant domestic and foreign investment, which in turn contributed to rapid economic growth in the early 1970s.

2.2.2 Rapid Growth and Rising Government Intervention, 1971-82

This was a period of continuous high economic growth, fuelled by the oil boom of the 1970s. Real GDP grew at an average rate of 7.7 per cent per annum and in all years grew by at least 5 per cent. It was also a period of increasing protection and state intervention in the economy. At least two factors that can be identified in explaining this policy shift towards greater intervention. First, the open door policy to foreign investors created resentment in nationalist circles, particularly against the more

conspicuous Japanese investors. This resentment culminated in a large protest (known as the 'Malari') in Jakarta against the visit of the Japanese Prime Minister Tanaka in January 1974. In response to this rising nationalist resentment, President Soeharto made several amendments to the Foreign Investment Law, of which the most substantive was the requirement that all foreign investors must have a local partner. The second factor was the massive increase in oil revenues that provided funds for a nationalist economic agenda that was emerging during this period (Hill, 1996: 16).

There are at least four channels through which the government intervened in the economy during this period: 1) the state enterprise sector, 2) trade policy, 3) industrial licensing, and 4) fiscal policy. The massive oil revenues helped government to finance heavy industry investments and to expand the state enterprise sector into diverse areas such as, steel production, fertiliser, cement, sugar, textiles, and food processing. State banks (which dominated the banking sector until the early 1990s) also provided subsidised credit to specific firms. Over this period trade and foreign investment policy became more restrictive. Barriers to imports took the form of both tariff and non-tariff protection; it included selective, tailor-made protection, especially for heavy, import-substitution industries such as steel, cement, and automobiles. Several changes were made to the Foreign Investment Law. The mandatory joint venture rule was referred to earlier. Divestment rules were also strengthened, and foreign ownership was to be reduced to 49 per cent after 20 years.

In 1973, the Government established the Investment Coordinating Board (Badan Koordinasi Penanaman Modal or BKPM). This board was given wide discretionary authority to approve both foreign and domestic investment. In 1977, BKPM published the annual Priority Investment List for the first time. The publication listed four investment categories: 1) product groups open to both foreign and domestic investors, 2) closed to foreign investors, 3) closed to both foreign and domestic investors, and 4) sectors open to small-scale domestic investment only. The publication also listed any fiscal incentives or conditions (e.g., capacity limits, geographic restrictions, and technology requirements) attached to investment. During this period, an increasing number of industries were closed to foreign investment, and FDI was more and more confined to resource extraction, and inefficient, import-substitution industries.

2.2.3 Adjustment to Lower Oil Prices and Economic Recession, 1982-86

Falling oil prices, rising external indebtedness and a sharp decline in economic growth in 1982 signalled an end to the decade of oil-financed growth and abundance. The policy response was ambivalent during this phase. The macroeconomic policy responses were generally prompt and effective. The government devalued the rupiah by 27 per cent in March 1983. The government's heavy industry investment plans were rescheduled. Fiscal policy was tightened: public servant wages were frozen, reductions in subsidies on domestic fuel, agriculture and state enterprises were introduced. The tax system was also simplified.

However, the government's strategy of industrial deepening developed in the era of abundance continued to receive high priority. Indeed, non-tariff barriers proliferated, exacerbating the problems already faced by a small, inefficient industrial sector. Pangestu and Boediono (1986), writing at the time when these devices were most commonly employed, identified some 22 separate instruments issued by eight different government departments. In 1982, the government introduced the approved importers system (Tata Niaga Impor, TNI). Prior to this system, importers who obtained an import licence from the Ministry of Trade were either general importers who could import most goods, or importer-producer who could import the raw materials and intermediate goods for use in their production. Under the TNI system, two types of licences were issued. The first was a general licence under which the importer could import goods falling under certain categories. The second was a specific licence. Only approved importers could import certain goods. The type and amount of goods imported was specified and as such there was a built-in quota under this system. The list of such goods, the volume of imports allowed, and sometimes even the selling price of a good (e.g. steel products) were determined after discussions between the interdepartmental team, business and industry groups (Pangestu and Boediono, 1986: 14). Consequently, the licensing system tended to be captured by vested interests and used as instruments for quantitative restrictions on imports, including the creation of import monopolies. Examples of products covered

under the specific licences were cement, fertiliser, inner tyre tubes and tyres, milk powder, meat products, steel, sheet glass, heavy equipment, automotive components, newsprint, staple polyester, viscose rayon fibre, and electronics. As the coverage of these licences extended to more industries, it became increasingly obvious that powerful political business interests were the prime beneficiaries (Hill, 1996: 113).

Two broad indicators of the evolution of trade policy are the various estimates of effective protection, and the incidence of non-tariff barriers. Various estimates of effective rates of protection for the period 1971 to 1984 are summarised in Table 2.1. Differences in methodologies, concepts and data mean that the different sets of estimates can not be compared directly. However, several conclusions can be drawn from an examination of these estimates. First, all studies except for Pangestu and Boediono (who did not include all non-tariff barriers) found negative protection for exportables, indicating that the structure of protection adversely affected export-oriented industries. This is often referred to as the anti-trade bias of policy. Second, in all studies the interindustry variations in protection are extremely large, ranging from negative rates to several hundred percent. It is clear that the trade regime had a marked impact on the distribution of resources among industries. It has tended to penalise the more efficient export activities. Third, manufacturing has, on average, received relatively high protection. Very high rates of effective protection were reported for a diverse range of industries including automobiles, cigarettes, processed sugar, and weaving.

Table 2.1

Estimates of Effective Rates of Protection, 1971-84
(%)

	Pitt	Pitt/World Bank	Pangestu & Boediono		Parker
	1971	1975	1975	1980	1984
All tradeables	33	30	115	56	133
Exportables	-11	-2	91	32	-4
Importables:	66	58	n.a	n.a	224
import					
competing	n.a	61	121	60	n.a
non-import					
competing	15	9	21	9	n.a
Sub-sectors:					
cigarettes	556	4	246	105	n.a
sugar refining	154	-9	-8	0	141
weaving	na	192	135	127	589
motor vehicles	526	718	22	33	2 948

Notes: These series are not directly comparable, except where the same author (Pitt/World Bank) is involved. Sources: Pitt (1981: 208-9); Pitt/World Bank (1981: 10-17); Pangestu and Boediono (1986: 25-6); Parker (1985: 12-17)

The system of regulation and industrial licensing became more extensive and complex during this period. Hundreds of products and product groups were subject to BKPM investment restrictions, which particularly affected foreign investors.¹ In addition to BKPM, line ministries (e.g., Ministries of Trade and Industry)² would also issue decrees or regulations erecting new entry barriers and restrictions on domestic competition. For example, the Ministry of Trade issued a series of decrees regulating the cement industry, including the geographic allocation of cement supplies, quantitative restrictions on imports, and administered regional retail prices.

Many of the features of the industrial licensing system were examined in a controversial, unpublished World Bank report in 1981. The report emphasised several key aspects of the licensing system. Many of the provisions of the industrial and legal code were (and still are) based on those which the Dutch colonial regime introduced in the 1930s. There was a wide range of decrees emanating from the bureaucracy, from different departments, from different tiers within the departments, and from both

¹ See BKPM's Priority Investment Lists, 1983 to 1986.

² The Ministries of Trade and Industry were merged into one Ministry of Industry and Trade in December 1995.

central and regional offices. It was not uncommon for these decrees to be inconsistent. The report also noted that to establish and operate a business, the company must often obtain numerous licences, approvals and permits involving various levels of government (national, provincial, and local government). This often resulted in lengthy delays in the planning process, and increased the opportunity for rent-seeking activities by bureaucrats.

According to Professor Sadli (1988),³ the proliferation of industrial licensing during this period was partly the outcome of the government's belief that competition among domestic firms should be managed to avoid socially wasteful activities, of which excess capacity was viewed as one such activity. In principle, a firm or industry group which could show that it has sufficient production capacity could petition the Ministry of Industry and the BKPM for restrictions on entry, capacity or regional location in the industry. This procedure also tended to be captured by vested interests, and was widely used as an instrument for protection from both domestic and foreign competition.

2.3 Trade and Investment Liberalisation, 1986-95

The plunge in oil prices in 1986, coupled with the persistent slow growth phase between 1982 and 1986, forced the government to embark on a substantive trade, industry and financial sector liberalisation programme. First, the government introduced the duty drawback facility for exporters in May 1986. In September of the same year, the government devalued the Rupiah by a massive 45 per cent. These two policies were followed by a series of deregulation packages between October 1986 and May 1995. The liberalisation programme is discussed below.

(a) Trade Liberalisation

The deregulation packages substantially reduced tariff rates, and replaced most quantitative restrictions with tariffs. The export bonus scheme, which was open to

³ Professor Sadli of the Faculty of Economics at the University of Indonesia was the Minister of Labour and Mines during the 1970s. He also administered the investment regulation in the late 1960s and early 1970s.

abuse, was replaced by the duty drawback facility, known initially by its acronym BAPESKTA. This scheme enabled exporters to source imported inputs at international prices. Exporters were exempt from all duties and regulations on imported inputs. They were also allowed to import directly without having to deal with licensed importers. The duty exemption and drawback facility had significantly reduced the adverse effect of protection on intermediate inputs embodied in exports (Thee and Pangestu, 1994: 10). However, according to Wymenga (1991) and Thee and Pangestu (1994), Indonesia's foreign trade regime still adversely affected the firm's incentive to export. Wymenga (ibid: 140) showed that export-oriented textile and garment firms, though having access to tradable inputs at international prices, nevertheless received negative effective protection as their non-tradable intermediate inputs still had to be purchased at prices above international benchmarks. On the other hand, domestic market-oriented textile and garment producers continued to enjoy high effective protection (Table 2.2). Thee and Pangestu (1994: 10) observed,

'Indonesia's trade regime, though improved in recent years, still contains a considerable 'anti-export bias' in the case of the textile and garment industries. Under such a protective trade regime, domestic market-oriented textile and garment producers will not have a great incentive to shift to the less profitable export markets'.

Table 2.2

**Effective Rates of Protection for Textile and Garment Producers
by Sales Destination in 1989
(%)**

Sectors	Domestic Sales	Export Sales
Textiles	109.4	-2.0
Garments	16.5	-1.3

Source: Wymenga, (1991), Table 5, p 140.

Table 2.3 shows the changes in the estimated real effective rates of protection (RERP) and nominal rates of protection (NRP) between 1987 and 1995. RERPs are effective rates of protection corrected for trade-policy induced changes in wages. Whereas the effective rate of protection of a sector is defined as the proportionate increase in its value added per unit due to the complete system of trade policies, the RERP is

defined as the corresponding increase in its real value added per unit, where real value added is obtained by deflating nominal value added by the nominal wage. The advantage of RERPs over the more familiar ERPs is that RERPs allow for the effects of protection on the general price level, and hence on the real exchange rate, whereas ERPs do not. These estimates of protection are taken from Fane and Phillips (1991) and Fane and Condon (1996). The authors obtained the RERP estimates using the methodology of Humphrey (1969), adjusted for nominal wage effect (see Fane and Condon, 1996: 36). The estimates take account of the complete system of trade policies: tariffs, quantitative restrictions on imports, and export quotas and taxes (see Fane and Phillips, 1991). The 1987 estimates summarise the situation after the first reform package of October 1986, while the 1995 data summarise that after the package of May 1995. Table 2.3 confirms and quantifies that trade protection has been greatly reduced across all broad sectors since the mid-1980s. The RERP estimate for the non-oil manufacturing sector declined by three quarters, from 59 per cent in 1987 to 16 per cent in 1995. Equally important, the dispersion of RERPs in non-oil manufacturing narrowed considerably over this period. The standard deviation of RERPs declined from 102 per cent in 1987 to 39 per cent in 1995, indicating a considerable reduction in trade policy distortions based on this measure of protection.

Table 2.3**Estimates of Nominal and Real Effective Rates of Protection, 1987-95**
(%)

Sector	NRP		RERP	
	1987	1995	1987	1995
All tradable	10	3	4	0
Exportables	-1	na	-13	-13
Import competing	22	na	29	11
Sub-sectors:				
Agriculture	14	8	9	4
Forestry, fishing & hunting	-22	-24	-14	-34
Mining and quarrying	0	1	-13	-6
Manufacturing				
(excl. oil refining and LNG)	21	6	59	16
Manufacturing				
(incl oil refining and LNG)	16	5	27	11
Anti-trade bias (%)	25	16	50	28
Standard Deviation of RERPs (%):				
All sectors	17	17	42	26
Non-oil manufacturing	21	17	102	39

Source: Fane and Phillips (1991:118) and Fane and Condon (1996: 53).

Notes: The estimates are weighted by production shares of each sector.

Na indicates not reported in Fane and Condon (1996)

A useful summary measure of the extent to which the overall system of tariffs, export taxes, and NTBs inhibits trade is the anti-trade bias (ATB) of policy, defined as the RERP (or ERP) for import-competing sectors, relative to the RERP (or ERP) for exporting sectors (Fane and Phillips, 1991). The ATB fell from 50 per cent in 1987 to 28 per cent in 1995. An alternative measure of the policy bias against trade can be obtained by using average NRPs in place of average RERPs. This alternative measure of bias was 24 per cent in 1987 and had fallen to 16 per cent in 1995. The reductions in ATBs over this period indicate that the trade policy reforms have significantly reduced the anti-trade bias that was prevalent in the structure of protection in the mid-1980s.

**Table 2.4 Changes in Real Effective Rates of Protection by
Major Industry Groups, 1987-95**

ISIC Code		1987	1995
31	Food, beverages and tobacco	106	21
32	Textiles, garments and footwear	78	-9
33	Wood products	10	27
34	Paper and paper products	15	2
35	Chemicals	44	-7
36	Non-metallic minerals	38	15
37	Basic steel and metals	-1	-4
38	Machinery, equipment and transport	121	86
39	Other manufactures	95	12

Source: Fane and Condon (1996), p 39.

Table 2.4 shows the average RERPs according to two-digit ISIC industries. The table shows that RERPs have significantly declined in all but one major industry sector - wood products. Despite the overall trend towards trade liberalisation, there have been some important changes in the opposite direction. The main examples are animal slaughtering (ISIC 31111); other milled cereals (ISIC 31169); noodles (ISIC 31179), soybean products (ISIC 31242), non-alcoholic beverages (ISIC 31340); leather (ISIC 32310); plywood (ISIC 33111); other wood products (ISIC 3312/3314); soaps and detergents (ISIC 35231); and plastic products (ISIC 35600). RERPs for individual industries are listed in the Appendix to this Chapter.

Tables 2.5 and 2.6 compare the coverage of 'restrictive' NTBs in 1986 and 1995. The 1986 data summarise the situation before the reform package of October 1986. The 1995 data summarises the situation after the package of May 1995. Tables 2.5 and 2.6 confirm and quantify the obvious fact that restrictive NTB coverage has been greatly reduced since the mid-1980s. In several manufacturing sectors such NTBs have been largely, or entirely, eliminated. For all traded sectors, the NTB coverage of assisted value added has fallen from 44 per cent in 1986 to 23 per cent in 1995. For manufacturing, excluding oil refining, the fall has been much greater: from 77 per cent to 17 per cent. Substantial NTBs remain in processed food and drink products (ISIC 31), wood products (ISIC 33) and paper and paper products (ISIC 34). Most of these NTBs will be eliminated under the IMF Structural Reform programme.

Table 2.5 NTB Coverage of Gross Output and Value Added, 1986-95

Sector	% NTB Coverage of Gross Output		% NTB Coverage of Value Added	
	1986	1995	1986	1995
Agriculture	64	45	67	48
Forestry, fishing & hunting	61	43	64	46
Mining and quarrying	2	0	2	0
Manufacturing (excl. oil refining and LNG)	80	24	77	17
Manufacturing (incl oil refining and LNG)	62	20	53	14
All tradeables	52	23	44	23

Source: Fane and Condon (1996), p 51.

Table 2.6 NTB Coverage of Gross Output and Value Added by Major Industry Groups, 1986-95

		% NTB Coverage of Gross Output		% NTB Coverage of Value Added	
		1986	1995	1986	1995
ISIC Code					
31	Food, beverages and tobacco	88	45	85	25
32	Textiles, garments and footwear	82	0	79	0
33	Wood products	78	58	74	58
34	Paper and paper products	69	25	72	37
35	Chemicals	69	0	77	0
36	Non-metallic minerals	59	0	59	0
37	Basic steel and metals	53	0	59	0
38	Machinery, equipment and transport	88	0	87	0
39	Other manufactures	33	0	34	0

Source: Fane and Condon (1996), p 39.

(b) Financial Sector Liberalisation

Major financial sector reforms were introduced in October 1988. All domestic banks were free to open new offices, and new private banks were permitted. These reforms had a dramatic impact. The private banking sector boomed, as these institutions began to compete for customers and market share. The state banks were slow to adjust to the new environment, and the decline in their market share accelerated. The stock market grew rapidly over this period. An intensive study by Gultom (1995) on the investment impact of the 1983 and 1988 reforms showed that small and medium-sized firms and

sized firms and export-oriented firms benefited greatly from improved access to bank funds compared with the period before the reforms.

(c) Liberalisation of the Restrictive Investment Regime

Substantial progress had been made in dismantling many (but not all) restrictions on investment during the last decade. In 1989, BKPM replaced the Priority Investment List with the much simpler Negative Investment List. This new publication lists the sectors closed to domestic and/or foreign investment and sectors closed to investment unless certain requirements are met. Importantly, the number of industries included in the negative list declined substantially between 1989 and 1995. The number of industries closed or restricted fell from 75 in 1989 to 34 in 1995 (Table 2.7).

Table 2.7

The Negative Investment List

Category	Number of Sectors	
	1989	1995
1. Sectors closed unless certain requirements are met	47	9
2. Sectors closed to foreign investment only	19	6
3. Sectors closed to 100% foreign investment	na	8
4. Sectors absolutely closed	9	11
TOTAL	75	34
5. Sectors reserved to small enterprises	35	37

Source: BKPM

Notes: Category 3 was added in 1995.

Line ministries can, and do, impose investment restrictions on sectors not included in the investment list. See Table 2.8 below.

Equity restrictions and divestment rules on foreign investment were gradually removed between 1986 and 1994. In the deregulation package of June 1994, foreign firms now have two choices. One is to form a joint venture with 95 per cent foreign ownership with no further divestment required thereafter. The alternative is to form a wholly foreign-owned subsidiary, in which case some divestment must be undertaken after 15 years. The amount of divestment was not stipulated, but the then Minister of Industry, Tunky Ariwibowo, stated that 'even one per cent divestment is sufficient' (*Jakarta Post*, June 4, 1994). This deregulation represented a major policy shift: previously the maximum initial foreign ownership permitted in a joint venture was 80

per cent, except in the case of export-oriented investments (95 per cent). On divestment the previous rule was that foreign ownership had to be reduced to 49 per cent after 20 years, except for export-oriented investments in export processing zones. Under the new regulation, it is up to the foreign investor to decide whether to have a domestic partner, what the composition of foreign-domestic equity should be, and whether and by how much to divest to domestic entities.

While the pace and extent of market-oriented economic reforms in Indonesia since 1986 had been remarkable, many of the government-sanctioned monopolies and cartel arrangements, as well as other 'sensitive' regulated sectors (plywood, cement, fertiliser, sugar processing, BULOG, aircraft manufacturing, steel, distribution) remained relatively untouched during the deregulation period. FDI remained restricted in several major sectors listed in the 1995 negative list and 37 sectors were reserved for small-scale producers. Also, there had been little progress in the area of state enterprise reform. Furthermore, in recent years there have been a number of policy reversals and non-transparent means of protection. Examples included the granting of a clove monopoly to a private-state trading enterprise joint venture in 1991, tariff protection to a large petrochemical plant in February 1995, and the granting of tax exemptions to a so-called 'pioneer automotive company' in 1996. All three companies are partly owned by former President Soeharto's children.

Table 2.8 lists several major sectors that remained heavily regulated in the mid-1990s, in addition to those sectors included in the negative investment list. The negative investment list is not exhaustive. Line ministries (e.g., Ministry of Industry and Trade) also issue decrees or regulations that erect entry barriers and restrict domestic competition. The list is compiled from various World Bank Reports, academic publications and seminars, newspaper articles and my fieldwork in 1995. The list is not intended to be complete, as it is impossible to identify all industries that are regulated to some extent.

Government-sanctioned monopolies or cartels exist in wheat flour milling, sugar processing, steel production, cement, fertiliser and plywood to mention a few. Until recently, in the cement industry there were regulations governing the geographic

distribution of cement, market shares and regional prices. Distribution quotas for the domestic and export markets were negotiated at monthly meetings between officials from the Ministry of Industry and Trade and the Cement Producers Association (Asosiasi Semen Indonesia), which represents all producers. The official objective of this system was to ensure a continuous supply of cement to all provinces at stable prices. However, as shown in Chapter 11 the distribution system had limited success in stabilising prices. Instead, the regulatory arrangements created a market structure that closely resembled a cartel where competition among firms was greatly restricted.

In the fertiliser industry, all urea fertiliser is distributed by the state-owned producer, P.T Pusri. According to a study by Xie and de Bruyn Kops (1995), the distribution system exhibits monopolistic characteristics. They estimated that excessive distribution fees in the industry cost farmers around US\$100 million per annum. The plywood producers' association, headed by Bob Hasan, a close associate of President Soeharto, had authority to control distribution of all plywood production in both the domestic and export markets. In the highly dispersed sugar processing industry, state enterprises are dominant. There are also regulations controlling new entry, imports, the geographic distribution of sugar production, and retail prices. These regulations had perpetuated the 'overcrowding' of sub-optimal plants in the processing industry.

Until recently, entry and import controls in the wheat flour milling industry protected the domestic monopolist, P.T Bogasari (a private-state owned enterprise joint venture with first-family connections). It is also believed that the close supplier-buyer relationship between Bogasari and its affiliated noodle producer led to the near monopolisation of the domestic instant noodle market by the noodle producer. Both companies are majority owned by the Salim group, the largest conglomerate in Indonesia.

Table 2.8: Selected Regulated Manufacturing Industries, Mid-1990s

Code	Industry	% VA ^b	RERP ^c	Restrictions
31164	Wheat flour milling	0.53	-33	Investment restrictions. Import and distribution monopoly held by BULOG.
31150	Cooking oil	1.12	-1	Import and entry restrictions, export quota.
31181	Processed sugar*	0.51	44	State dominant producer (SOE), price controls, investment restrictions, distribution controls. Import monopoly held by BULOG.
	Salt	na	na	State-owned PT Garam holds a dominant position in the industry. Until 1993 PT Garam was responsible for the national salt buffer stock. Imports of salt restricted. There are regulations on mechanisation of salt processing.
31330	Alcoholic beverages ^a	0.88	62	New entry prohibited, import monopoly.
3142/3	Cigarettes	0.44	108	Entry restricted in clove cigarettes, minimum retail prices based on firm size. Mechanisation restrictions.
33113	Plywood	0.64	42	Government-sanctioned export cartel.
35120	Fertiliser*	0.81	-24	SOE production and distribution monopoly. Natural gas subsidies, direct budget subsidies to producers, price controls. Export quota, quantitative import restrictions.
36310	Cement*	0.37	-18	Large SOE presence, regional distribution controls, administered prices.
37100	Basic steel and iron*+	1.19	-2	SOE dominant producer, monopolistic distribution arrangements. Natural gas subsidies.
38411	Shipbuilding* +	0.64	-6	Large SOE sector, ban on second hand fishing vessels. Budget subsidies to SOE producers.
38340	Automobiles	0.55	600	Entry restrictions, preferential tax treatment to pioneer company, import restrictions on completely built up kits.
38450	Aerospace*+	0.50	-9	SOE monopoly, budget subsidies
<i>Other Sectors and Institutions</i>				
	Oil distribution	na	na	State oil company has wholesale and retail monopoly
	Wholesale and retail trade	na	na	Foreign investment in wholesale and retail trade prohibited, except under licence to an Indonesian company. Foreign manufacturers are prohibited from directly distributing their products in the domestic market.
	BULOG	3.9		State food logistics agency has an import and distribution monopoly over several key agriculture commodities, including rice, refined sugar, soybeans, wheat and wheat flour, and garlic.
	Cloves	0.14	-2	Government granted a cloves trading monopoly to a private-state trading company joint venture.

* Viewed as 'Strategic' industries by the government. + state enterprises under the supervision of the then State Minister for Science and Technology, Professor Habibie (now President of Indonesia).

a. Regulated on social grounds b. % Share of VA refers to percentage share of total value added produced by the tradable sector (agriculture, mining/oil/gas and manufacturing). Source: 1993 Input-Output Tables. BULOG includes value added of the commodities listed in the table. c. RERP refers to real effective rates of protection. Source: Fane and Condon (1996).

Why was there a lack of policy reforms in these sectors when many other sectors had been deregulated? In the case of the state enterprise sector several factors appear to have been important. First, technical ministries have generally resisted the reform process, especially if it involves privatisation of state enterprises. State enterprises (SOEs) under their control constitute a valuable source of additional funding (Hill, 1996: 105). State enterprises are also viewed by the department as a vehicle for their development objectives, in areas of small enterprise development and the promotion of subcontracting networks. In addition, particular Ministers have regarded state enterprises as personal fiefdoms, immune from public scrutiny. The obvious example, since the early 1980s has been the then Minister for Research and Technology, Professor Habibie. He has been able to circumvent the reforms and protect his extensive commercial interests through his direct and close contact with the former President. To further protect his interests the Strategic Industry Board (Badan Pengelola Industri Strategis, BPIS) was established in 1989. Under this arrangement, ten of the largest state enterprises were placed under his direct control. Among these industries are aerospace, shipbuilding and repair, nuclear energy, ammunitions, and the state steel company, P.T Krakatau Steel.

A second major reason for the limited SOE reform relates to concern over the likely buyers. The buyers would almost certainly be either foreign investors or the major domestic conglomerates which consist mainly of non-*pribumi* (mainly ethnic chinese) or politically powerful owners. Deep seated *pribumi* reservations persist over the extent of non-*pribumi* wealth and economic dominance. Faced with public sentiment towards non-*pribumi* business dominance, it is not surprising that the government has been reluctant to initiate bold reforms in this area. An additional concern has been that there is little point in transforming public monopolies into private monopolies and that privatisation without reforms in the fields of trade and competition policies would produce little benefit.

The lack of microeconomic reforms in many of the industries listed in Table 2.8 can also be explained by powerful vested interests. Several politically powerful business groups operate in many of these industries (often with state-owned enterprise

partners), and are presumably extracting rents through the competition-restricting regulations. Thus, they are likely to use their strong political connections to resist the reform process in these industries.⁴ Indeed, the absence of reform in these industries during this period is testimony to the presence of powerful vested interests opposing such measures.

2.4 Summary

This Chapter described the trade and industry policy reforms implemented between the mid-1980s and 1995, and provided a backdrop to our subsequent analysis on the interrelationships between market structures, competition and government policies during this period. The pace and extent of market-oriented economic reforms in Indonesia since 1986 have been remarkable. Tariff rates were substantially reduced, and most quantitative import restrictions were replaced by tariffs. Deregulation of the industrial sector eliminated many restrictions on new investment, including foreign investment.

However, many of the government-sanctioned monopolies and cartel arrangements, as well as other 'sensitive' regulated sectors (plywood, cement, fertiliser, sugar-processing, BULOG, aircraft manufacturing, steel, distribution) remained relatively untouched during the deregulation period. A major empirical issue examined in subsequent chapters is the extent to which past and current policies shaped industrial structure, the nature of competition and industry performance in Indonesian manufacturing.

⁴ Major general references on this subject include Mackie and MacIntyre (1994) and Bresnan (1993). Schwarz (1994) provides an informative account of business and politics through to the early 1990s. Studies which focus particularly on the political economy of policy-making, and emphasise the rent-seeking and lobbying activities of business include Robison (1986), Yoshihara (1988), and Muhaiman (1991).

Appendix 1

Changes in Real Effective Protection in Manufacturing, 1987 to 1995

Input-Output Sector		Real Effective Rates of Protection		
		1987	1995	Change, 1987-95
Increases in effective protection (<i>industries= 19</i>)				
44	Slaughtering	49	174	125
52	Other milled cereals	-17 ^{c,d}	45	62
54	Noodles etc.	34	126	92
59	Soybean products	-45 ^d	16	61
63	Non-alcoholic beverages	52 ^c	537	485
72	Leather	-8	72	80
75	Plywood	7	42	35
78	Other wood products	45	142	97
82	Paper & cardboard products	28	31	3
84	Basic chemicals	-5	3	8
88	Paints & lacquers	65	70	5
91	Soaps & detergents	88 ^b	352	264
94 ^x	Oil refining	-14	6	20
99	Plastic products	79	600 ^a	521
108	Non-ferrous metal products	-7 ^b	3	10
111	Structural metal products	82	156	74
112	Other metal products	19	26	7
115	Electric motors & generators	12 ^b	77	65
123	Motor vehicles	428	600 ^a	172
No change in effective protection (<i>industries = 1</i>)				
97	Tyres	600 ^a	600 ^a	0
Decreases in effective protection (<i>number of industries = 68</i>)				
45	Processed meat	600 ^a	-8	-608
46	Dairy products	600 ^a	85	-515
47 ^x	Processed vegetables & fruits	600 ^a	-26	-626
48 ^x	Processed fish	600 ^a	-40	-640
49 ^x	Copra, vegetable & animal oil	-15 ^{c,d}	-1	14
50	Milled polished rice	0 ^c	-6	-6
51	Wheat flours	600 ^a	-33	-633

53	Bread & bakery products	83	66	-17
55	Sugar	187 ^c	44	-143
56	Chocolate & confectionery etc.	112 ^d	0	-112
57	Processed coffee	144 ^d	-8	-152
58 ^x	Processed tea	-15 ^d	-7	8
60	Other food	43	12	-31
61	Animal feeds	30	-2	-32
62	Alcoholic beverages	90	62	-28
64	Tobacco products	14 ^d	0	-14
65	Cigarettes	600 ^a	108	-492
66 ^x	Yarn & cleaning kapok	94 ^d	-13	-107
67 ^x	Textile weaving	160	-11	-171
68 ^x	Garments, non-apparel	71	-8	-79
69 ^x	Knitting	10	-9	-19
70 ^x	Wearing apparel	23	-8	-31
71 ^x	Carpet, rope & other textiles	12 ^c	-12	-24
73 ^x	Footwear, leather products	502	-1	-503
74 ^x	Sawn processed wood	-24	-13	11
76 ^x	Wooden building material	144	56	88
77 ^x	Furniture (wood, rattan)	368	62	-306
79 ^x	Woven goods, non plastic	101	25	-76
80 ^x	Pulp	516 ^b	0	-516
81	Paper & cardboard	516 ^b	10	-506
83	Printing & publishing	-26	-9	17
85	Fertiliser	56 ^b	-24	-80
86	Pesticides	56 ^b	34	-22
87	Plastic resins & fibres	37	-16	-53
89	Drug & medicine	37	-3	-40
90	Traditional medicine	na	-14	na
92	Cosmetics	88 ^b	116	28
93	Other chemical products	15	-5	-20
95 ^x	Liquid natural gas	-12	-12	0
96	Smoked & crumb rubber	-15	-9	6
98 ^x	Other rubber products	98	-9	-107
100	Ceramics & earthenware	600 ^a	31	-569
101	Glass & glassware	111	-2	-113

102	Structural clay products	68	42	-26
103	Cement	138 ^d	-18	-156
104	Other non-metal products	21 ^{c,d}	3	-18
105	Basic iron & steel	7 ^b	-8	-15
106	Iron & steel products	7 ^b	-2	-9
107	Non-ferrous metals	-7 ^b	-13	-6
109	Tools, cutlery & kitchenware	93 ^c	56	-37
110	Metal furniture etc.	114	24	-90
113	Prime mover engines	135 ^b	60	-75
114	Machinery & apparatus	135 ^b	36	-99
116	Electrical machinery	122 ^b	22	-100
117 ^x	Communication equipment	70	40	-30
118	Household electricals	600 ^a	6	-594
119	Other electricals	52	-1	-53
120	Batteries	600 ^a	-4	-604
121	Shipbuilding	-7	-6	1
122	Locomotives	na	-9	na
124	Motor cycles	600 ^a	-7	-607
125	Other transport equipment	86	16	-70
126	Aircraft	na	-9	na
127 ^x	Optical & precision instruments	3 ^b	-11	-14
128 ^x	Jewellery	96	-8	-104
129	Musical instruments	108	63	-45
130 ^x	Sports equipments	56	-10	-66
131	Other manufacturing	117	33	-84

Source: Fane and Condon (1996)

Notes: Number of manufacturing industries under I-O classification = 88

a. Indicates a sector in which value added at world prices was negative, or the calculated ERP exceeded 600%. The reported RERP was therefore set at the cut-off point of 600%.

b. There are several cases in which a single industry in the 1985 I-O table was separated into two industries in the 1990 I-O table; in these cases, the single estimated RERP for 1987 is shown in both rows of Appendix 1, which is based on the 1990 I-O table.

c. Indicates a sector (I-O 1990 basis) whose RERP estimate was obtained by aggregating the Fane and Phillip (1991) data for its constituent sectors (I-O 1985 basis).

e. Indicates a sector in which the RERPs in 1987 and 1995 are not absolutely comparable, because the definition of the sector was changed between 1985 and 1990 I-O Tables for reasons other than those indicated in notes b and c above. Most of these reclassifications appear to be minor; e.g. some crop processing activities, formerly classified under an agricultural sector, were transferred to the corresponding manufacturing sector.

'x' indicates that the sector is an export-competing industry (See Fane and Phillips, 1991).

Chapter 3

Structural Change in the Manufacturing Sector

3.1 Introduction

This Chapter presents an overview of structural transformation in the Indonesian manufacturing sector over the last 25 years. The Chapter also describes the salient features of the manufacturing sector and provides a background to our subsequent analysis of market structure and competition.

Reflecting the patterns of economic growth described in Chapter 2, Indonesia's structural transformation has been remarkably rapid. The Indonesia of the 1990s is almost unrecognisable compared with that of the mid-1960s, or even the mid-1970s. Agriculture's share of GDP declined from around 53 per cent in the mid-1960s to less than 17 per cent by the mid-1990s. Conversely, manufacturing's share of GDP increased from a negligible 8 per cent in 1965 to 25 per cent by 1996. There has also been a remarkable transformation in exports since 1986. Manufacturing exports as a share of total exports grew from around 3 per cent in 1975 to just over 51 per cent by 1996. The rapid transformation of the economic structure reflects the interplay of several factors including natural factor endowments, demand factors and government policies reviewed in the preceding chapter. In particular, the liberalisation of trade and the investment regime after 1986 stimulated a broad-based, export-oriented industrial growth in the last decade.

The remainder of this Chapter is divided into four sections. Section 3.2 describes the structural transformation of the Indonesian manufacturing sector since the early 1970s. Section 3.3 charts the transformation in manufacturing exports, particularly after liberalisation of trade in the 1980s. Section 3.4 describes the salient features of the manufacturing sector, including the pattern of ownership, firm size, and export-

orientation. Finally, section 3.5 summarises the main findings of the Chapter.

3.2 Structural Change in the Manufacturing Sector

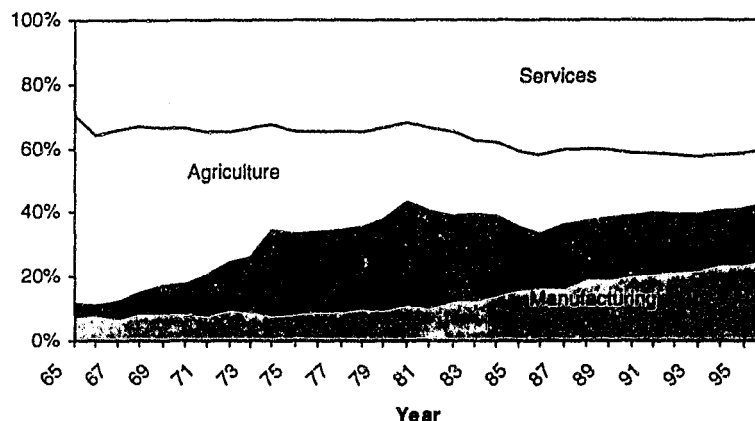
Reflecting the patterns of economic growth outlined in Chapter 2, Indonesia's structural transformation has been remarkably rapid. Figure 3.1 shows the changing composition of agriculture, industry (manufacturing and non-manufacturing), and services over the period 1965 to 1996. Agriculture's share of GDP declined from around 53 per cent in 1965 to 17 per cent in 1996. There has been a commensurate increase in the share of industry (broadly defined to include mining, manufacturing, utilities, and construction), which is more than three times what it was in 1965: industry's share of GDP increased from 12 per cent in 1965 to 43 per cent in 1996. The manufacturing share of GDP has grown from just under 8 per cent in the mid-1960s to reach 25 per cent by 1996, having overtaken agriculture's share of GDP in 1990. Most of the increase in manufacturing share of GDP occurred after 1987, partly as a result of liberalisation of trade and the investment regime.

The non-manufacturing industry's (broadly defined to include crude oil and natural gas mining, other mining and quarrying, construction and utilities) share of GDP declined from a peak of 31.7 per cent in 1980 to 17.7 per cent in 1996. This decline was principally due to the fall in the crude oil and natural gas sector's share of GDP during this period. Although not shown in Figure 3.1, the oil and gas sector's share of GDP declined from a peak of 26.0 per cent in 1980 to 8.2 per cent in 1996. The construction and utilities share of GDP increased over the last two decades, from 6.0 per cent in 1980 to 9.1 per cent in 1996.

This pattern of structural change is typical of the development process and has been observed in most other industrialising countries. The share of value added in agriculture declines during the transformation process, while manufacturing value added rapidly grows, overtaking the agricultural sector as the dominant sector. Indonesia was a late starter in the development process compared to other countries in the region, partly due to the dominance of the oil and gas sector during the 1970s and early 1980s (Booth, 1992).

Figure 3.1

**Structural Change in the Economy, 1965-96
(% GDP)**



Source: BPS, National Income Statistics

Notes: GDP measured in current market prices.

Accompanying this remarkable growth has been the structural change within manufacturing. Table 3.1 shows the shares of total manufacturing value added (MVA) by major industry groups, including oil and gas refining. MVA data for non-oil/gas manufacturing industries are calculated from the Central Bureau of Statistics (BPS) annual manufacturing survey, 1975 to 1993. A consistent series of annual manufacturing surveys are available only since 1975. At the time of writing the thesis, the latest manufacturing survey available was for 1993. MVA data for oil/gas manufacturing are taken from BPS National Income Statistics, but are available only since 1983. Considerable change in MVA shares is observed during the period 1975 to 1993. The oil and gas sector's share of MVA declined from 27.7 per cent in 1985 to 11.3 per cent in 1993, indicating the declining importance of the oil refining sector to the economy as a whole. Conversely, non-oil/gas manufacturing share of total MVA increased from 73.3 per cent in 1985 to 88.7 per cent in 1993. Within non-oil/gas manufacturing there has been considerable structural transformation. The food, beverage and tobacco sector experienced the greatest change in MVA share, declining from 47 per cent in 1975 to 24 per cent by 1993. Most of this decline in share is due to the shift in production away from traditional resource-intensive commodities such

as processed tea, coffee, sugar and cooking oil. In 1975, these four commodities accounted for 58 per cent of the food-processing sector's share of total MVA. By 1993, these same industries accounted for less than 10 per cent of the sector's share of MVA. Textiles, garments and footwear (ISIC 32) and machinery and transportation (ISIC 38) had the largest increases in shares of total MVA during this period. Chemicals (ISIC 35) experienced a decline in its relative share of MVA, but this was principally due to the decline in the importance of the traditional rubber processing industry (ISIC 3552) during this period. Processed rubber's share of total MVA declined from 11.1 per cent in 1975 to 1.1 per cent in 1993. Several other chemical products increased their share of total MVA during this period (e.g., plastics).

The pattern of structural change in manufacturing partly reflects Indonesia's resource endowment and is similar to the pattern observed in other countries in the region: declining shares of traditional resource-intensive products and an increase in the shares of labour and capital-intensive commodities as the industrial structure increases in depth and sophistication. Government policies have also had an important influence on structural change in manufacturing. Liberalisation of the trade and investment regime has increased the flow of resources into industries in which Indonesia currently has a comparative advantage such as the labour-intensive sectors. Indeed, a substantial proportion of the production growth in garments and footwear was due to the rapid growth in exports of these products after trade liberalisation in the late 1980s (see Table 3.2).

Table 3.1 Share of MVA by Broad Industry Group, 1975-93

Sector	1975	1985	1993
1. Oil and gas refining	na	27.7	13.3
2. Non-oil/gas manufacturing	na	72.3	86.7
Share of Non-Oil/Gas MVA:			
31 Food, beverages and tobacco	46.7	32.2	24.3
32 Textiles, garments and footwear	10.8	14.1	19.4
33 Wood and wood products	2.5	8.8	9.3
34 Paper and paper products	4.6	3.5	5.0
35 Chemicals, and petrochemicals	20.0	16.1	13.2
36 Non-metallic mineral products	2.6	5.1	4.3
37 Steel and metal products	0.7	7.3	7.1
38 Machinery, equipment and transport	12.1	12.8	17.4
39 Other manufactures	0.1	0.3	0.9
Major industries			
3142/30 Cigarettes	12.3	15.0	9.9
35520 Rubber	11.5	3.1	1.1
31181 Sugar	8.1	3.7	1.6
31163 Coffee	7.2	1.9	0.2
31150 Cooking Oil	6.0	2.3	1.2
31220 Tea	4.8	1.0	0.3
32112 Weaving	4.7	4.7	3.6
35120 Fertiliser	2.4	3.4	2.1
38440 Motor cycles	2.0	1.4	3.1
32111 Spinning	1.9	3.0	2.7
38430 Motor vehicles	1.7	1.8	3.9
36310 Cement	1.5	2.0	1.5
32400 Footwear	0.9	0.6	2.9
32210 Garments	0.8	3.6	6.6
35600 Plastics	0.7	1.4	2.3
33113 Plywood	0.4	2.4	5.8
31170 Bakery & noodles	0.2	0.6	5.2

Source: For rows #1 and #2, National Income Statistics, BPS. For non-oil/gas manufacturing industries, Annual Manufacturing Survey, BPS, 1975-93.

na indicates oil/gas processing value added not available prior to 1983.

3.3 Manufacturing Export Boom: 1986 to Present

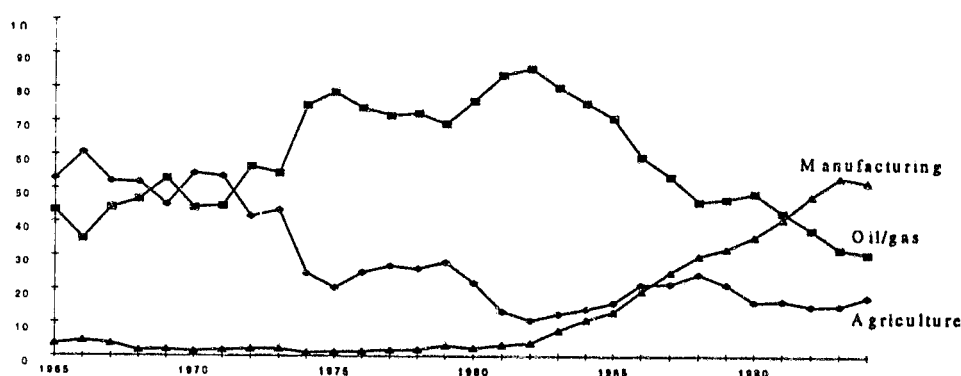
The structural transformation of the economy is also reflected in Indonesia's changing pattern of exports. Figure 3.2 charts the changing composition of exports during the last three decades. Between 1965 and 1974, Indonesia's exports were dominated by agricultural commodities and oil. The oil price increases in the early 1970s almost doubled the contribution of oil in total exports. By 1982, more than 80 percent of the value of total exports emanated from the oil sector. The plunge in oil prices in the first half of the 1980s cut the share of oil exports by almost half to 45 per cent of the total

in 1987. The share of agricultural exports declined sharply in the 1970s, partly as a result of lower agricultural commodity prices, and the 'Dutch Disease' effect of the oil boom.¹

Exports of manufactures were negligible during the first 18 years of the New Order government. Indeed, manufacturing exports rarely surpassed five per cent of total exports during this period. The devaluation of the Rupiah in 1983 and 1986, and the 1980s trade reforms stimulated rapid expansion in non-oil manufacturing exports in the late 1980s. Manufacturing exports as a share of total exports grew from less than 3 per cent in 1975 to around 12 per cent in 1985 and to just over 51 per cent by 1995.

Figure 3.2

**Changing Composition of Exports, 1965-95
(% Total Exports)**



Source: BPS, Export Statistics, various issues.

Note: 1. The following definitions (SITC) are used:

Agriculture - SITC items 0,1,2, (excluding 27 and 28), and 4.

Oil and gas - SITC items 3, 27, 28, and 68.

Manufacturing - SITC items 5, 6 (excluding 68), 7 and 8.

Substantial transformation has also occurred within the manufacturing sector. Table 3.2 shows the composition of manufacturing exports according to three factor intensity classes: labour, capital, and resource intensity. This classification of industries according to factor intensity is taken from Ariff and Hill (1985) and Hill (1992). Table 3.2 shows that the share of total exports emanating from labour-intensive industries increased from 45 per cent in 1984 to 61 per cent in 1995.

¹ See Warr (in Booth, 1992) for a detailed discussion on the effects of the oil boom on Indonesia's competitiveness in the 1970s and resulting policy responses.

Conversely, the share of exports emanating from resource-intensive industries declined from 46 per cent in 1984 to 25 per cent in 1995. The share of exports emanating from capital-intensive industries has fluctuated around 14 for most of the last decade. This pattern of manufacturing exports - dominated by labour-intensive products - is expected in a labour abundant, developing economy like Indonesia.

Table 3.2 **Major Manufactured Exports, 1980-95**
(US\$ million or %)

	1980	1984	1986	1988	1990	1992	1995
<i>Labour-intensive</i>							
Total	287	826	1,054	2,061	4,634	9,963	12,517
Percentage of all manufactures	57	45	40	38	51	62	61
Major items							
Garments	98	296	522	797	1,646	3,164	3,205
Woven Fabrics	43	183	287	571	1,132	2,494	1,820
Footwear	1	5	8	82	570	1,324	1,888
Electronics	94	214	29	41	204	935	2,068
Furniture	3	5	9	70	286	491	783
Yarn	3	17	20	109	109	344	678
Toys, sporting equipment	n	n	n	n	57	218	245
Jewellery	n	8	36	78	57	99	726
<i>Resource-intensive</i>							
Total	119	832	1,209	2,575	3,324	4,131	5,052
Percentage of all manufactures	24	45	46	47	37	26	25
Major items							
Plywood	68	791	1,127	2,368	2,791	3,501	4,125
Cement	26	13	41	88	96	105	30
Leather	6	7	15	68	63	61	47
<i>Capital-intensive</i>							
Total	97	194	418	919	1,183	2,139	2,869
Percentage of all manufactures	19	10	14	15	12	13	14
Major items							
Paper products	5	20	33	128	154	341	594
Steel products	8	7	58	269	188	230	272
Fertiliser	35	37	127	134	193	184	178
Rubber tyres	n	2	11	45	66	96	103
Total, all manufactures	501	1,839	2,639	5,476	9,041	16,061	20,458
Three largest as % of total	52	71	73	68	61	57	38
Manufactures as % of total exports	2	8	18	28	35	48	51

Source: BPS, Ekspor (Export Statistics), various issues

Note: 1. The following definitions (SITC) are used:

Resource intensive - SITC items 61, 63, 66 (excluding 664-666), 671.

Labour intensive - SITC items 54, 55, 65, 664-666, 695-697, 749, 778, 793, 81-85, 89.

Capital intensive - SITC items 5 (excluding 54 and 55), 62, 64, 67 (excluding 695-697), 7 (excluding 749, 776, 778, 793), 86-88. This classification was developed by Krause (1982), and subsequently modified by Ariff and Hill (1985) for ASEAN and by Hill (in Booth 1992) for Indonesia.

'n' indicates less than \$1 million.

A second feature of the pattern of manufacturing exports is the increasing diversification of exports, particularly during the 1990s. Table 3.2 also shows the

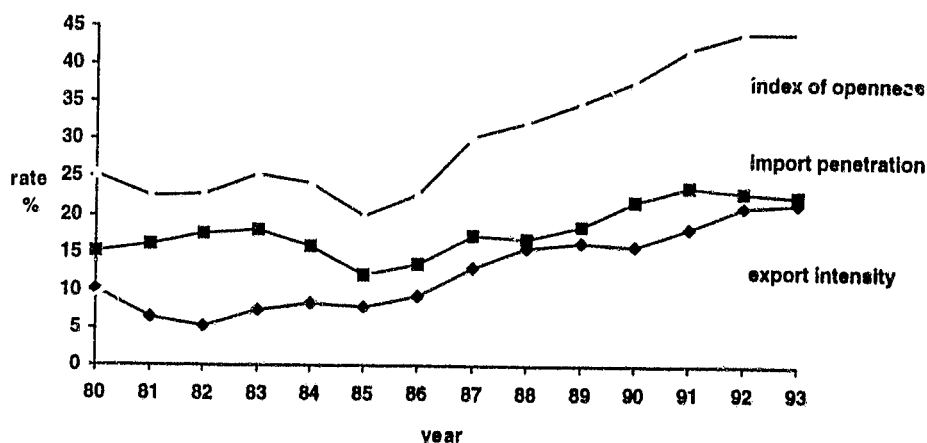
export shares of major products between 1980 and 1995. In 1986, 73 per cent of manufacturing exports came from three products: plywood (43 per cent), garments (20 per cent), woven fabrics (11 per cent). By 1995 these three products accounted for 45 per cent of all manufacturing exports: plywood (20 per cent), garments (16 per cent), and woven fabrics (9 per cent). In the 1990s, rapid export growth occurred in paper products, electronics, footwear, yarn, furniture, jewellery, toys, and sporting goods. A feature of resource-intensive manufacturing exports is that they remain dominated by plywood exports; plywood still accounts for over 80 per cent of RI exports. Processed-agricultural manufactures make up a small proportion of total RI manufacturing exports in the early 1990s. This small proportion is due to a combination of factors including numerous restrictions in the agricultural sector (e.g., BULOG's import monopoly over several agricultural commodities) and the lack of foreign investment in this sector.

The increasing integration of the manufacturing sector with world markets is illustrated in Figure 3.3. Figure 3.3 shows the export-orientation ratio (exports as a percentage of manufacturing output value), import penetration rates (imports as a percentage of manufacturing output value), and an index of openness (ratio of total trade to manufacturing output value). All three series show increasing openness of the manufacturing sector to international trade after trade liberalisation. The export-orientation ratio increased from a negligible 9.2 per cent in 1986 to 23 per cent by 1993. Import penetration declined over the period 1980 to 1985, partly as a result of heavy domestic protection during this period. The share of imports increased after 1986 as a result of trade liberalisation.² A clearer trend in the degree of integration with international markets since 1986 is shown by the index of openness. Prior to trade policy reforms the index fluctuated between 20 and 25 per cent of total manufacturing output value. In 1987, the index shifted upward and continued to increase thereafter. The index of openness has increased from a low-point of 19.8 per cent in 1985 to 44 per cent in 1993.

² Part of the increase in import penetration is also due to economic recovery after 1987.

Figure 3.3

Rising International Trade in the Manufacturing Sector, 1980-93
(% manufacturing output value)



Source: UNIDO, International Trade Statistics Year Book (various issues).

Import penetration rate is the percentage share of imports to total manufacturing output.

Export intensity ratio is the percentage share of exports to total manufacturing output

Index of openness is the percentage share of total trade to total manufacturing output. The index measures the degree of openness of the manufacturing sector to international trade.

3.4 Salient Features of the Manufacturing Sector

This section examines the salient features of the manufacturing sector including the pattern of ownership, firm size and export-orientation by ownership. The BPS manufacturing surveys distinguish firms according to ownership type: government, foreign, private domestic and joint ventures between the three. Ownership is an empirically slippery concept in Indonesia. Reflecting the impact of domestic equity regulations, and multinationals' strategic motives, joint ventures are a particularly common organisational form. In view of the large joint venture presence, it is no simple matter to devise an operationally satisfactory definition of "ownership". Some previous studies use a "cut off" point so that firms with, say, more than 30% foreign equity are defined as foreign-controlled enterprises (Chou, 1986). However, these ignore the reality of control in most instances. Aswicahyono and Hill (1995) devised a more appropriate empirical definition of foreign and state enterprise ownership for Indonesia based on the foreign investment regime and the reality of control in many cases. As indicated above, from 1974 to 1994 foreign firms were unable to secure

100% ownership, and those established before 1974 had been under pressure to divest a portion of their equity. Numerous Indonesian case studies (cited in Hill, 1988) have demonstrated that, in the large private-foreign group, the local partners invariably played a subordinate role, especially in matters of finance and technology. These private-foreign groups may therefore be regarded as "foreign" for our purposes. Similarly, the small government-private group of firms may be regarded as "government".

This leaves the more complex groups of government-foreign joint ventures (that is, GF and GFP). Though small in number, several of these joint ventures are very large operations and they dominate a few key industries. This group can be allocated to ownership groups only on a case by case basis. In particular, there are five industries where the government can be regarded as the dominant partner in the joint venture – processed sugar (ISIC 31181), fertiliser (ISIC 35110), basic metals (ISIC 371), cement (ISIC 36310) and ship building (ISIC 38411). In all these cases, the government established the firms in these industries (or in the case of sugar, inherited them from the colonial era and subsequent nationalisation), it is heavily involved in their development, and assigned them specific strategic objectives. In all other cases, the government's role in the joint ventures has been a good deal more passive, and here, as in the P-F group, they may be regarded as foreign owned (and certainly controlled).

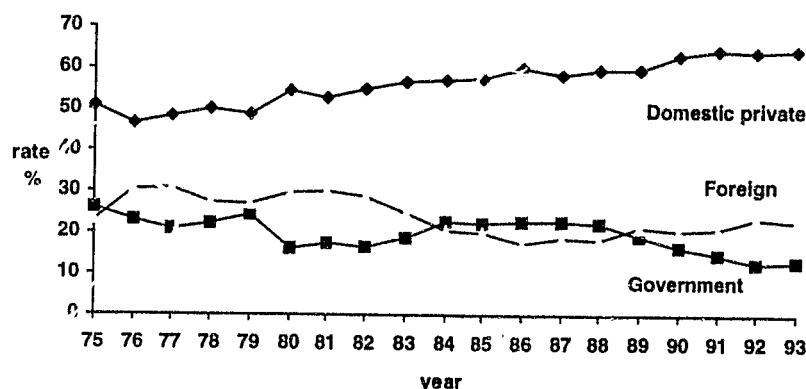
Based on these considerations Aswicahyono and Hill (1995) defined foreign-ownership as: $MNCs = F + FP + (1 - D1) * (GF + GFP)$ where F is wholly foreign owned, FP is foreign-private joint venture, GF is government-foreign joint venture and GFP is government-foreign-private joint venture. Each ownership group is measured in terms of their share of industry value added. D1 is a dummy variable equal to one if the industry is sugar, fertiliser, basic metals or ship building, otherwise zero. Similarly, the definition of state ownership is:

$SOEs = G + GP + D1 * (GF + GFP)$ where G is wholly state owned, GP is government-private joint venture, GF is government-foreign joint venture and GFP is government-foreign-private joint venture. Each ownership group is measured in terms of their share of industry value added. D1 is defined above.

Figure 3.4 shows the pattern of ownership between 1975 and 1993 for the manufacturing sector. The trends in ownership patterns mirror quite accurately the government's policy priorities discussed in Chapter 2. The government inherited a sizeable industrial state enterprise sector, mainly the result of the nationalisation of foreign property in 1957-8 and 1963-4. The 1970s oil boom enabled the government to expand the state enterprise sector into heavy industry, such as chemicals, steel, fertiliser and cement. There was a considerable gestation period between planning and implementation. Consequently, the share of state enterprises was broadly constant in the 1970s, actually declined in the early 1980s, but then rose strongly as these investments came on stream. The fall in oil prices in the mid-1980s halted further state enterprise expansion. After 1987, the relative size of the state enterprise sector declined as a result of the liberalisation in the investment regime and the rapid expansion of the private sector. The share of total MVA emanating from state enterprises declined from 23 per cent in 1987 to 13 per cent in 1993. Foreign ownership was also significant in the 1970s, but declined in the first half of the 1980s as foreign investment restrictions took effect. The share of foreign ownership rose after 1987 as a result of the liberalisation in the foreign investment regime and trade policy. Domestic private firms have also been major beneficiaries of the reforms, their share of MVA continued to increase after 1987. Contrary to widespread expectations that foreign-owned firms will establish a dominant position in the new liberal, export-oriented environment, the Indonesian experience at least suggests that this is not necessarily an inevitable outcome.

Figure 3.4

**Pattern of Ownership in Manufacturing
(% Total non-oil MVA)**



Source: BPS, Annual Manufacturing Surveys, 1975-93.

Note: The oil-refining sector is not included in these figures. The state petroleum firm, PT Pertamina dominates this sector.

Table 3.3 shows the distribution of the number and manufacturing value added of foreign and state enterprises by 2-digit industries. The trends in the pattern of foreign firms by broad industry group mirror quite accurately the government's policy priorities. Examining the period 1975 to 1985 first, it is apparent that a greater proportion of foreign firms entered capital-intensive industries. More than half of all foreign firms were located in chemicals (ISIC 35) and machinery and transportation (ISIC 38). As indicated in Chapter 2, trade policy and the restrictive investment regime during this period was designed to attract FDI into import-substituting industries. After liberalisation of trade and the investment regime, a greater proportion of foreign firms entered the export-oriented sector of textiles, garments and footwear (ISIC 32). The share of foreign firms in textiles increased from 13.4 per cent in 1985 to 24.4 per cent by 1993. Just under one third of the MVA produced by foreign firms emanated from machinery and transportation in 1993, followed by textiles and footwear (19.6 per cent) and chemicals (19.0 per cent). This pattern of FDI is not intrinsic to Indonesia or developing economies but rather to small national markets generally. It is evident also in countries like Ireland (Andrews, 1972), and Australia (Ratnayake, 1993). In terms of MVA, state enterprises are concentrated in the capital-intensive sectors of basic metal and steel (ISIC 37), chemicals (ISIC 35) and

machinery and transportation (ISIC 38), and the resource-intensive, processed food sector (ISIC 31). Twenty-five per cent of state enterprises' MVA in food processing was derived from the sugar processing industry (ISIC 31181).

Table 3.3

Distribution of Foreign and State Enterprises by Broad Industry Group

(a) Distribution of the Number of Foreign Enterprises (%)

Sector	1975	1985	1993
31 Food, beverages and tobacco	23.0	12.3	11.8
32 Textiles, garments and footwear	13.1	13.4	24.4
33 Wood and wood products	9.3	11.1	7.9
34 Paper and paper products	4.1	2.6	2.3
35 Chemicals	23.5	30.4	20.0
36 Non-metallic mineral products	3.4	3.5	2.7
37 Steel and metal products	1.1	0.5	2.2
38 Machinery, equipment and transport	22.0	24.8	23.9
39 Other manufactures	0.4	1.4	4.8
Total	100.0	100.0	100.0

(b) Distribution of MVA Produced by Foreign Firms (%)

Sector	1975	1985	1993
31 Food, beverages and tobacco	41.2	17.1	10.1
32 Textiles, garments and footwear	17.0	17.0	19.6
33 Wood and wood products	3.1	5.8	4.9
34 Paper and paper products	2.9	1.3	2.8
35 Chemicals, and petrochemicals	16.9	23.8	19.0
36 Non-metallic mineral products	2.7	10.0	3.6
37 Steel and metal products	0.3	3.1	10.5
38 Machinery, equipment and transport	16.0	21.1	27.6
39 Other manufactures	0.0	0.7	1.9
Total	100.0	100.0	100.0

Table 3.3 Continued**(c) Distribution of the Number of State Enterprises (%)**

Sector	1975	1985	1993
31 Food, beverages and tobacco	36.1	40.1	49.0
32 Textiles, garments and footwear	11.3	9.5	9.5
33 Wood and wood products	8.3	8.3	5.8
34 Paper and paper products	9.8	6.8	5.6
35 Chemicals, and petrochemicals	12.2	7.3	7.3
36 Non-metallic mineral products	4.9	13.7	19.2
37 Steel and metal products	0.3	1.9	2.6
38 Machinery, equipment and transport	16.5	11.8	9.0
39 Other manufactures	0.6	0.7	0.0
Total	100.0	100.0	100.0

(d) Distribution of MVA Produced by State Firms (%)

Sector	1975	1985	1993
31 Food, beverages and tobacco	41.1	19.8	19.1
32 Textiles, garments and footwear	6.9	4.5	5.1
33 Wood and wood products	0.6	5.9	1.5
34 Paper and paper products	5.6	3.1	3.7
35 Chemicals, and petrochemicals	23.7	22.1	17.6
36 Non-metallic mineral products	11.0	8.9	9.2
37 Steel and metal products	0.1	26.1	25.2
38 Machinery, equipment and transport	10.3	9.8	18.4
39 Other manufactures	0.1	0.1	0.0
Total	100.0	100.0	100.0

Source: BPS, Annual Manufacturing Survey, 1975-93.

Table 3.4 shows the average firm size by ownership class in 1993. Firm size is measured by the average number of employees per firm. Table 3.4 shows that, on average, foreign firms and state enterprises are larger than private domestic firms. This pattern of firm size is typical of many small countries, such as in Australia (on which see Caves, 1987: 66).

Table 3.4

Average Firm Size by Ownership Group, 1993
(Number of employees per firm)

Sector	MNC	SOE	POE
31 Food, beverages and tobacco	331	738	112
32 Textiles, garments and footwear	1061	684	225
33 Wood and wood products	480	265	213
34 Paper and paper products	447	362	139
35 Chemicals, and petrochemicals	260	506	160
36 Non-metallic mineral products	421	337	84
37 Steel and metal products	364	1235	226
38 Machinery, equipment and transport	384	845	142
39 Other manufactures	611	na	140

Source: BPS, Annual Manufacturing Survey, 1993. na; no state enterprises produced in this industry.

Evidence that foreign firms are significant exporters of manufactures is shown in Table 3.5.³ Table 3.5 shows that, on average, foreign firms have higher export-output ratios compared with local firms. In particular, MNC's export-output ratios are relatively high in textiles, garments, and footwear (54 per cent), processed wood products (71 per cent) and 'other manufactures' such as, toys and sports equipment (68 per cent). Private domestic firms have relatively high export-output ratios in textiles, garments, and footwear (30 per cent), processed wood products (57 per cent), non-metallic mineral (27 per cent) and 'other manufactures' (33 per cent). Conversely, state enterprises have the lowest export-output ratios among the three groups, except in wood processing industries (10 per cent).

This pattern of exports by ownership group normally arises because MNCs are better placed to penetrate export markets than domestic firms (Willmore, 1992). Foreign firms have specialised knowledge of, and access to, export markets, better access to technology, and ability to maintain quality standards. When MNCs are present in a given industry, there is likely to be a positive spillover to domestic firms which induces them to become more export oriented. For example, when a MNC establishes an export-oriented venture in Indonesia, its international buyers visit the country and local firms may benefit from this. Local firms often acquire the new technology, quality standards and knowledge of export markets from MNCs through joint ventures with them, or through labour turnover between MNCs and domestic firms.

³ Export data by ownership were collected by BPS only after 1990. The export data are weak due to deficiencies in the survey questionnaire. In the 1993 survey, BPS only asked firms what proportion of output was exported. It is unclear whether respondents reported actual quantity or value of exports

Table 3.5

Export-Output Ratios by Ownership Group, 1993 (%)

Sector	MNC	SOE	POE
31 Food, beverages and tobacco	13	9	10
32 Textiles, garments and footwear	54	14	30
33 Wood and wood products	71	69	57
34 Paper and paper products	3	0	1
35 Chemicals, and petrochemicals	5	10	6
36 Non-metallic mineral products	24	10	27
37 Steel and metal products	20	11	9
38 Machinery, equipment and transport	23	0	10
39 Other manufactures	68	0	33
3 Average	31	14	20

Source: BPS, Annual Manufacturing Survey, 1993

3.5 Summary

The structural transformation of the Indonesian economy has been remarkable. The Indonesia of the 1990s is almost unrecognisable compared with that of the mid-1970s. Agriculture's share of GDP has declined from around 53 per cent in the mid-1960s to less than 20 per cent by the early 1990s. Conversely, manufacturing's share of GDP has increased from a negligible 8 per cent in 1965 to 23 per cent in 1994. There has also been remarkable transformation in exports since 1986. Manufacturing exports as a share of total exports grew from around 12 per cent in 1985 to just over 51 per cent in 1995. The rapid transformation of the economic structure is partly attributed to shifts in government policies. In particular, the 1980s trade reforms have stimulated a broad-based, export-oriented industrial growth in the last decade.

The most important characteristics of Indonesian manufacturing are increasing integration with international markets, and a rapidly expanding private (both foreign and domestic) sector. In Chapter four we will discuss another important characteristic of Indonesian manufacturing: high, but declining, seller concentration. These structural characteristics provide the basis for the analysis of the interrelationships between market structure, conduct and performance, and government policy in subsequent chapters.

Chapter 4

Concentration in Indonesian Manufacturing

4.1 Introduction

This Chapter provides an overview of industrial concentration levels and concentration trends in 102 four and five-digit ISIC industries over the period 1975-93. The descriptive analysis presented below enables one to gauge the magnitude, direction, and pattern of concentration change that has occurred among these industries and provides a backdrop for the statistical analysis into the underlying factors explaining the observed levels of concentration and its effect on other aspects of market structure and performance in Chapter 7.

The descriptive analysis presented below shows that there is a tendency towards industrial deconcentration across manufacturing over the period 1975-93. The simple average four-firm concentration ratio (CR4) declined from 63.6 per cent in 1975 to 53.5 per cent in 1993. Similarly, the weighted average CR4 (weighted by each industry's share of total MVA) declined from 55.0 per cent in 1975 to 44.0 per cent in 1993. The percentage of total industries that are classified as highly concentrated (CR4 above 75 per cent) declined from 39.2 per cent in 1975 to 27.5 per cent in 1993. Correspondingly, the share of manufacturing valued added emanating from highly concentrated industries declined from a peak of around 49.0 per cent in 1980 to 31.0 per cent in 1993. Allowing for foreign trade reduces average concentration substantially. In 1993, for example, the average concentration of a sample of 67 industries without adjustment for foreign trade was 53.3 per cent whilst allowing for foreign trade it was 41.1 per cent. Thus, allowing for such trade indicates that competition is *prima facie* stronger in Indonesian markets than domestic concentration ratios would suggest.

The analysis of concentration trends presented in this Chapter mainly refers to non-oil/gas manufacturing. The oil and gas processing industry is highly concentrated (CR4=100%) and dominated by the state oil company, PT Pertamina. We adjusted the simple and weighted average CR4 ratios to include the oil and gas sector. The weighted average concentration ratio for all manufacturing shows a greater decline compared to that of non-oil/gas manufacturing over the period 1983 to 1993. The manufacturing CR4 ratio declined from 61.3 per cent in 1983 to 51.4 per cent in 1993, a fall of 9.9 percentage points. The weighted average CR4 for non-oil/gas manufacturing fell by six percentage points during the same period. The greater decline in the weighted average CR4 for all manufacturing is principally due to the significant fall in the oil and gas sector's share of total MVA during this period. As noted in Table 3.1, oil/gas share of total MVA declined from 28 per cent in 1983 to 13.3 per cent in 1993.

The remainder of this Chapter is divided into the following ten sections. Section 2 discusses popular perceptions of industrial concentration in Indonesian manufacturing. Section 3 discusses the limitations of concentration measurements. Section 4 describes the data base for calculating the four-firm concentration ratio for Indonesian manufacturing. Sections 5 and 6 examine the pattern of change and trends in concentration over the last 20 years. Section 7 examines the impact of foreign trade on seller concentration. Section 8 investigates the characteristics of persistently concentrated industries. Section 9 compares Indonesia's industrial concentration statistics with those of other countries that have liberalised their trade regime. Section 10 presents some evidence on the extent of conglomeration in Indonesian manufacturing. Finally, section 11 summarises the main findings of the Chapter.

4.2 Views on Industrial Concentration in Indonesian Manufacturing

A popular view of the Indonesian economy is that industrial concentration is relatively high and on the rise, and that the recent policy reforms have done little to abate this trend. This view is uncritically accepted and widely disseminated by authors of the non-professional (and sometimes professional) literature on the subject, including both the Indonesian and foreign press. This deep suspicion of big firms is

not new to Indonesia and can be traced back to the early period of Indonesia's independence when President Soekarno nationalised a large part of the economy. However, in recent years the debate has intensified as reflected in the extensive coverage of the subject in the Indonesian media, and numerous seminars on competition policy. The World Bank added new impetus to the debate in two separate reports in 1994 and 1995. In both reports, the World Bank noted that industrial concentration in Indonesian manufacturing was very high by international standards, and identified cartel practices in several large industries and commodities: cement, fertiliser distribution, sugar processing, plywood distribution, paper production, rice, cloves.

Recent research in Indonesia has primarily focused attention on changes in industrial concentration levels over a relatively short period of time. Simandjuntak (1991) was one of the first economists to examine concentration over time, and noted a declining trend in industrial concentration between 1983 and 1987. Econit (1995) showed that levels of industrial concentration have increased for several industries over the period 1988-92. This attempt to examine trends is misleading for the reason that they are examining short-run changes only. Little information is conveyed about the long term trend in the levels of concentration or the pattern of change in the levels of highly concentrated industries from a four year period. A much longer time period is needed to extract more reliable information. This is important because competition is a long run phenomenon and concentration levels in the short run often fluctuate around their long term trend. In fact, by examining concentration trends over the period 1975 to 1993, our analysis shows that there is a longer term declining trend in average concentration. The slight increase in concentration between 1988 and 1992 could either be a short-term fluctuation around the long term trend or the impact of trade liberalisation beginning to show up in import-competing industries.¹

¹ Aswicahyono, Bird, and Hill (1996) examined the trend in average concentration over the period 1980 to 1990. They found a statistically significant negative trend in concentration over this period. They also found that the trend in concentration over the period since 1986 did not differ significantly from that of the entire period. They did note that concentration fell more quickly in the most export-oriented industries (textiles garments and footwear, wood products and miscellaneous manufactures; respectively ISIC 32, 33 and 39).

4.3 The Limitation of Concentration Measurements

In the industrial organisation literature, concentration of sales among a few firms in a market has been assigned an important role in the analysis of market structure, conduct and performance. It is often used as a summary measure of market structure (Scherer and Ross, 1990) and as an indirect measure of the intensity of competition (Baldwin and Gorecki, 1994). That is, concentration measures the potential for collusive or anti-competitive behaviour among firms in a market. For example, several analysts have contended that an industry with a small number of firms and a four-firm concentration ratio above 75 per cent is more likely to have a 'competition problem' than an industry with a large number of firms and a concentration ratio below, say, 50 per cent (Baldwin and Gorecki, 1994). The concentration-collusion hypothesis has been criticised in the literature by several leading industrial organisation researchers (e.g. Demsetz, 1973; Brozen, 1982). Demsetz (1973), for example, argues that the high concentration-profit result is often the outcome of efficient firms growing faster than less efficient firms. In other words, in a 'Schumpertanain world' industries are concentrated and profitable because existing firms are so efficient they have driven other firms out of business.

Most researchers acknowledge that high concentration is a *necessary*, but not a *sufficient*, condition for anti-competitive behaviour.² Concentration measures are only one element of market structure; other elements of market structure include entry and exit barriers (including regulations restricting entry and exit of firms), and horizontal relationships between firms that affect the degree of competitiveness in an individual market. Moreover, market structure itself does not fully determine the degree of competitiveness in an industry. For each specific market structure (apart from pure competition) a range of firm behaviour is possible. An oligopoly's behaviour can vary between collusion and price competition (Green and Porter, 1984). Conversely, in Indonesian manufacturing some unconcentrated industries have anti-competitive outcomes because of government constraints on competition (e.g. sugar processing and plywood).³

² Posner (1976) lists 11 other conditions, in addition to high concentration, for indicating a potential for successful collusion.

³ Xie and de Bruyn Kops (1995).

Most of the earlier literature on industrial concentration was developed within a large, closed (no international trade) economy model.⁴ Today, international trade is well established and most countries have moved towards free(r) trade. Thus, in a small, open economy, domestic concentration (unadjusted for foreign trade) statistics are inappropriate measures of market power.⁵ When foreign trade is substantial, exposure to trade should significantly influence competition and industry profits. Economic theory predicts that concentration will have a significantly reduced impact on profits as domestic prices for a small, open economy will tend to be determined by foreign markets (Caves et al, 1980). Empirical evidence for other countries show that strong import competition constrains market power of domestic monopolies and oligopolies in most kinds of markets (De Melo and Urata, 1986; Katcs and Petersen, 1994). Thus, at the minimum, it is essential to adjust concentration ratios for foreign trade to obtain a more accurate measure of market power. We will present evidence on trade-adjusted concentration measures in section 6.

The Theory of Perfectly Contestable Markets makes it plain that the level of concentration is unlikely to be an important determinant of market performance. If a market is perfectly contestable, price always approximate cost, even when there is only one incumbent firm (Baumol et al, 1982). For an industry to be perfectly contestable it must meet a number of conditions. First, entry and exit must be costless. That is, there are no sunk or irrecoverable costs in the industry. Secondly, contestability also requires that potential entrants can enter before incumbents can retaliate through price cuts, and can exit before retaliation produces negative profits. The contestable market theory has been questioned on both theoretical grounds (See, for example, Brock, 1983), and on empirical grounds (See Shepherd, 1984). According to Green (1987), one might justifiably question the relevance of the contestable markets paradigm, if it was not for the growing influence of foreign competition. For example, Shepherd (1984), who has been the most scathing in his

⁴ In fact, most of the earlier studies examined the effect of seller concentration on profitability of US industries in the 1960s and 1970s when import competition was not significant.

⁵ Indonesia is a small economy relative to the rest of the world. While Indonesia is the fourth most populous country in the world, its economy accounts for less than 1 per cent of the world's output at official exchange rates. Countries like Canada and South Korea (two larger economies than Indonesia) are also referred to as 'small' economies in the economics literature.

attack on contestable market theory, has suggested that if the theory has any applicability, it is in the area of imports. Some economists have gone further and argued that the viability of contestable markets depends on imports. Green (1987) argued that for Canada, a small open economy, the contestability paradigm may be relevant. Many of the conditions prescribed for the existence of a contestable market are met with import competition in a small, open economy. Thus, if sunk costs facing foreign exporters are negligible, the possibility of more rapid entry by foreign firms exists. This threat of rapid import competition will force domestic firms to set domestic prices equal to international prices.

Concentration statistics are static measures in the sense that they simply record the characteristics of a size-distribution at some particular instant. If the identity of the dominant firms were to change over time, then even persistently high levels of concentration would not imply the absence of competitive forces. Changes in the relative positions or market share of the leading firms would indicate healthy competitive conditions prevailing in that industry (Baldwin and Gorecki, 1994; Geroski and Toker, 1996). Changes in the relative positions or market share of the leading firms in Indonesian manufacturing will be investigated in Chapter 8.

4.4 Calculating CR4 Levels from the Indonesian Backcasted Annual Manufacturing Surveys

The CR4 is calculated from the 'backcasted' Annual Manufacturing Survey produced by the Central Bureau of Statistics (Badan Pusat Statistik or BPS).⁶ The survey attempts to enumerate all establishments with 20 or more employees in the non-oil/gas manufacturing sector. Indonesian non-oil/gas manufacturing is classified into 119 four and five-digit ISIC industries.⁷ Seventeen industries are dropped from the analysis for two reasons. First, eight industries are dropped from the sample because

⁶ In the 1985 Industrial Census, BPS discovered around 6,000 establishments that had commenced operations before 1985, but were not registered with BPS. Thus, the annual manufacturing surveys prior to 1985 are greatly under-enumerated. The 'backcasted' Annual Manufacturing Survey is a revised survey of the output values, employment numbers and input values of the discovered establishments over this period.

⁷ Actually, up until 1990 BPS classified Indonesian manufacturing into 119 ISIC industries. Since 1990, BPS disaggregated all four-digit industries into five-digit industries resulting in over 288 five-digit industries in the annual manufacturing surveys since 1990. To make a consistent comparison of concentration levels over the period 1975 to 1993 we continue with the 119 ISIC industry classification.

their product classification is so broad that they have no economic meaning: these are the 'not else included industries'. Second, nine industries are dropped from the analysis because their classification has changed since 1990, and thus can not be compared with previous years. This leaves a sample size of 102 industries, which produced about 94 per cent of total non-oil/gas manufacturing value added in 1993.

The CR4s in Indonesian manufacturing are likely to be underestimates of 'true' concentration. The underestimation arises for three reasons. First, the data are based on establishments rather than on firms, so that multi-establishment firms are recorded more than once, even though they are in effect one commercial entity. Thus, concentration ratios will be underestimated in those industries where the leading firms own more than one establishment. Secondly, the data take no account of horizontal relationships between different firms such as, interlocking directorates, family partnership, and business groups or conglomerates. To the extent that these conglomerates are horizontally, rather than vertically, integrated many concentration ratios will also understate firms' effective market power. Finally, the concentration figures refer to *national* ratios and will be underestimated for industries which are regionally fragmented in the sense of having regional submarkets. In almost all cases the regionally weighted national concentration ratios will be greater than the corresponding unweighted national concentration ratios. The determinant factors in the formation of distinct regional and local submarkets in Indonesia are high transportation costs and the 'perishability' nature of certain products. However, transportation costs in Indonesia are rapidly falling in real terms as infrastructure improves, and this in turn will reduce regional fragmentation of many markets. According to Scherer and Ross (1990), in general the most regionally segmented commodities are cement, glass and glass products, and steel mill products. Although high transport cost does not necessarily confine commodities to regional markets, there are commodities which by their very 'perishable' nature usually are confined to much narrower markets than the nation as a whole; among them are milk, bread and bakery products and newspapers.

Conversely, the CR4s can be overestimated, because the backcasted annual manufacturing survey only enumerates establishments with 20 or more employees.

Establishments with less than 20 employees are not included in the calculation of the concentration ratio. There are data for small-scale firms (those with 20 or less employees), but they are less reliable and are not produced on an annual basis - the small-scale survey was only published twice in the 1980s. In aggregate this is not a serious problem because small firms accounted for less than 15 per cent of manufacturing value added in 1985 (Hill 1990a: 89). However, the omission might matter in certain industries (e.g. leather processing). Hill (1987: 82) found for a sample of 18 industries in 1982 that the CR4s adjusted for small scale and cottage industries were not appreciably lower (except for leather processing) than their corresponding unadjusted values. Moreover, small and cottage industries are often not in direct competition with the factory sector, so the unadjusted estimates of CR4 may be a more accurate measure of the intensity of competition.

The extent of these biases and their impact on industrial concentration statistics in Indonesian manufacturing industries are unknown. However, there are reasons to believe that they may not be substantial. First, conglomerates are more often vertically integrated rather than horizontally integrated in manufacturing. While they are widely dispersed across the economy, they often produce in unrelated markets. Second, our industry case studies show similar concentration ratios based on BPS establishment data and primary firm data collected during my fieldwork, suggesting that under-estimation may not be significant, at least for these two industries. In clove cigarettes, for example, the CR4 ratio based on BPS establishment data is 82 per cent, while it is 85 per cent based on primary firm data (Chapter 9). Finally, it is important to emphasise that any under and over-estimation of CR4 levels may not be serious for our analysis of trends in concentration if the net effects of under and over-estimation of CR4 levels remain unchanged over time.

4.5 Inter-temporal Changes in the Distribution of Industries by CR4 Class

This section examines inter-temporal changes in the distribution of industries by CR4 class. Table 4.1 presents the distribution of industries and manufacturing value added by concentration class interval. Figure 4.1 presents a two-way classification of the number of industries distributed by CR4 class intervals for the years 1975, 1985 and

1993. Concentration is divided into quartile class intervals: CR4 between 0 and 24 per cent, between 25 and 49 per cent, between 50 and 74 per cent, and between 75 and 100 per cent. Those industries with a CR4 above 75 per cent are referred to as highly concentrated industries. Those industries with a CR4 between 50 and 75 per cent are referred to as moderately concentrated industries, and those industries with a CR4 less than 50 per cent are referred to as low concentrated industries. These four class intervals are chosen for comparative purposes with other studies.

Table 4.1

The Distribution of Industries and Share of MVA by CR4 Class Intervals

(a) Number and Percentage* of Industries

CR4 Class	1975	1980	1985	1990	1993
CR4:75 to 100	40 (39.2%)	29 (28.4%)	23 (22.5%)	22 (21.6%)	28 (27.5%)
CR4:50 to 74	31 (30.4%)	35 (34.3%)	30 (29.4%)	25 (24.5%)	24 (23.5%)
CR4:25 to 49	19 (18.6%)	30 (29.4%)	32 (31.4%)	37 (36.3%)	36 (35.3%)
CR4:0 to 25	12 (11.8%)	8 (7.9%)	17 (16.7%)	18 (17.6%)	14 (13.7%)

*Percentages in parenthesis
102 non-oil/gas industries

(b) Share of Manufacturing Value Added (% of total non-oil/gas MVA)

CR4 Class	1975	1980	1985	1990	1993
CR4:75 to 100	36.1	49.0	36.6	35.0	31.1
CR4:50 to 74	27.6	15.1	11.4	14.0	18.1
CR4:25 to 49	9.0	10.5	21.4	19.0	31.7
CR4:0 to 25	27.3	17.4	30.6	32.0	19.1

Source: BPS, Annual Manufacturing Survey, 1975-93.

Examining Table 4.1 first, there is a fair degree of variation between different CR4 class intervals in the number of industries and the share of manufacturing value added (MVA). There has been a decrease in the number of industries and a decrease in the share of manufacturing value added in highly concentrated industries. Over the period 1975-93, the number of high concentrated industries has declined from 40 (or 39 per cent of total industries) in 1975 to 28 (or 27.5 per cent of total industries) in 1993. The share of manufacturing value added emanating from highly concentrated industries has fluctuated over this period from a peak of 49 per cent in 1980 to 31.1 per cent in 1993. Almost 70 per cent of the MVA emanating from highly concentrated

industries in 1993 is attributed to four industries only: clove cigarettes (9.6 per cent), noodles (4.8 per cent), automobiles (3.9 per cent) and motor cycles (3.2 per cent). Over the sub-period of 1990 to 1993 the number of highly concentrated industries has increased from 22 to 28 industries. The share of MVA emanating from these highly concentrated industries actually decreased from 35.0 per cent in 1990 to 31.1 per cent in 1993. The decline in the share of MVA during this period was primarily due to the basic iron and steel industry (6.9 percent of total MVA) shifting to the moderately concentrated class (CR4 between 50 and 75 per cent) by 1993. The converse is found for the lowest two CR4 class intervals. The number of low concentrated industries has increased from 31 (or 30 per cent of total industries) in 1975 to 50 (or 49 per cent) industries in 1993. The share of manufacturing value added emanating from this class has increased from 36.3 per cent in 1975 to 50.8 per cent in 1993.

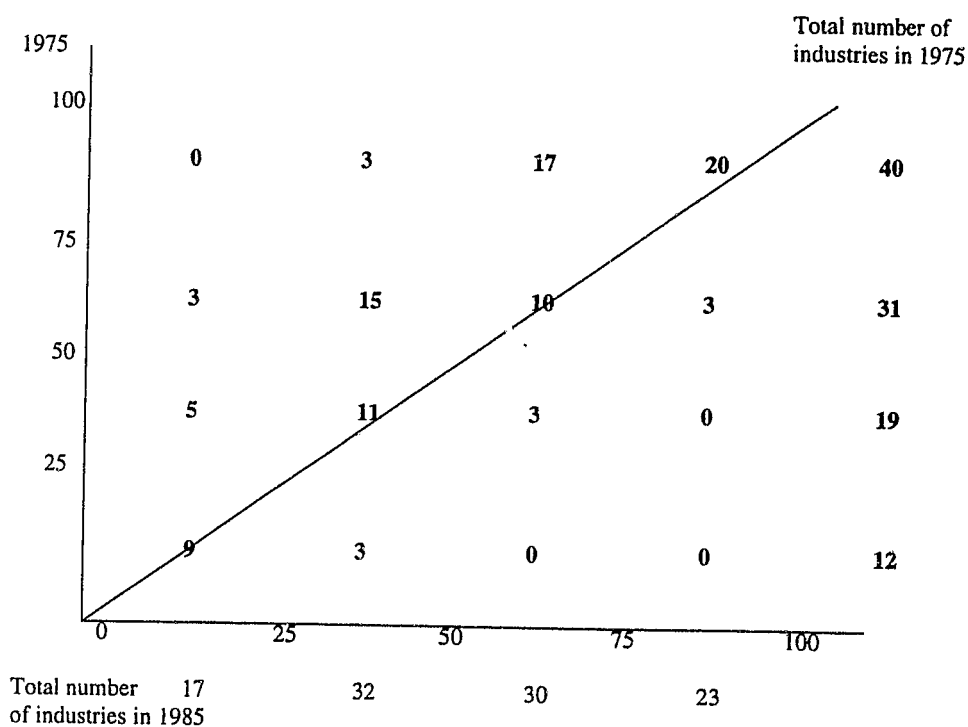
Underlying these observations are the shifts in the number of industries between CR4 class intervals over the period 1975-93. For example, the two-way classification of Figure 4.1 shows that of the 40 highly concentrated industries in 1975, 17 declined to CR4 levels between 50 and 75 by the year 1985 (Figure 4.1a) and 10 by the year 1993 (Figure 4.1b). Three of these 40 industries declined to CR4 levels between 25 to 50 per cent by the year 1985 and eight by the year 1993. Of these 40 industries, 22 are included in the 28 highly concentrated industries in 1993. Of these 28 industries, four had CR4 levels between 50 and 75 in 1975, and two had CR4 levels between 25 and 50 in 1975.

Figure 4.1 (a) and (b) also indicate that, across the total industry sample, about half of all industries remained within their respective CR4 class. Adding the number of industries along the diagonal in Figure 4.1(b), the total number of industries that remained within their respective CR4 class interval is 51 (or 50 per cent of total industries in the sample). However, the number of industries that shifted to a lower concentration class was greater than those industries that shifted to a higher concentration class. This can be seen by comparing the number of industries to the 'right' as against the 'left' of the diagonal. Industries to the 'left' of the diagonal indicate a shift to a lower concentration class and industries to the 'right' of the diagonal indicate a shift to a higher concentration class. In the different periods, the number of industries with decreases in concentration levels range between 37 and 43 while those with increases range between 9 and 15.

Figure 4.1

Inter-temporal Changes in the Distribution of Industries
by CR4 Class Intervals, 1975-93

(a) 1975-1985



(a) 1975-1993

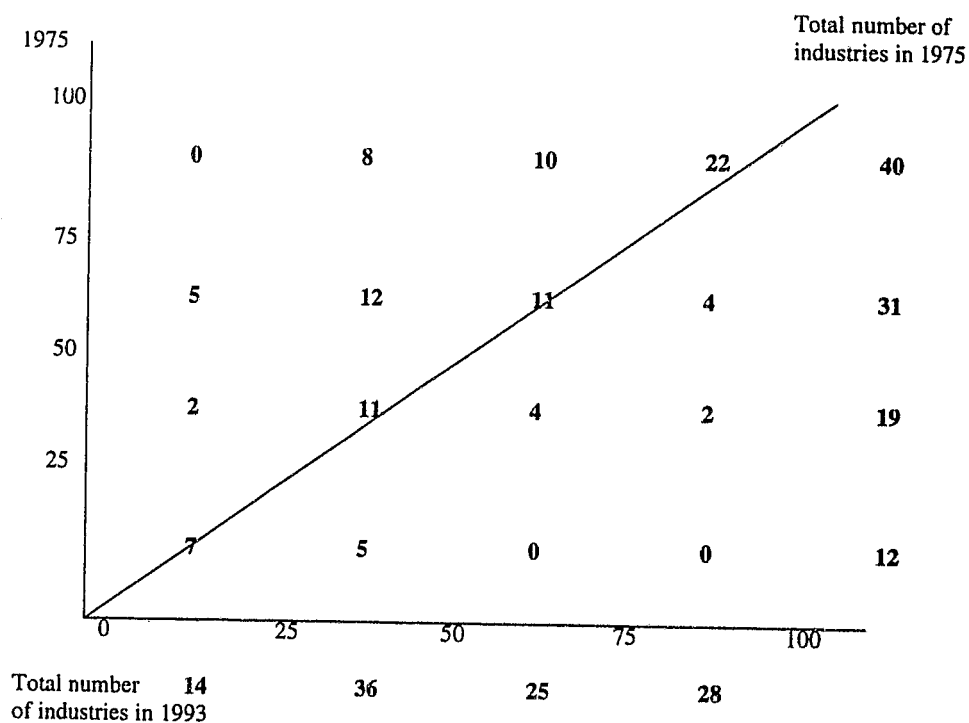


Table 4.2 presents the total sample of industries distributed according to differing magnitudes of percentage point change in CR4 levels over 1975-93. This table confirms that the number of industries with decreases in concentration levels is greater than the number of increases. Of the 102 industries, 69 industries had decreases in concentration, two industries had no change, and the remaining 31 industries had increases in concentration. Table 4.2 also shows that, in 75 per cent of all highly concentrated industries in 1975, concentration decreased. In the majority of cases these decreases are 10 or more percentage points in CR4 levels.

Table 4.2
Number of Industries with Rising, Stable or Declining Concentration,
1975-93

Percentage Point Change in CR4	CR4 Class Interval in 1975				Totals
	0 to 24	25 to 49	50 to 74	75 to 100	
Increases in CR4:					
Greater than 20	1	3	0	0	4
Between 10 and 20	2	4	4	2	12
Between 5 and 10	2	0	2	2	6
Between 0 and 5	4	1	1	3	9
No Change in CR4:	0	0	0	2	2
Decreases in CR4:					
Between 0 and 5	1	3	1	8	13
Between 5 and 10	1	0	6	2	9
Between 10 and 20	1	5	4	7	17
Greater than 20	0	3	13	14	30
Total Increases	9	8	7	7	31
No Change	0	0	0	2	2
Total Decreases	3	11	24	31	69

4.6. Trends in Average Concentration

This section examines the trend in average concentration over the period 1975 to 1993. Concentration trends in sub-samples of high and low concentrated industries, export-oriented and import-competing industries are also examined in sections 4.6.2 - 4.6.4.

4.6.1 Average Concentration

Table 4.3 shows the simple and weighted average CR4 levels over the period 1975 to 1993. A visual interpretation of the average CR4 trends is presented in Figure 4.2. A weakness of the simple average CR4 is that it does not take account of the differences in output sizes between industries. Therefore, we include two weighted averages of concentration. The first weighted average uses the industry's share of total manufacturing output in the current year as a weight, and is referred to as the 'current-year weighted average CR4'. This weighted average CR4 adjusts for differences in output sizes between industries. However, changes in the current year weighted average CR4 comprise changes in concentration and industry weights. The second weighted average CR4 uses the industry's 1975 share of total manufacturing output as a weight, and is referred to as the 'constant weighted average CR4'. By keeping industry weights constant at their 1975 level, we can decompose changes in the current year weighted average CR4 into changes in industry weights and changes in concentration.

Table 4.3

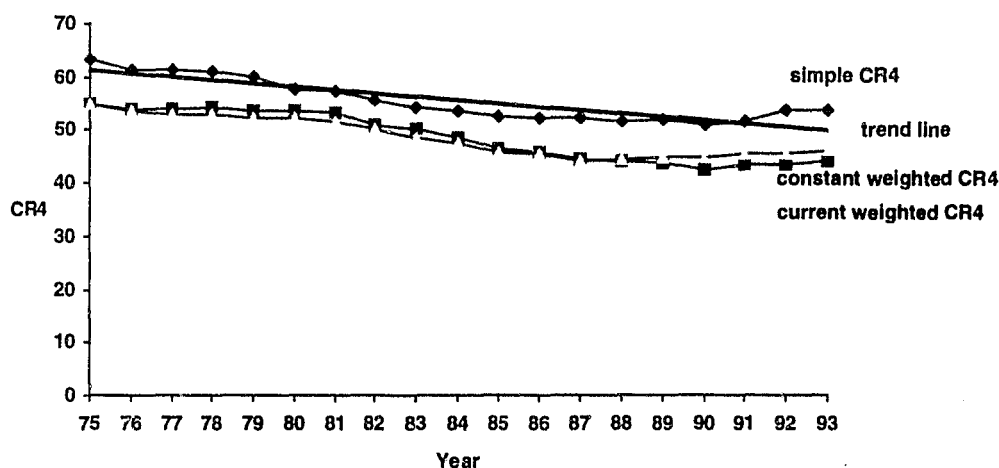
Average Four-Firm Concentration Ratios: 1975-93

Year	Simple Average CR4		Current Year Weighted Average CR4		1975 Constant Weighted Average CR4
	excl. oil/gas	incl. oil/gas	excl. oil/gas	incl. oil/gas	excl. oil/gas
1975	63.6	na	55.0	na	55.0
1976	61.9	na	53.8	na	53.6
1977	61.5	na	54.0	na	53.0
1978	61.2	na	54.3	na	53.0
1979	60.0	na	53.6	na	52.1
1980	57.9	na	53.5	na	52.2
1981	57.5	na	53.1	na	51.5
1982	56.0	na	50.9	na	50.2
1983	54.5	54.9	50.0	61.3	48.5
1984	53.6	54.1	48.4	63.1	47.3
1985	52.6	53.1	46.6	58.1	45.8
1986	52.4	52.9	45.9	54.6	45.5
1987	52.3	52.8	44.3	53.7	44.2
1988	51.8	52.3	44.2	52.7	44.5
1989	52.1	52.6	43.8	52.1	44.7
1990	50.9	55.4	42.5	52.8	44.7
1991	51.8	52.3	43.3	51.7	45.5
1992	53.7	54.1	43.4	51.7	45.3
1993	53.5	54.0	44.0	51.4	46.2
% point change:					
1975-93	-10.1	na	-11.0	na	-8.8
1983-93	-0.9	-0.9	-6.0	-9.9	-2.3

Columns 3 and 5 include the oil/gas processing sector in the calculation of the simple and current-year weighted average concentration ratios for manufacturing. The weighted CR4 for all manufacturing (column 5) is calculated as follows: $CR4 = s_1 * CR4_1 + s_2 * CR4_2$. 's₁' is non-oil/gas manufacturing share of total MVA in the current year. 's₂' is oil/gas processing share of total MVA in the current year. Source: BPS, National Income Statistics. CR4₁ refers to the weighted average CR4 of non-oil/gas manufacturing presented in column (3). CR4₂ refers to the CR4 ratio of the oil and gas sector which is equal to 100% (state monopoly). 'na' refers to not available. Reliable data on the oil and gas processing sector are not available prior 1983 from the National Income Statistics.

Figure 4.2

Trends in Average Concentration (non-oil/gas manufacturing)



The trend line represents the linear trend in the simple average concentration, estimated over the period 1975 to 1993. To estimate the trend in concentration the following simple regression is estimated by OLS: $CR4_t = \alpha + \beta t + \mu$, where t is time and $t=1..19$ (i.e. 1975-1993).

The estimated intercept term (α) is 62.3 and the estimated slope (β) coefficient is -0.66. The negative slope coefficient (-0.66) indicates that there is a declining trend in average concentration over the entire period. The estimated parameters of the trend equation for the the current year weighted average CR4 are $\alpha = 56.6$ and $\beta = -0.80$. The estimated parameters of the trend equation for the constant 1975 weighted average CR4 are $\alpha = 54.7$ and $\beta = -0.61$. The absolute values of the estimated slope coefficients of the three trend equations are significantly less than one at the 5% or better level of significance. The estimated parameters of the intercept terms are significantly greater than zero at 5% or better.

Consider, first, the trend in the simple average four-firm concentration ratio for non-oil and gas manufacturing. Average concentration fell from 63.6 per cent in 1975 to 50.9 per cent in 1990, and increased to 53.5 per cent in 1993. Over the entire period, average concentration fell by 10.1 percentage points. Average industrial concentration in Indonesian manufacturing is high by international standards, but this is expected because of Indonesia's relatively small domestic market size (see Table 4.9 below). Second, there is a continuous reduction in average concentration over most of this period. This significant negative trend in concentration is expected in a rapidly industrialising and growing economy, as Indonesia was over this period.

Table 4.3 show the results for the weighted averages of concentration. The weighted

averages of concentration show a similar trend to the simple average concentration. The current-year weighted average concentration ratio fell from 55 per cent in 1975 to 44 per cent in 1993, a fall of 11 percentage points. In terms of constant 1975 output weights, the average concentration ratio fell from 55 per cent in 1975 to 46.2 per cent in 1993, a fall of 8.8 percentage points.

It is possible to draw a number of conclusions from a comparison of the simple and weighted average concentration ratios. First, simple average concentration is greater than the weighted average concentration, suggesting that concentration must be negatively correlated with industry output size; that is, concentrated industries are smaller on average than unconcentrated industries. Second, we can decompose the change in the current weighted average concentration into the change in concentration and the change in industry weights. Using 1975 output weights in Table 4.3, the change in the current weighted average concentration (-11 percentage points) can be decomposed into the change in concentration (-8.8) and the change in industry weights (-2.2).⁸ This shows that about one fifth of the fall in the current weighted average is due to the change in industry weights, that is, there is a tendency for more concentrated industries to grow at a slower rate than less concentrated industries over the entire period, 1975 to 1993.

Table 4.3 also shows the simple average and current-year weighted average concentration ratios for all manufacturing industries, including the oil and gas processing sector. The current-year weighted average concentration ratio for all manufacturing (column 5) shows a greater decline compared to non-oil/gas manufacturing concentration (column 4) during the period 1983 to 1993. The manufacturing CR4 ratio declined from 61.3 per cent in 1983 to 51.4 per cent in 1993, a fall of 9.9 percentage points. The weighted average CR4 for non-oil/gas manufacturing fell by six percentage points during the same period. The greater decline in the weighted average CR4 for all manufacturing is principally due to the significant decline in the oil and gas sector's share of total MVA during this period. As noted earlier, oil/gas share of total MVA declined from 28 per cent in 1983 to 13.3

⁸ The change in current year weighted concentration between 1975 and 1993 (-11 percentage points) less the change in constant weighted concentration (-8.8 percentage points) equals the change in industry weights (-11+8.8=-2.2 percentage points).

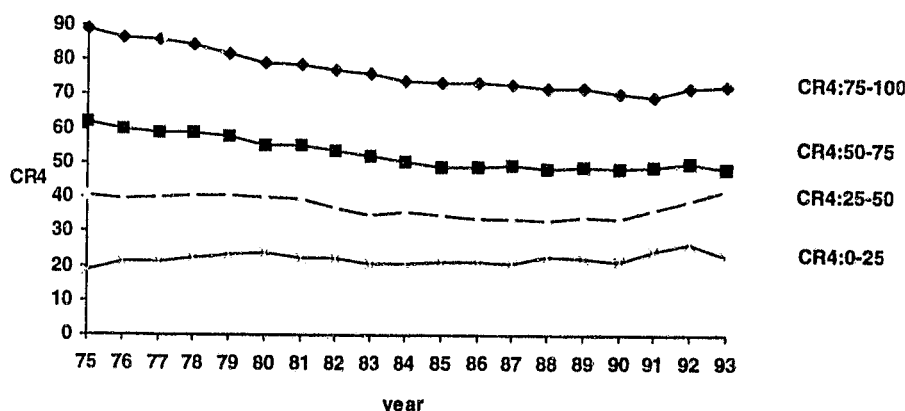
per cent in 1993 (refer back to Table 3.1).

4.6.2 Do Highly Concentrated Industries Become Less Concentrated Over Time?

The above trend in average concentration does not distinguish between different concentration classes. We would like to know whether the trend in average concentration varies across different CR4 class intervals. For example, does average concentration in highly concentrated industries decline more rapidly than the other CR4 class intervals? To examine the trends in different concentration classes, industries are grouped into quartile class intervals according to their 1975 concentration levels. Figure 4.3 shows the trends in average concentration levels of these four groups.

Examining Figure 4.3, the data point towards a rapid decrease in the average CR4 level of highly concentrated and moderately concentrated industries over the period 1975 to 1991, and a slight increase in concentration in 1992 and 1993. The data also point towards an increase in average concentration of low concentrated industries over this period.

**Figure 4.3 Trends in Average Concentration by 1975 CR4 Class Intervals
(simple average for non-oil manufacturing)**



Average concentration in highly concentrated industries (so defined in the base year) declined from 88.8 per cent in 1975 to 69.4 per cent in 1991, and increased to 72.3 per cent in 1993. Over the entire period of 1975 to 1993 average concentration of highly concentrated industries fell by 16.5 percentage points, greater than the manufacturing average of 10.1 percentage points (Table 4.3). In moderately concentrated industries, average concentration decreased from 62.1 per cent in 1975 to 49 per cent in 1985, and it has remained fairly stable since then. Over the entire period, average concentration declined by 13.8 percentage points. This contrasts with the class intervals of the two lowest concentrated industries. The simple average CR4 in the second lowest concentration class (CR4 between 25 and 50 per cent) decreased from 40 per cent in 1975 to 33.2 per cent in 1988, but increased to 42.1 per cent by 1993. In the lowest CR4 class (CR4 less than 25 per cent) average concentration increased from 18.8 per cent in 1975 to 23 per cent in 1993.

It is possible to draw a number of conclusions from an examination of these trends. First, the trends confirm our earlier results (Tables 4.1 to 4.3) that high concentrated industries have experienced a decline in their concentration levels over time. This trend has also been observed in Canadian manufacturing industries (Khemani, 1980) and in United States manufacturing industries (Brozen, 1982). Second, in the words of Brozen (1982:96) "there is a centripetal tendency for CR4s to move towards the manufacturing average". Concentrated industries tend to become less concentrated,

moving towards the average concentration ratio. Low concentrated industries tend to become more concentrated, also moving toward the central value of all concentration ratios. In other words, the trends in average concentration across and within different CR4 class intervals suggest that differences in CR4 levels have tended to decrease over time. To confirm that there is a tendency for the CR4s to move towards the manufacturing average the following simple regression is estimated by OLS: $CR4_{1993,i} = \alpha + \beta CR4_{1975,i} + \mu$, where i refers to industry i . By regressing the 1993 CR4 levels on the initial (1975) CR4 levels, we can ascertain whether concentration is regressing to the manufacturing average of CR4 (i.e. $\beta < 1$), whether concentrated industries are becoming more concentrated relative to less concentrated ones (i.e. $\beta > 1$), or whether concentration is stable over time (i.e. $\beta = 1$). The estimated equation is: $CR4_{1993,i} = 0.092 + 0.702 CR4_{1975,i}$. The estimated slope coefficient (β) of 0.702 is significantly less than one, indicating that there is a tendency for CR4s to move towards the manufacturing average of CR4.

4.6.3 The Impact of Trade Liberalisation on Concentration Trends

From Figure 4.2, there appears to be no clear impact of the policy reforms on average concentration trends post-1986. There has been an increase in concentration since 1991, but it is too early to reach a conclusion on whether this increase is due to the 1980s policy reforms or is a short term fluctuation around the trend line. This led AswicaHyono, Bird, and Hill (1996: 359) to conclude in their study of concentration trends over the period 1980-90 that, 'Where there has been a decline (since 1986) it appears to represent little more than a continuation of previous trends.' However, more confident conclusions can be reached about the impact of policy reforms on export-oriented industries. Figure 4.4 shows the trends in average concentration of import-competing and export-competing industries. The classification of industries into export and import-competing industries is taken from Fane and Condon (1996).⁹

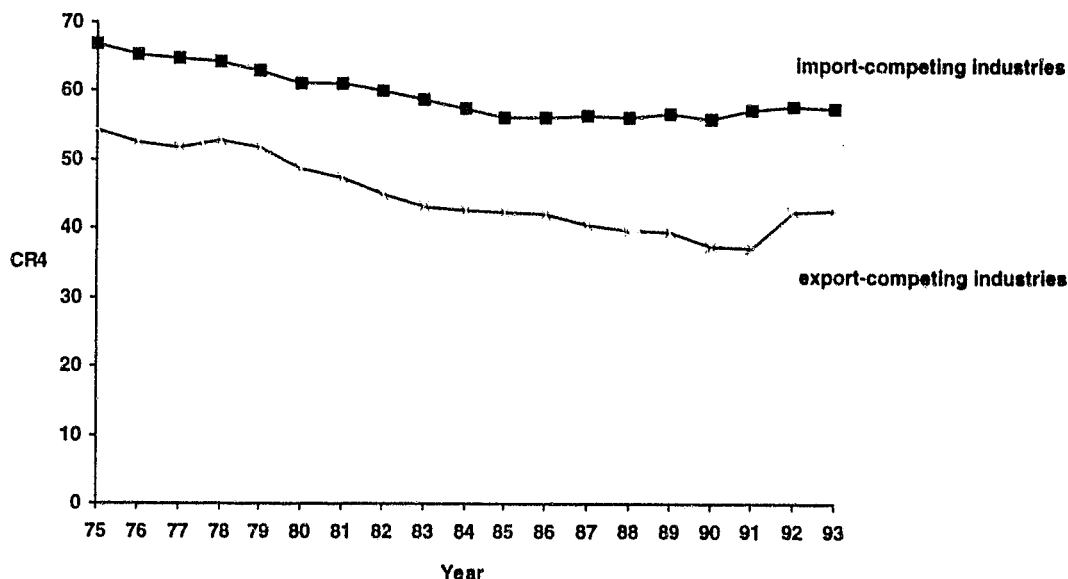
It is immediately apparent that average concentration in export-oriented industries is substantially lower than in import-competing industries both before and after the

⁹ This classification is listed in Appendix 1 of Chapter 2.

1980s trade policy reforms. This arises because unconcentrated industries and export-oriented industries in Indonesian manufacturing share common structural characteristics, namely, low capital intensity or barriers to entry. With the exception of a few industries, all these industries had very low export intensity ratios prior to the 1980s trade reforms, suggesting that the high labour intensity of many of these industries is a major explanation of the relatively low levels of concentration.

Figure 4.4

**Concentration Trends in Export-Oriented and Import-Competing Industries
(non-oil/gas manufacturing)**



However, it is clear from Figure 4.4 that the trend in average concentration of these two types of industries has diverged significantly since liberalisation. In the case of export-oriented industries there has been a continuous reduction in average concentration over the period 1986 to 1991. Average concentration increased in 1992, but this was due to three industries: kapok (ISIC 31260), wooden boxes and containers (ISIC 33120), and jewellery (ISIC 39010). If we drop these three industries from the sample, the trend in average concentration stabilises in 1992 and 1993. The reduction in average concentration is due to the expansion of the market facing domestic sellers. The expansion of export opportunities means that the domestic industry can support a greater number of viable producers, thereby reducing

concentration. This trend contrasts with that for import-competing industries. Average concentration in import-competing industries has remained fairly stable over the period 1986 to 1991. There has been a slight increase in concentration since 1991 but it is too early to reach a conclusion on whether this is due to liberalisation. A much longer time series post-1986 is required. On balance, however, our finding suggests that liberalisation has not had the major effects on industrial structure of import-competing industries that its opponents - or in some cases proponents - maintain.

Of course, not all export-competing industries have low or declining levels of concentration. Firm size and concentration will increase in those industries where scale economies are important or where the fixed cost of exporting is substantial. Economies of scale are important in exporting industries such as, synthetic fibers, spinning, knitting mills, weaving mills and certain processed foods such as canned vegetables and fruits. Concentration will be low, or decreasing, in industries where economies of scale are not important or the fixed cost of exporting is low, such as in garments.

Figure 4.5 Concentration in Selected Export-Oriented Industries

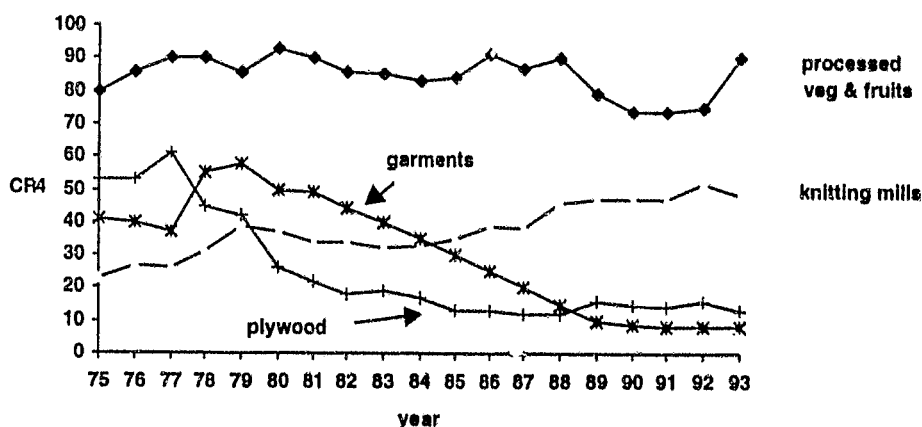


Figure 4.5 show the trends in concentration of a selected number of highly export-oriented industries with different structural characteristics. The figure confirms that in the industries where economies of scale are important, concentration has increased. For example, knitting mills (ISIC 32130) have experienced an increase in

concentration as a result of economies of scale, especially since trade liberalisation. Except for a few years, concentration in the processed vegetables and fruits industry has remained fairly stable around a CR4 of 90 per cent. Conversely, concentration has decreased in those industries where economies of scale are not so important. Garments have experienced a rapid decline in concentration since the late 1970s and this trend continued throughout the 1980s. Concentration in plywood production declined rapidly until the mid-1980s, and has remained stable since then. The declining trend in concentration was primarily due to the government's ban on the export of logs in the early 1980s; which resulted in the entry of a large number of sub-optimal plants.

4.6.4 Concentration in Broad Industry Groups

Further evidence on changing concentration over broad industry groups is shown in Table 4.4. This table gives trends in unweighted average sales concentration classified by two-digit industry class. Concentration is highest in other manufactures (sector 39), paper and paper products (sector 34) and chemicals and plastics (sector 35). The export-oriented sectors of wood processing (sector 33) and textiles and garments (sector 32) record the lowest average concentration levels in 1993. Over the last two decades, significant falls in average concentration occurred in 'other' manufactures (sector 39), wood processing and wood products (sector 33), and paper and paper products (sector 34).

Table 4.4

Concentration Trends in Broad Industry Groups

Sector	1975	1980	1985	1990	1993
31. Food, beverages and tobacco	61.0	55.8	52.9	52.1	55.9
32. Textiles , garments and Footwear	50.7	44.9	41.1	37.6	42.5
33. Wood processing and products	51.1	45.1	35.6	32.4	33.2
34. Paper and paper products	78.5	63.9	63.3	63.2	61.5
35. Chemicals, rubber and plastic Products	69.2	64.7	54.4	54.5	60.5
36. Non-metallic mineral products	57.6	57.4	46.4	46.0	45.3
37. Basic iron and metal	86.0	84.0	82.0	74.0	71.0
38. Metal products machinery and Equipment	66.7	59.8	53.7	53.4	54.1
39. Other manufactures	92.0	80.0	74.0	59.0	70.0
Manufacturing Average	63.6	57.9	52.6	50.9	53.5

4.7 Adjustments for Foreign Trade

In interpreting the above results, it is important to remember that the data relate only to domestic concentration and do not take account of foreign trade. Whilst the trade adjustment concentration ratio itself may contain measurement errors, it is clearly important to take account of foreign trade in measuring concentration, in order to capture more accurately the extent of market power, especially in a small, open economy like Indonesia.

Adjustments for foreign trade can be made only on certain simplifying assumptions using available data. First, it is necessary to assume that industries are dominated by the top four firms; that is, foreign firms are not amongst the top four suppliers in the Indonesian market. Secondly, it is necessary to assume that the four firms do not import goods for sale in Indonesia. And finally, it is necessary to assume that these firms export in proportion to their sales so that no special adjustments for exports need to be made. Clearly, one can think of examples where each of these assumptions would be wrong. Unfortunately, in the absence of detailed knowledge of individual industries it is not possible to adjust for these factors in a systematic way. It is important, therefore, to bear these limitations in mind when interpreting the results reported below.

On the basis of the above assumptions, it can be shown that concentration adjusted for foreign trade becomes:

$$CR4MX = \frac{CR4(Q - X)}{Q - X + M}$$

where $CR4MX$ = trade adjusted four-firm sales concentration

$CR4$ = unadjusted four-firm sales concentration

Q = domestic production

X = exports

M = imports

The import and export data are extracted from the Input-Output Tables for 1975, 1980, 1985, and 1990. The data for 1993 are taken from a preliminary 1993 Input-Output Table provided to us by BPS.¹⁰ Sixty-seven I-O industries and ISIC industries have an exact or nearly matching concordance, and we use these industries to examine the trend in trade-adjusted concentration ratios.

Table 4.5
Comparison of Unadjusted and Foreign Trade Adjusted CR4 Ratios
(non-oil/gas manufacturing)

Year	Unadjusted CR4	Foreign Trade Adjusted CR4
1975	63.5	46.9
1980	58.8	46.0
1985	53.6	42.9
1990	53.0	41.5
1993	53.3	41.1
Change:		
1975-85	-9.9	-4.0
1985-93	-0.3	-1.8

Table 4.5 shows the trend in unadjusted and trade-adjusted average four-firm concentration between 1975 and 1993. Two points should be noted. First, it is immediately apparent that allowing for foreign trade reduces average concentration substantially. In 1993, for example, average concentration without adjustment for foreign trade was 53.3 per cent whilst allowing for foreign trade it was 41.1 per cent, a difference of 12.2 percentage points. Some part of this difference will be due to measurement errors in adjusting for foreign trade, in particular, the assumption that all imports are competitive. Nevertheless, it seems likely that the bulk of foreign trade does reflect the importance of foreign trade in Indonesian markets in 1993. Allowing for such trade indicates that competition is *prima facie* stronger in Indonesian markets than domestic concentration ratios would suggest.

Second, over the period 1985 to 1993 average trade-adjusted concentration fell by 1.8 percentage points compared with a fall of 0.3 percentage points in domestic concentration. While the fall in trade-adjusted concentration is not large in magnitude

¹⁰ The BPS publishes Input-Output Tables every five years. At the time of this study the 1995 Input-Output Table was not available

it does indicate that most of the decline (1.8 percentage points) in average trade-adjusted concentration since 1985 is primarily due to rising foreign trade (1.5 percentage points) and less from falls in domestic concentration (0.3 percentage points). In other words, while domestic concentration shows a slight increase in the 1990s, rising import competition reverses this trend when concentration is adjusted for foreign trade.

4.8 Characteristics of Highly Concentrated Industries in 1975 or 1993

An examination of the determinants of concentration, requiring the construction of an econometric model, is undertaken in Chapter 7. But for illustrative purposes it is useful to examine the characteristics of the concentrated industries. This is done in Table 4.6 for the industries in 1975 and 1993 for which the CR4 exceeded 75 per cent. The results suggest the following pattern:

(1) Many of the concentrated industries in 1993 experienced some instability in their concentration levels. For example, 7 of the 22 persistently concentrated industries (those industries with a CR4 exceeding 75 percent in 1975 to 1993) had changes in concentration of more than 10 percentage points between 1975 and 1993.

(2) Most of the industries are very small. Only seven of the 28 concentrated industries in 1993 have a share exceeding 1 per cent of MVA (recall there are 102 industries in our sample). In over half the cases the share is less than 0.3 per cent. Many Indonesian industries are concentrated partly because of their small domestic market sizes.

(3) Several concentrated industries receive relatively high effective protection, well in excess of the average for manufacturing as a whole. However, most of these industries are far less protected in 1995 than they were in the mid-1980s as a result of trade liberalisation between 1985 and 1995. Substantial reductions in protection are observed in ice cream (ISIC 31122), carpets and rugs (ISIC 32140), sheet glass (ISIC 36220), motor bikes (ISIC 38440), cigarettes (3142/3) and jewellery (ISIC 39010).

(4) A number of the concentrated industries (wheat flour milling and noodles, cement, fertiliser, paper, alcoholic beverages, ship building) have had numerous regulations

restricting entry and exit of firms, distribution, imports, and prices over the last two decades. These restrictions have reduced competition among firms, and thus, economic efficiency.

(5) The high levels of concentration in many of these industries can be explained partly by their technological conditions (i.e., significant economies of scale) or product differentiation. Fertiliser, cement, sheet glass, paper and paper products, and motor bikes are all characterised by high capital intensity as indicated by the fact that their non-wage value added per employee (NWVA) ratios are greater than the manufacturing average.¹¹ Noodles, cigarettes, malt beer, cosmetics, motor vehicles and bikes are also characterised by high product differentiation.

(6) High concentration is to some extent associated with foreign ownership, but much less so with state ownership. In the case of foreign ownership this arises because foreign enterprises and high concentration share common structural characteristics, such as high capital intensity, technology intensity and product differentiation. However, there is a view in the literature that MNCs may also cause high concentration through their aggressive conduct and possession of intangible assets (Lall, 1979). In the case of state ownership, in only two of the 29 industries (fertiliser and ship building) do state enterprises contribute a majority of value added. In an additional case, a government-foreign joint venture is the major producer. In two other industries (cement and steel) state involvement is significant. Two industries (animal slaughtering and beer) are characterised by significant regional government involvement.

(7) Allowing for foreign trade reduces concentration in most of the highly concentrated industries. Of the 24 domestic concentrated industries that could be adjusted for foreign trade, eight industries have low or moderate levels of trade-adjusted concentration (e.g. trade-adjusted CR4 less than 75 per cent). Substantial reductions in concentration are observed in carpets and rugs (trade adjusted CR4=63.7 per cent), wooden boxes and containers (CR4=71.3 per cent), paper products (CR4=68.2 per cent), structural clay products (CR4=32 per cent), and ship building (CR4=20 per cent).

(8) Finally, the table lists two low concentrated industries (sugar processing and plywood production) that have constraints on competition. These constraints are likely to have perpetuated the 'overcrowding' of sub-optimal plants thereby maintaining an inefficiently low level of concentration.

¹¹ The ratio of non-wage value added per employee in Table 4.6 refers to each industry's NWVA per employee relative to the manufacturing average.

Table 4.6

Characteristics of Highly Concentrated Industries

ISIC No.	Industry	Four-Firm Concentration Ratio (Domestic CR4)			Trade- adjusted CR4	Ownership Share (% of production)		RERP(a) 1987;1995	MVA (% of total) 1993	Ratio of NWVA per employee 1993	Regulation (b)
		1975	1993	Change		1993	Foreign				
Persistently Concentrated Industries											
31111	Animal Slaughtering	90.1	89.8	-0.3	89.0	0	66	49,174	0.01	0.22	
31122	Ice cream	96.9	95.2	-1.7	95.2	0	0	600+, 85	0.02	0.39	
31130	Proc. veg and fruit	80.2	89.8	9.6	79.2	0	0	-30,-26	0.18	0.45	
31164	Wheat flour	100	100	0	100.0	0	0	600+, -33	0.32	4.39	entry
31260	Spices	75.4	77.6	2.2	na	14.1	0	na, na	0.08	0.51	
31310	Alcoholic liquors	98.1	100	1.9	na	0	0	90,62	0.00	0.08	entry
31320	Wine	79	96.4	17.4	81.9	0	0	90.62	0.03	0.36	entry
31330	Malt beer	99.1	97.8	-1.3	89.1	99	0	90,62	0.35	5.11	entry
31430	White cigarettes	76.3	93.9	17.6	93.5	54	0	600+, 108	0.44	3.73	
32140	Carpet and rugs	94.7	78.3	-16.4	63.5	7	0	12,-12	0.11	1.60	
33120	Wooden boxes	75.6	84.5	8.9	71.3	24	0.2	45,142	0.04	0.43	
34190	Paper products	97.7	86.4	-4.7	68.2	34	0.17	28,31	0.67	1.16	
35120	Fertiliser	100	80.3	-19.7	75.5	10	85	56,-24	2.07	2.84	distribution
35231	Soap and detergents	91.2	76	-15.2	74.5	43	1	88,352	0.50	0.88	
35510	Tyres	87.5	75.8	-11.7	73.4	44	0	600+, 600+	0.82	1.15	
36220	Sheet glass	100	90.6	-9.4	87.2	90	0	111,-2	0.19	1.21	
36310	Cement	93.9	83	-10.9	82	6	31	138,-18	1.52	2.89	price, distribution
36490	Structural clay prod	93.9	89.5	-4.4	32	0	12	68, 42	0.02	0.52	
38430	Motor vehicles	100	100	0	100	50	0	428, 600+	3.92	4.33	Local content
38440	Motor bikes	96.2	96.5	0.3	96.5	16	0	600+, -7	3.22	12.08	
39010	Jewellery	85.9	85.5	-0.4	na	13	0	96,-8	0.24	1.62	
39020	Musical instruments	100	98.6	-1.4	87.8	98	0	108,63	0.16	1.41	

Table 4.6 Continued

Table 4.3 Continued

ISIC No.	Industry	Four-Firm Concentration Ratio (Domestic CR4)			Trade- adjusted CR4	Ownership Share (% of production)		ERP(a)	MVA (%)	Ratio of NWVA per employee	Regulation (b)
		1975	1993	Change	1993	Foreign	State	1987;1995	1993		
Industries that shifted to the highest CR4 Class											
31171	Noodles	44.6	96.1	51.5	96.0	0	0	34,126	4.83	7.59	VI
31420	Clove cigarettes	63.5	81.7	18.2	81.7	0	0	600+, 108	9.57	2.20	price
32160	Kapok	35.6	81.8	46.2	na	29	15	12,-12	0.13	1.02	
35222	Traditional medicine	74.6	80.3	5.7	80.3	5	0	na, -14	0.07	0.14	
35232	Cosmetics	71.5	77.5	6	74.4	57	0	88,116	0.67	1.76	
38411	Ship building	57.7	75.3	17.6	20.6	1	58	-7,-6	1.06	1.52	import ban
Concentrated industries that shifted to a lower CR4 class											
31112	Processed meats	99.2	71.5	-27.7	52.7	0.7	1.3	600+, -8	0.03	0.31	
31121	Milk products	86.8	63.1	-23.7	52.8	62	5.7	600+, 85	0.54	4.02	local content
31270	Food pastes etc	77.6	64.5	-13.1	na	72.7	0	na, na	0.49	1.78	
31340	Soft drinks	77.7	39.5	-38.2	39.0	33	0.1	52,537	0.46	0.65	
32330	Leather products	92.4	38.7	-53.7	36.9	60.1	0	502,-1	0.34	0.32	
32400	Footwear	77.8	31.2	-46.6	31.0	47	0.3	502,-1	3.60	0.42	
34120	Paper board products	80.4	34.8	-45.6	27.5	16	0.4	28,31	0.69	1.07	
35130	Resins	83.9	51.2	-32.7	16.6	3	47	37,-16	0.06	0.52	
35140	Pesticides	91	48.9	-42.1	46.0	42	2	56,34	0.32	0.91	distribution
36110	Ceramics	91.4	37.8	-53.6	28.2	25	2	600+, 31	0.91	0.63	
37100	Steel and iron	86	71	-15.0	48.9	23	41	7,-2	6.85	5.07	
38140	Metal containers	78.8	56	-22.8	na	36	0	82,156	0.34	0.47	
38311	Storage batteries	86.3	62.0	-24.3	53	58.8	0	600+, -4	0.24	1.58	
38320	Electronics etc	85.2	43.3	-41.9	5.8	49.7	12.6	70,40	1.62	0.78	
39030	Sports equipment	85.9	68.4	-17.5	na	60	0	56,-10	0.07	0.31	
39040	Toys	90.6	34.4	-56.2	na	70	0	na, na	0.23	0.13	
39060	Stationery etc	100	64.6	-35.4	40.3	4	0	na, na	0.06	0.12	
31181	Sugar processing:	17.4	20.7	3.3	19.4	0.3	74	187, 44	1.60	0.56	price, distribution
33113	Plywood	53.9	12.9	-41.0	12.0	11	0.8	7, 42	6.02	0.75	distribution
Manufacturing average		63.6	53.5		41.1	22.5	9.4	59, 16	0.98		

Notes: 'entry' indicates the presence of entry restrictions; 'distribution' indicates the presence of distribution controls or monopoly practices; 'price' indicates price setting or controls; 'VI' refers to monopoly vertical integration. a. RERPs taken from Fane and Condon (1996). b. Source: Xie and de Bruyn Kops (1995) and the author's fieldwork in 1995. Four industries listed as persistently concentrated industries (CR4 ratios above 75% in 1975 and 1993) had shifted into lower CR4 classes during the 1980s, but had shifted back into the highest CR4 class by the early 1990s. These industries are soaps and detergents, jewellery, spices, and wooden boxes.

4.9 Some International Comparisons

It is of interest to compare concentration levels and trends in Indonesian manufacturing with that of other countries. Are there consistent patterns in the degree of concentration in similar industries across diverse economies? Is average concentration higher or lower in Indonesian manufacturing industries compared to other countries? And is the trend in concentration of Indonesian manufacturing industries similar to that observed in other countries? Because there are substantial differences across nations in industrial classification systems and in the extent to which data are reported for the more finely subdivided classes, it is difficult to answer the first two questions.

Tab. 4.7

Comparison of Concentration Ratios in Selected Industries

Industries	Indonesia (CR4 in 1993)		South Korea (CR3 in 1987)		Australia (CR4 in 1988)		United Kingdom (CR5 in 1989)	
Cigarettes	76a	(74)	99	(98)	100	(94)	99	(89)
Sugar processing	20	(12)	100	(75)	100	(100)	100	(93)
Flour milling	100	(97)	51	(48)	74	(73)	77	(77)
Bakery and Noodles	92	(92)	84	(84)	60	(57)	52	(52)
Soft drinks	40	(37)	67	(67)	67	(67)	54	(54)
Footwear	31	(26)	50	(50)	40	(38)	39	(20)
Garments	26	(20)	12	(17)	19	(15)	16	(10)
Weaving	36	(30)	49	(42)	57	(27)	37	(9)
Sawmill	13	(12)	29	(26)	23	(20)	26	(0)
Cement	83	(82)	83	(82)	82	(81)	84	(82)
Steel and iron	71	(43)	84	(41)	80	(70)	95	(72)
Ship building	75	(20)	86	(73)	72	(57)	38	(29)
Chem. Fertiliser	80	(75)	64	(49)	95	(88)	48	(20)
Motor vehicles	109	(100)	68	(55)	81	(54)	84	(41)

Notes: Import-adjusted CR4 in parenthesis

Indonesia and Korean concentration ratios are based on establishment data. Australian and United Kingdom ratios are based on firm data. All CR4s are based on four-digit industries, except for the U.K. which is based on the three-digit classification.

a. Indonesian cigarette industry includes both clove and 'white' cigarettes.

Sources: for Australia, Australian Bureau of Statistics; for South Korea, Korea Development Institute; for United Kingdom, Clarke (1993).

Table 4.7 presents concentration ratios of 14 comparable industries in four countries:

Indonesia, Korea, United Kingdom and Australia. Foreign trade adjusted concentration ratios are in parenthesis. A considerable amount of variation among the four countries is evident, but one can see that certain industries - for example, cigarettes, cement, sugar processing (except in Indonesia), flour milling and fertiliser - tend to be relatively highly concentrated in every country, while others such as weaving, garments, sawmills and footwear, tend to be relatively unconcentrated. The variation in concentration of a number of industries in the four countries reflects differences in domestic market size, the stage of industrial maturity, and the degree of government intervention. For example, concentration in the Indonesian sugar processing industry is much lower than in the other three countries because, as noted, the government's trade policy has protected a large number of sub-optimal sugar processing factories. Concentration in wheat flour milling is also higher in Indonesia because the government has restricted entry into this industry.

This qualitative impression is verified by correlating the concentration ratios for each nation pair. We drop the sugar processing industry from the table because the Indonesian government's policy on sugar processing has substantially distorted the level of concentration in the domestic industry. Because of the small sample size, this industry has an undue influence on the correlation coefficients. The matrix of intercorrelations is as follows:

Table 4.8

Rank Correlation Coefficients Between Country Pairs

(a) Domestic Concentration

	Indonesia	Korea	United Kingdom
Australia	0.74	0.75	0.84
United Kingdom	0.67	0.76	
Korea	0.62		

(b) Foreign Trade-Adjusted Concentration

	Indonesia	Korea	United Kingdom
Australia	0.65	0.64	0.83
United Kingdom	0.70	0.69	
Korea	0.54		

All the correlation coefficients are positive, and are statistically significant at the 95 per cent confidence level or better. Thus, if concentration in some industry is relatively high in one nation, it tends to be relatively high in other nations too. There are some notable differences in the correlation coefficients between nation pairs. First, Indonesia's domestic concentration correlation coefficients with the other three countries are the lowest, suggesting that Indonesia's concentration hierarchy is less similar to the other three countries. Second, adjusting domestic concentration to foreign trade reduces Indonesia and Korea's correlation coefficients with the United Kingdom and Australia, and with each other. This may have arisen because of differences in trade policy of these four countries during this period.

A danger in any such analysis is that the small industry sample (i.e we could only compare 14 out of our 104 industries with equivalent industries in the three other countries) may not be representative. However, a number of other comparative studies have reported similar conclusions to ours. Meller's (1978) study compared a number of identical industries between ten Latin American countries. It showed that each of these countries has a similar seller concentration hierarchy among its industries: the industries that have high concentration levels in one country tend to have high concentration levels in the other nine countries. Highest levels of seller concentration were recorded in tobacco, basic metals, certain chemicals, paper, cement and certain foodstuffs and beverages. Scherer et al (1975) found similar results in a comparison of 12 industries in six industrialised countries.

Table 4.9
Simple Average Concentration Ratios of Selected Countries

Countries	Year	Average CR4
Panel A: Developing Countries		
South Korea	1987	57
Indonesia	1993	54
Pakistan	Mid-1980s	68
Turkey	Mid-1980s	67
Chile	1979	50
Malaysia	1990	53
Sri Lanka	1988	75
Panel B: Developed Countries		
United States	1982	39
United Kingdom	1989	41
Canada	1979	50
Australia	1988	53
New Zealand	Mid-1980s	58

Sources: for Australia, Australian Bureau of Statistics; for South Korea, Korea Development Institute; for Malaysia, Department of Statistics (1990); for United Kingdom, Clarke (1993); for U.S.A Scherer and Ross (1990); for Chile, de Melo and Urata (1986); for Canada, Baldwin and Gorecki (1994); for Pakistan, Turkey and Sri Lanka, and New Zealand, Centre for International Economics (1990).

Table 4.9 presents the simple average concentration ratios for a number of selected countries. The selection of countries is dictated by the availability of published data. Concentration ratios for the developing countries listed in panel A of Table 4.9 measure establishment concentration. Concentration ratios of the developed countries listed in panel B measure firm concentration, and thus are not directly comparable with the ratios presented in panel A. Finally, these numbers should be interpreted with caution because they refer to different years. The countries in each panel are arrayed in descending order according to the size of their manufacturing sector in the reference year in the table (the ranking of these countries' manufacturing sectors has not changed in the last ten years). Table 4.9 shows substantial variation in average industrial concentration among the countries. Sri Lanka, Pakistan, and Turkey stand out as having highly concentrated manufacturing sectors. Indonesia's average concentration is also high by international standards, although slightly lower than in the Korean manufacturing sector. With the exception of New Zealand, the concentration ratios of the countries listed in panel B are lower than most of the developing countries' establishment concentration ratios. Seller concentration is typically higher in developing countries than in developed countries because the domestic markets they serve are proportionately smaller (Kirkpatrick et al, 1984: 70).

As Scherer and Ross (1990) observe, 'frequently, the markets of small countries are simply too small to accomodate many viable competitors'. In addition, government intervention in the market place is typically greater in developing economies than in these developed countries and this may have an impact on concentration levels in these countries.

More confident conclusions can be reached on concentration trends *within* countries, although trends *between* countries are less clear, possibly reflecting differences in the time period analysed, the stage of industrial maturity, and policy regimes. Table 4.10 shows the trend in weighted average concentration of seven countries where some published time series data are available. Examining Korean manufacturing first, the data show a substantial increase in concentration between 1966 and 1981, followed by a reversal in the 1980s. Min (1994: 37-38) argued that the rise in concentration during the 1960s and 1970s was due to government intervention favouring specific firms and industries through trade protection and subsidised interest rates on bank loans. The reversal in the trend in concentration in the 1980s was due to a combination of factors, of which the most important were the reduction in government intervention, and the general promotion of competition through trade liberalisation. In contrast to Korea's experience, concentration in Chilean manufacturing increased substantially during Chile's trade liberalisation experience in the 1970s. Average weighted concentration increased from 49 per cent in 1968 to 61 per cent in 1979. De Melo and Urata (1986) argued that the increase in concentration was the result of the 1970s trade policy reforms stimulating structural change in Chilean industry through a number of mechanisms. These included mergers among domestic firms, efficient firms growing fast and becoming large relative to less efficient firms, and greater import competition displacing inefficient firms. For the United Kingdom, data are available at the three-digit level of aggregation and trends in unweighted average employment concentration are presented in column (5). The average five-firm concentration ratio increased by 15 percentage points between 1935 and 1968, remained fairly stable between 1970 and 1979, and declined by 5 percentage points between 1980 and 1989. Clarke (1993: 125) speculates that the decline during the early to mid-1980s may have been due to the British recession, when larger firms engaged in a proportionately greater shakeout of employment and production in the

period. Henley (1994) suggests that the decline in the 1980s may also be due to the government's industry and trade policy reforms of the time. In U.S.A manufacturing the data show a modest increase in concentration between 1947 and 1963, with a reversal evident in the 1970s. In Canada, the average four-firm ratios increased by nearly 10 percentage points between 1948 and 1965, but from 1965 through 1982 they varied narrowly in the range of 47.8 to 50.8 (Scherer and Ross, 1990: 88). Finally, in Australia the average four-firm concentration ratio has increased gradually over time. This is partly the outcome of greater competitive pressures resulting from substantial trade reforms over the last 15 years.

Table 4.10

Comparison of Trends in Concentration: Selected Countries

Year	Indon (CR4)	South Korea (CR3)	Chile (CR4)	Malay (CR4)	UK* (CR5)	U.S.A (CR4)	Canada (CR4)	Aust (CR4)
1935					26.3			
1948						35.3	44.3	
1951					29.3			
1954						36.9	48.7	
1958					32.4	37.0	50.2	
1963					37.4	38.9		
1966		54.6					53.9	
1968			49.0		41.0		51.1	
1970					44.8	39.2	52.9	
1972							51.1	
1974		58.5						
1975	55.0				45.5			
1977	54.0	57.0				38.5		49.9
1978	54.3							
1979	53.6		61.8	44.8	45.6			
1980	53.5				44.0			
1981	53.1	62.0			43.6			
1982	50.9				42.9	37.1	50.8	
1985	46.6				40.4			
1987	44.3	56.1		47.3	40.1			
1988	44.2				39.5			51.6
1989	43.8				39.1			
1990	42.5			44.5				
1993	44.0							

'Indon' indicates Indonesia, 'Malay' indicates Malaysia, and 'Aust' indicates Australia.

Source: South Korea, Korea Development Institute; Malaysia, Yusof and Phang Hooi Eng (1993); Chile, Urata and de Melo (1984); U.S.A, Scherer and Ross (1990); Canada, Khemni (1980) and Scherer and Ross (1990); Australia, Australian Bureau of Statistics

*For the United Kingdom, the 1935 to 1968 series consist of 42 three-digit industries (Hart and Clarke, 1980). The 1970 to 1979 series consist of 93 three-digit industries (Clarke, 1985). The 1980 to 1989 series consists of 100 three-digit industries (Clarke, 1993).

All concentration ratios are weighted average ratios, except for the United Kingdom, which are simple CR5 ratios.

4.10 Conglomeration and Aggregate Industrial Concentration

This section briefly examines the extent of aggregate concentration in the Indonesian economy. Business groups are a feature of many developing countries at some point in their industrial development (for a review of the extent of business groups in LDCs, see Kirkpatrick et al 1984: Ch 3). Large business groups are also dominant in Japan, several European countries, and to a lesser extent in the U.S.A. Table 4.11 presents comparable figures on the sales of the top 6, 10 and 15 groups in four

countries.

Table 4.11

Ratio of Business Groups' Sales to GDP (%)

Country	Year	Top 6 Groups	Top 10 Groups	Top 15 Groups
Indonesia	1990	23.4	29.4	34.9
Japan	1987	56.9	n.a	n.a
Korea	1989	59.4	68.3	75.9
Turkey	1988	29.2	33.7	36.7

Source: The World Bank (1994:59)

The figures are taken from The World Bank (1994:59). It needs to be emphasised that determining the overall economic concentration in the Indonesian economy, as in most countries, is a difficult task. The ratios may understate the degree of aggregate concentration because of difficulties in identifying firms belonging to particular groups, and because they ignore the links that exist between legally autonomous companies and corporations within the manufacturing sector and between other sectors. On the other hand, the ratios will overstate the degree of aggregate concentration in the domestic economy because they do not exclude business groups' revenues generated from overseas. For example, the Salim group, Indonesia's largest business group, generated about 35 percent of its sales from overseas activities in the early 1990s. Table 4.11 shows that the sales of the top 10 groups in Indonesia is approximately equal to 30 per cent of GDP.¹² This ratio is substantially lower than in Korea, and Japan, and close to that of Turkey. Published figures on aggregate concentration ratios for other countries are available, but they often refer to the largest 100 or 200 firms. For example, aggregate manufacturing sales concentration ratios of the largest 100 firms for the following countries are: U.S.A (32 per cent in 1982); U.K (41 per cent in 1980 and 38 per cent in 1989); EC12 (24 per cent in 1975, 25 per cent in 1980); and Australia (41 per cent in 1969, 47 per cent in 1983). Time series data for the United States show rising aggregate concentration in the between 1947 and the mid-1960s, and a levelling off between 1965 and 1985 (Scherer and Ross, 1990:61).

¹² The World Bank figure is substantially greater than other published figures for Indonesia. *Warta Ekonomi* (April 24, 1994), a leading Indonesian business magazine, estimated that the largest 10 business groups accounted for 16 per cent of total sales turnover. The difference between The World Bank and these figures highlight the difficulty and the controversial nature of estimating aggregate concentration ratios in Indonesia.

Rising aggregate concentration in the U.S economy once raised fears, familiar in Indonesia today, that the American economy was becoming monopolised by a few very large firms (e.g. Berle and Means, 1932). This, of course, has never eventuated in the U.S or any other capitalist economy.

Scherer and Ross (1990: 62) observed that aggregate concentration indices tend to be inversely correlated with a country's size, suggesting that scale economies or other imperatives push leading firms toward being larger relative to their domestic market in small economies than in large ones. Thus, for this reason alone, it is not surprising to see relatively high levels of aggregate concentration in small developing economies like Indonesia. However, political patronage and rent seeking activities of some business groups also explain their rise in Indonesia (World Bank, 1994: 58). According to the influential work of Robison (1986) the rise of business groups is part of the process of capitalist evolution and maturity in Indonesia.

The major Indonesian conglomerates are listed in Table 4.12, which includes information on their principal owner(s), activities, estimated turnover, and the number of companies in the group. Several features of these groups stand out. First, the list underscores the *non-pribumi* (non-indigenous) dominance of the economy. The top seven are all in the hands of Sino-Indonesian individuals or families. Only four pribumi firms make it into the top 25 conglomerates; two of the three largest are owned by the former President's sons. A second feature is that the Salim group is in a class of its own, particularly since the late 1992, when the resources of the Astra group were diluted by the bail-out of Bank Summa, owned by the son of the Astra founder William Soeryadjaya. Thirdly, virtually all the groups emerged during the New Order. Several of the leading players had not been heard of until as recently as the late 1980s, a notable case being the timber tycoon Prajogo Pangestu. Most of the companies were established in some form before 1966, but generally on a small scale, often in trading and with a long history of military ties. Starting as highly personalistic companies, centred around the owner and immediate family, they have gradually become more professional in orientation. The second-generation owners usually possess international education, in marked contrast to most founders, who had little formal education (Hill, 1996:109).

Fourthly, while the rank order of the top five conglomerates has changed little between 1987 and 1993, there is considerable change in the rank order of the other conglomerates. None of the conglomerates ranked in the second top five business groups in 1993 were similarly ranked in 1987. Seven of the conglomerates that were ranked in the top 25 business groups in 1987 were not ranked in the top 25 in 1993. Finally, many of the groups are highly diversified, with investment in finance and banking, manufacturing, plantations, real estate, and other fields. According to Hill (1996:110) their skill lies in being able to identify commercial opportunities, to understand the Indonesian bureaucracy and the system of patronage, and to be able to marshal packages of finance, management, and technical inputs. Many of the conglomerates are dominant in oligopolistic markets, such as certain food products, automobiles, steel, cement, sheet glass, plastics, and basic chemicals, although some are found in less concentrated industries such as in soft drinks.

Table 4.12 Major Business Conglomerates in Indonesia

Conglomerate	Principal owner ^a	Principal Activities	Turnover Rp ^b	Ranking		No. of companies 1993 ^c
				1993 ^c	1987 ^b	
Salim	Liem Sioe Liong	Cement, finance, autos, argo-industry	18 000	1	1	450
Astra	Prasetia Mulya	Autos, argo-industry	5 890	2	2	205
Lippo	Mochtar Riady	Finance, real estate	4 750	3	4	78
Sinar Mas	Eka Tjipta	Argo-industry, pupil and paper, finance	4 200	4	3	150
Gudang Garam	Rachman Halim	Kretek cigarettes	3 600	5	5	6
Bob Hasan	Bob Hasan, Sigit Harjojudanto	Timber, estates	3 400	6	12	92
Barito Pacific	Prajogo Pangestu	Timber	3 050	7	26	92
Bimantara	Bambang Trihatmodjo ^P	Trade, real estate, chemicals	3 000	8	13	134
Argo Manunggal	The Ning King	Textiles	2 940	9	15	54
Dharmala	Soehargo	Argo-industry, real estate	2 530	10	14	151
Djarum	Gondokusumo	Kretek cigarettes	2 360	11	6	25
Ongko	Budi and Michael Hartono	Real estate, finance	2 100	12	11	59
Panin	Mu'min Ali Gunawan	Finance	2 080	13	10	43
Rodamas	Tan Siong Kie	Chemicals	2 000	14	18	41
Surya Raya	Soeryadjaya	Property, estates, trade	1 980	15	n.a	242
Jan Darmadi	Jan Darmadi	Real estate	1 940	16	9	60
CCM/Berrca	Murdaya	Electronics, electricity	1 800	17	n.a	32
Humpus	Widyawimarto Poo	Oil, trade, chemicals	1 750	18	23	11
Gadjah Tunggal	Hutomo Mandala Putra ^P	Tyres, finance, real estate	1 650	19	24	49
Raja Garuda Mas	Sjamsul Nursalim	Pulp and rayon, finance	1 590	20	34	66
Gemala	Sukanto Tanoto	Chemicals, autos	1 550	21	7	78
Pembangunan Jaya	Wanandi	Real estate	1 390	22	n.a	57
Metropolitan	Several	Real estate	1 200	23	n.a	57
Soedarpo	Soedarpo	Shipping, trade, pharmaceuticals	1 200	23	16	35
Tahija	Sastrosatomo ^P Julius Tahija ^P	Finance	1 200	25	n.a	39

a In some cases owned by the family of this individual. 'P' denotes pribumi ownership; otherwise the conglomerate is majority or solely non-pribumi owned.

b n.a indicates the conglomerate was not ranked in the top 40 in 1987

Table taken from Hill (1996:111). Source: Warta Ekonomi, 24 April 1994, and earlier listings in this magazine.

Ratio of Business groups' sales to GDP: Top 6 - 11.3%; Top 10 - 16.0%; Top 15 - 19.4%

It is useful to look at the Salim group in more detail because this group demonstrates that some conglomerates are inevitably in the process of industrial maturation. Liem Sioe Liong came to Indonesia as a migrant from China in the 1930s. His commercial connections with the military began with the 1940s Independence struggle, and were strengthened further by his ties with Soeharto in the 1950s when the latter headed

Central Java's Diponegoro Division. Liem was able to diversify quickly from his trading activities into import-substitution manufacturing in about 1968 and then to banking, cement and wheat flour milling in the mid to late 1970s. In the 1980s the group expanded rapidly into agro-industry activities, such as palm oil production and downstream food processing operations, notably instant noodles, and cooking oil. The Salim group was one of the first to invest in export-oriented activities. During this period the group was dependent on government support, as demonstrated by the government's bailout of Indocement in 1985,¹³ and in securing government-sanctioned monopolies in diverse fields as clove imports, flour milling, cement and steel. From the mid-1980s the group began to internationalise, becoming a leading player in Southeast Asian commerce, so much so that by the early 1990s about 35 per cent of its revenues came from abroad (Hill, 1996: 110). According to Hill (1996: 110) such a process introduced an entirely new element into the political economy of the relationship between conglomerates and the State. 'The conglomerates have begun to mature beyond their earlier intense dependence on state patronage and support, in the process becoming more powerful independent actors' (1996: 110).

Evaluating the competitive implication of conglomerate dominance in an individual market is an empirical question, about which *a priori* theorising is difficult. In a controversial report, The World Bank (1994) contended that in reality the degree of market power of these dominant groups in Indonesia is much greater than might appear from a consideration of concentration ratios in individual markets. To the extent that these groups are horizontally integrated, many of the concentration ratios will understate firms' effective market power. The World Bank report suggested that the 'financial staying power' of conglomerates (many of which also own banks) might provide opportunities for firms to engage anti-competitive behaviour, such as cross-subsidisation and predatory pricing. The World Bank report also referred to the "oligopolistic features of vertically integrated industrial groups", such as the downward rigidity in the prices of important industrial and consumer prices, as an example of increased market power possessed by some conglomerates. However, the market power of a vertically integrated oligopoly will be constrained in the long-run depending on rival firms' ability to vertically integrate, and the degree of import

¹³ In 1985 the government converted a large state bank debt into 35 per cent equity in Indocement.

competition in the input and product markets. Economic theory shows that if there are no regulatory or natural barriers to vertical integration, rival firms will integrate to avoid paying higher prices to the upstream monopoly. If a sufficient number of firms integrate the input will eventually be supplied competitively (Tirole, 1988). Thus, in the absence of constraints on vertical integration or imports of the input, any market power arising from an upstream monopoly is likely to be short lived.

There are a few publicised cases in Indonesia where large, vertically integrated firms have monopolised downstream markets, but in most of these cases this has occurred because of legal barriers to entry in the upstream input market. Indofood's virtual monopolisation of the noodle industry by the early 1990s was made possible because of government entry and import restrictions in the wheat flour industry, and not because of vertical integration *per se*. Several oligopolies in Indonesian manufacturing are vertically integrated for reasons other than the desire to increase market power. Firms in the food processing industry, for example, invest in plantations to control the quality of the input and to ensure continuous supply of raw material to their processing plants. Vertically integrated structures in the textiles industries and in the pulp and paper industries are influenced by technology, and are common organisational structures in most countries. Many conglomerates vertically integrate because trade policy has restricted their international source of inputs. Thus, it is misleading to make general inferences about the competitive effects of business groups from their scale and structure alone, although their existence does increase the potential complexity of industrial analysis in developing economies.

4.11 Summary and Conclusion

The purpose of this Chapter has been to focus on trends in industrial concentration over a relatively long period of time. This is important because competition is a long run phenomenon, and concentration levels in the short run often fluctuate around their long term trend. Contrary to popular public perceptions the results indicate that there is a long term declining trend in industrial concentration, particularly in those industries that were highly concentrated in the mid-1970s. This pattern of change in industrial concentration is typical of a rapidly growing small industrial sector: initially

high levels of concentration, declining over time as rapid growth reduces barriers to entry and broadens the industrial base. Further, the results suggest that liberalisation has not had the major effects on industrial structure that its opponents - or in some cases - proponents - maintain. Average concentration in import-competing industries has remained fairly stable since 1986. There has been a slight increase in concentration since 1991, but it is too early to reach a conclusion on whether this increase is due to liberalisation. However, more confident conclusions can be reached about the impact of policy reforms on export-oriented industries. The results show that there has been a continuous reduction in average concentration since 1986. The reduction is due to an expansion of the market facing domestic sellers. The expansion of export opportunities means that the domestic industry can support a greater number of viable producers, thereby reducing concentration.

We found that allowing for foreign trade reduces average concentration substantially. In 1993, for example, average concentration without adjustment for foreign trade was 53.3 per cent whilst allowing for foreign trade it was 41.1 per cent, a difference of 12.2 percentage points. Therefore, allowing for such trade indicates that competition is *prima facie* stronger in Indonesian markets than domestic concentration ratios would suggest. This finding also suggests that domestic concentration ratios are seriously misleading indicators of market power in a small, open economy like Indonesia.

Chapter 5

Analytical Framework and Model Specification

5.1 Introduction

This Chapter presents the analytical framework adopted in the study and specifies a structural model. The salient features of the structure-conduct-performance model are discussed in section 5.2. It shows that many aspects of market structure, international linkages, government policy, conduct and performance are jointly determined. In section 5.3 a structural model explicitly incorporating these interrelations is developed for the purpose of the empirical analysis in Chapter 7.

5.2 Structure-Conduct-Performance Paradigm

The structure-conduct-performance (S-C-P) approach to industrial organisation provides the basic framework for our analysis. It originated from the pioneering work of Mason (1939), and subsequently extended by Caves et al (1980). The essence of the S-C-P approach, in its original form, is that certain *intrinsic* structural variables (called basic conditions by Scherer, 1980) determine market structure, and that there is a unidirectional flow of causality running from market structure through conduct to performance.

Examples of intrinsic structural variables include available technologies for production and marketing, the nature of the product, and demand conditions. The most important variables representing market structure are seller concentration, product differentiation, and entry conditions. Seller concentration refers to the number and size distribution of sellers within the market. Entry barriers refer to the ease with which new sellers may enter the market. Product differentiation refers to the extent to which the products sold within the market are close substitutes for each other.

Market conduct is defined as "the patterns of behaviour that enterprises follow in adapting or adjusting to the market in which they sell or buy (Scherer and Ross, 1990; 9). These activities consist of the pricing policies of firms, determination of quality and quantity produced, advertising, brand and market strategies, innovative activity, excess capacity, and lobbying activities to obtain protection or favourable concessions from government. These factors are assumed to determine market performance.

There is no unique measure of market performance. However, the most commonly used measure of performance in S-C-P studies, and the one used in our study, is industry profitability. Industry profitability proxies allocative efficiency. Allocative efficiency measures the degree to which resources are optimally allocated among industries. Allocative efficiency require firms to set price equal to average costs, and therefore earn 'normal' profits in the long-run. Thus, a competitive (or allocatively efficient) market is one where price is equal to average cost in the long-run. A market is anti-competitive (or allocatively inefficient) when firms have some control over prices, and are able to set prices above average costs and, thus, earn 'above normal' or 'excessive' profits in the long-run.

Potentially, the structure-conduct-performance framework is a very useful tool in industrial analysis. However, there are limitations to its practical usefulness, and dangers of incorrect use if it is applied in an over-simplistic way (Kirkpatrick et al, 1984: 62). A number of these limitations have been identified through the many S-C-P empirical studies that have been completed in developed country studies and are reviewed by Schmalensee (1989, Ch 16). These general limitations are reviewed below.

The implementation of the S-C-P model using cross-sectional data is based on the implicit assumption that each market is in long-run equilibrium. However, in more dynamic market conditions, responses to change are continuous and non-instantaneous and in such conditions simple forms of comparative static analysis are less appropriate. Investigators have adopted a number of different empirical approaches to overcome the weaknesses associated with the kind of 'snapshot'

analyses undertaken in many S-C-P studies. The first approach, and the one adopted in our study, is to compare cross-sectional estimates of the concentration and profit equations between two or more points in time (De Melo and Urata, 1986). The second approach is to use panel data (cross-sectional and time series data together). The final approach is to investigate the changes in concentration and profit margins between two or more points in time using partial adjustment models (Levy, 1985; Weiss, 1993; Geroski and Pomroy, 1994).

As noted above, a key feature of the original S-C-P approach was that causality was assumed to run from structure through conduct to performance. Recent literature has emphasised the complexity and interdependence of these three components of industrial organisation (Schmalensee, 1989). Large firms operating within a given market may possess sufficient overall power to change the structure of that market where they consider their own commercial performance to be unsatisfactory. For example, an oligopolistic firm might intensify advertising and marketing strategies that may affect product differentiation, or intensify research and development activities that can change the nature of the product and the available technology in such a manner that rivals are forced out of the market, thus, increasing market concentration. Similarly, highly profitable firms would be able to influence the degree of seller concentration in the market by increasing the outlay of advertising. Industry-specific aspects of government policy are generally affected by industries' lobbying and other political activity and may also be affected by observed performance. For example, oligopolistic firms might lobby the government for tariff or non-tariff protection from imports to prevent an erosion of their market power and excessive profits. In other words, in such markets there may not be a simple line of causality running from structure through behaviour to performance; in certain circumstances, the line of causality may be reversed. Thus, the elements of structure, conduct and performance can be jointly determined in a given market.

The recognition of the interdependence of various aspects of market behaviour has resulted in the use of the simultaneous equations model, rather than single equation models in recent studies. Jacquemin et. al (1980), for example, examined the simultaneous relationship between concentration and profits, while Martin (1979)

analysed the simultaneous relationship between profits, advertising and concentration. Chou (1986) considered the simultaneity involved in concentration, profits, and international trade for Taiwan. The largest simultaneous equations model was estimated by Caves et al (1980) for Canadian manufacturing industries. The authors introduced 15 endogenous variables in their SCP model. Few studies, however, have entered trade protection as an endogenous variable in the SCP model. Round (1980) examined the determination of profitability and trade protection in Australian manufacturing. More recently, Ratnayake (1990) examined the interdependence between nominal tariff protection, concentration, profitability, international trade, foreign ownership and advertising expenditure in Australian manufacturing industries.

The analytical framework incorporating these kinds of relationships is now being used increasingly for similar purposes in developing economies. The theoretical and empirical difficulties in S-C-P studies that have been described so far are common to all types of economies, developed and developing. According to Kirkpatrick et al (1984: 64) there are reasons for believing that these difficulties are likely to be more severe in developing economies. In part, this is because the data available in most developing economies are less extensive and reliable than in developed economies. "At a more fundamental level it is because developing economies possess characteristics that make them less suitable candidates for the simpler forms of S-C-P analysis" (Kirkpatrick, 1984: 64). Kirkpatrick et al argue that the S-C-P model needs to be extensively modified and extended to make it relevant to developing countries conditions. The authors listed several developing country conditions that should be adequately taken into account when specifying a S-C-P model. Most of these conditions are relevant to the study of the Indonesian industrial sector, as clearly demonstrated in earlier chapters.

First, as illustrated in Chapter 3, the Indonesian economy has been industrialising rapidly, until recently, and consequently both the relative importance and the composition of the manufacturing sector are changing considerably, even over the short and medium term. Market structures are not yet "stabilised" to the degree that is found in mature industrial economies. It is therefore all the more important to analyse

S-C-P relationships over time rather than rely exclusively upon "snapshot" analyses of relationships at a given point in time. Secondly, Indonesia is a small, open economy. Thus, foreign trade and trade policy are an important influence on market structures, conduct and performance and therefore should be taken into account when estimating seller concentration and entry barriers. Thirdly, foreign-owned enterprises are of much greater relative importance in Indonesia and other LDCs than in most DCs. Therefore, there is, if anything, a stronger argument in the case of Indonesia for extending S-C-P studies to take explicit account of the types of enterprises operating within particular markets.

Finally, public sector involvement in the manufacturing sector is far more extensive in Indonesia than in many developed countries and the S-C-P model needs to be modified to take this into account. For example, the profit objective is less relevant to publicly owned than to privately owned enterprises. Similarly, governmental regulations play a much more important role, in addition to that of market structure, in determining market conduct and performance in Indonesia.

5.3 The Structural Model

We must first specify which variables are endogenous or exogenous to the system. Schmalensee (1989) contends that, potentially, most of the variables included in S-C-P studies are endogenous in the long run. Our system includes all the industry-level variables that we deem to be relevant to the conditions of Indonesia's manufacturing sector, and for which data are available. These are variables previously subject to investigation in industrial organisation, either because they indicate normatively important dimensions of resource allocation or because the theory of markets identifies them as important structural determinants of those performance dimensions. These are seller concentration, profitability, import penetration, export intensity, FDI, and trade policy. Advertising activity is usually treated as an endogenous variable in S-C-P studies. Unfortunately, promotional data are only reported in the Indonesian annual manufacturing surveys since 1993. In our study we treat product differentiation as an exogenous variable using data from U.S counterpart industries (Chapter 6). We examine advertising competition in cigarettes in Chapter 9 using a

primary data base collected during my fieldwork. Another endogenous variable that is often considered in S-C-P studies, but not available to us, is buyer concentration. This refers to the concentration of purchases or buyers in a market. It is often asserted in the industrial organisation literature that a few, very large buyers may have 'countervailing power' to push down prices toward competitive levels.

In this study, drawing on previous theoretical and empirical studies, we specify the following simultaneous equations system.

$$CR4 = f(EOS, IZ, RM, AKC, PD, EX, IM, MNC, SOE, REG, TP, \Pi)$$

$$\Pi = f(CR4MX, TP, AKC, RM, PD, CG, GRO, MNC, SOE, REG)$$

$$MNC = f(CR4, TP, EX, PC, EOS, HC, PD, TI, RM, REG, GRO, \Pi, SOE)$$

$$EX = f(CR4, TP, MNC, EOS, PC, HC, RI, WP, PD, CG, TI, RM)$$

$$IM = f(CR4, TP, MNC, SOE, EOS, PC, HC, RI, PD, CG, TI, RM)$$

$$TP = f(CR4, MNC, SOE, IM, EX, GRO, IZ, PC, HC, TI, RI, RM, TP(t-1), \Pi)$$

Where,

CR4	= seller concentration
Π	= profitability
MNC	= multinational enterprises
EX	= export-orientation
IM	= import penetration
TP	= trade policy
TP(t-1)	= 'historical' trade policy
EOS	= economies of scale
IZ	= output size of industry
RM	= regional markets
AKC	= absolute capital costs
PD	= product differentiation
SOE	= state-owned enterprises
REG	= domestic entry restrictions
CG	= consumer-goods industries
GRO	= industry output growth
HC	= human capital
PC	= physical capital
TI	= technology intensity
RI	= resource intensity
WP	= wood-based intensity

As specified, this system incorporates six endogenous variables which are shown in bold type in the above equations. The specification of each of these equations is discussed below.

Equation 1: Industrial Concentration

Industrial concentration in Indonesian manufacturing industries is specified as a function of the technological and demand conditions of the industry (economies of scale, industry size), regional market fragmentation, international influences (exports, import competition, and multinational enterprises), industry profitability, barriers to entry (product differentiation and capital costs), and government intervention through trade protection, constraints on domestic competition and state ownership of industry.

Economies of Scale and the Size of the Industry

Economies of scale (EC3), in relation to the size of the market, is generally recognised as one of the important factors determining concentration. Economies of scale are represented by the minimum efficient or optimum plant size (MES). The minimum efficient plant size is defined as the smallest level of output at which the long run average total unit costs reach a minimum, and depends primarily on the state of technology and relative factor prices. In general, the larger the MES plant in relation to the market size, the greater is concentration because the market can only accommodate a smaller number of viable competitors (Khemani, 1980; Caves et al, 1980). Thus, we expect a positive relation between economies of scale and concentration.

The size of the market (IZ) is also recognised as a major determinant of concentration. Economic theory postulates that, in a closed economy construct, the larger the size of the market, the lower is the level of concentration because the market can accommodate a greater number of viable firms (Caves et al, 1980). Therefore, we expect a negative relation between the size of the industry and concentration. The operative size of the market facing producers depends on the geographic size of the country and the regional distribution of demand. Indonesia's geographically dispersed market should

have a significant influence on industrial structure. We expect the smaller regional markets to constrain the size of Indonesian establishments in some circumstances, thereby increasing their number and reducing seller concentration when it is measured at the national level. Therefore, we expect a negative relation between concentration and the extent of regional fragmentation of the industry (RM).

International Influences

The operative size of the market facing Indonesian producers also depends on international trade (Caves et al, 1980). Thus, we include variables to represent export-orientation (EX) and import penetration (IM). The impact of export-orientation on concentration levels is ambiguous. A negative relationship may be observed if an expansion in export opportunities means that the domestic market can support a greater number of viable producers (de Melo and Urata, 1986). A positive relationship may be observed if producers engaged in exporting activities grow faster than firms more strictly confined to supplying the domestic market. This may arise if there are significant economies of scale in production. An increase in export opportunities means that producers engaged in exporting activities can better exploit economies of scale and, thus, grow faster than firms supplying the smaller, domestic market (De Melo and Urata, 1986; Chou, 1986). This relationship is more likely if the fixed costs of entering export activities are high (De Melo and Urata, 1986).

The impact of import penetration on concentration is also ambiguous. Greater import competition would increase concentration if imports displaced less efficient firms, or encouraged mergers among domestic firms. But it would reduce concentration if producers were induced to improve productivity and thereby raise the number of efficient producers that can fit into the market (De Melo and Urata, 1986).

The other possible international influence on concentration is FDI. Caves (1974a) explains that MNCs are prevalent in industries with concentrated sellers, because the influences giving rise to MNCs are identical to the bases of several barriers to entry, and entry barriers cause high seller concentration. Thus, we expect foreign investment activity and seller concentration to be closely associated. The empirical evidence we presented in Chapter 4 supports this conjecture to some extent. Even if oligopoly and

foreign investment share common structural causes, either one could still wield some causal influence on the other. But we must tread cautiously when specifying the causal mechanisms and testing them so as to control for their common causes.¹

There are two competing hypotheses regarding the likely effect of MNCs on concentration. The first hypothesis focuses on the competitive entry of MNCs into host country markets, and predicts that concentration will decline. Foreign firms are able to break down local oligopolies and widen the scope for competition by increasing the number of firms in the industry. This is possible because foreign firms have greater access to resources on the international capital markets, and intangible assets to overcome domestic entry barriers (Caves et al, 1980). The second hypothesis is that, while MNCs entry may reduce concentration in the short-run (in a purely statistical sense), they increase concentration of the industry in the long run for two reasons. First, MNCs possess intangible assets that can raise entry barriers against local firms and drive out local producers. Second, the aggressive conduct of MNCs can speed up the process of concentration (Lall, 1979). MNCs may drive out local firms through price cutting wars because they have financial staying power, or introduce restrictive business practices that lead to higher entry costs for local producers, and a diminished market share (Lall, 1979; Newfarmer, 1980, Long 1981).

Performance

Neumann et al (1983) show that concentration and performance (Π) are jointly determined variables. Performance can affect conduct and market structure. For example, highly profitable firms may influence the degree of seller concentration in the market by increasing their outlay of advertising or by building larger production capacity. Further, relatively efficient, and therefore profitable, firms might drive out less efficient firms, which in turn leads to greater market concentration. These possibilities suggest a positive relationship between performance and concentration.

Barriers to Entry

In the industrial organisation literature the two commonly proposed barriers to entry

¹ Foreign ownership shares, however, measure the effective MNC influence imperfectly. MNCs can also influence industry structure and market performance through other strategic arrangements, such as licensing technology and brands to domestic firms.

are product differentiation (PD), and the absolute capital cost of establishing a plant of minimum efficient size (AKC). The effect of product differentiation on market structures has been debated for decades. Studies by Bain (1956) and Comanor and Wilson (1974) suggest that product differentiation advantages can raise entry barriers by increasing the advertising and promotional costs to potential entrants. Alternatively, product differentiation may facilitate firm entry into niche markets, which in turn reduces concentration (Nelson, 1974). In Indonesia, as in many other developing economies, there are several reasons to believe that product differentiation may not be positively related to concentration. First, it might be presumed that consumers are more price-sensitive and, at least outside the major urban centres, less exposed to sales promotion of brands. Lall and Mohammad (1983), for example, express reservations about the importance of advertising in their Indian case study. Second, for more than a decade, until 1989, television advertising was prohibited in Indonesia for a variety of reasons related to social values, modernisation impacts, and rural-urban migration. Given the ambiguous nature of the theoretical predictions and the previous restrictions on television advertising in Indonesia, no attempt is made to postulate, *a priori*, the direction of the relationship between product differentiation and concentration.

Caves et al (1980) argued that the high capital costs of establishing a plant of minimum efficient size act as a barrier to entry, thereby raising concentration levels. Capital costs are likely to be a barrier to entry in Indonesian manufacturing because the financial sector remains underdeveloped, at least compared with its somewhat more sophisticated neighbours, Malaysia, Singapore and also Thailand (Hill, 1996). However, we would expect the positive influence of capital costs to moderate over time as the financial sector continues to grow in depth and sophistication, especially after the major financial sector reforms in 1988. The study by Goeltom (1995) shows that financial liberalisation improved smaller firms' access to capital. The progressive removal of restrictions on FDI after 1986 should also have contributed to the declining influence of capital cost barriers.

Government Intervention

We include three policy variables, trade protection (TP), constraints on domestic competition (REG), and state ownership of industry (SOE).

(a) Trade Policy

The extent to which imports and exports affect concentration in Indonesian manufacturing depends on the structure of protection. There are two competing views in the theoretical literature. The most common view is that protection facilitates the 'overcrowding' of establishments of sub-optimal size, thereby lowering concentration (Khemani, 1980). However, there are several mechanisms by which trade protection can also increase concentration. First, by insulating firms from foreign competition, high protection may induce producers to become inefficient and thereby lower the number of efficient firms that can 'fit into' the industry (De Melo and Urata, 1986). Second, the kind of protection offered is important. For example, if protection is given to selected firms, then these favoured firms will grow faster, which in turn increases concentration of industry.

(b) Constraints on Domestic Competition

In Chapter 4 we gave examples of several industries where constraints on competition (entry and exit restrictions, price setting, and distribution controls) may have influenced the level of concentration. In some of these cases restrictions may have maintained relatively low levels of concentration (e.g., sugar processing), while in others they may have increased concentration (e.g., noodles). Since these restrictions have different effects on concentration for different industries, we include industry-specific dummy variables in the concentration equation. The industries identified in Chapters 3 and 4, and included in our sample (to be discussed in Chapter 6), as having significant constraints on competition for most of the last decade are: sugar processing (ISIC 31181), cooking oil (ISIC 31150), noodles (ISIC 31171), alcoholic drinks (31310/30), fertiliser (ISIC 35120), cement (ISIC 36310), and basic metals (ISIC 37100). While there may be other industries that are restricted in some way, or have been in the past, the industries listed above are by far the most important in terms of both public policy discussions and manufacturing value added.

However, one approaches a cross-sectional test of the effect of constraints on competition (including import protection) cautiously, because the restrictions may take some time to affect market structures. In addition, the restrictions may affect market structure indirectly through other determinants, and thus the dummy variables may not show up as statistically significant in the econometric analysis when in fact they are important. For example, entry and exit regulations are likely to influence the number and size distribution of plants in an industry, and thus influence economies of scale, which in turn influence concentration of the industry.

(c) State-ownership of Industry

The final form of government intervention is through state ownership of industry. In Chapter 4 we observed that high concentration was less associated with state ownership of industry compared with foreign ownership. Further, the concentrated industries that have significant state ownership are normally concentrated because of their high capital intensity. Even if oligopoly and state investment share common structural causes, state enterprises could still wield some causal influence on concentration. State enterprises might cause higher concentration in these industries if they are given special facilities and concessions by government. Further, a large state enterprise sector might crowd out private sector investment in the industry and deter private sector investment to the extent that private investors fear that the government will bias commercial conditions to the benefit of their own companies.

The above theoretical considerations lead to the following specification of the concentration equation:

$$CR4 = f(\overset{+}{EOS}, \overset{-}{IZ}, \overset{-}{RM}, \overset{+}{AKC}, \overset{+}{PD}, \overset{?}{EX}, \overset{?}{IM}, \overset{+}{MNC}, \overset{+}{SOE}, \overset{?}{REG}, \overset{?}{TP}, \overset{+}{\Pi})$$

Where EOS is economies of scale, IZ is industry size, RM is regional markets, AKC is capital costs, PD is product differentiation, EX is export-orientation, IM is import penetration, MNC is the share of foreign ownership of the industry, SOE is the share of state ownership of the industry, REG is the dummy variable for the seven industries that had been heavily regulated over the last two decades, TP is trade policy, and Π is profitability.

Equation 2: Profitability

In the standard closed-economy oligopolistic model, industrial concentration and barriers to entry have been identified as the basic conditions that enable firms and industries to raise price above the competitive level and thereby earn excessive profits. When we consider a small, open economy such as Indonesia the hypotheses about profit determinants become increasingly vulnerable to the erroneous assumption of a closed economy. When foreign trade is substantial, exposure to trade should significantly affect industry profits. Economic theory predicts that concentration and other explanatory variables (including product differentiation and capital requirements) would have a significantly reduced impact on profits, as domestic prices for a small open economy would tend to be determined by foreign markets. Furthermore, in a small, open economy domestic concentration measures (unadjusted for trade) become inaccurate measures of market power.

Most researchers acknowledge that at least three conditions are necessary (but not sufficient) for monopolistic distortion of a market in an open economy. Sellers must be few enough to recognise their mutual interdependence in short-run pricing and long run investment decisions affecting quantity sold in the market. Entry barriers must deter entry even when profits are persistently elevated above a normal competitive level. And international competition must not constrain the domestic price to a closed-economy competitive level. The joint necessity of these conditions implies that they should interact with each other in the statistical specification.

Previous research on the determinants of industry profitability in other small, open countries has reached consistent conclusions in some areas but failed to confirm relationships in others. Most studies show that seller concentration is positively related to profits, but its effect is weak and sensitive to the choice of specification, sample, time period and estimation technique. For example, de Melo and Urata (1986) found a significant association between concentration and profits in their post-trade liberalisation equation, but not in their pre-trade liberalisation equation. Jacquemin et al (1980) could not find a significant relationship between unadjusted concentration and profits for Belgian manufacturing. The authors argued that the

insignificant result for concentration is consistent with the hypothesis that in a small, open economy market power is constrained by import competition. Similarly, Lee (1986) could not find a significant relationship between concentration and profits in Taiwanese manufacturing. On the other hand, Chou (1986) found a positive correlation between profits and concentration for Taiwanese manufacturing. The difference between these two studies might be explained by differences in model specification. Chou (1986) estimated the concentration-profits relation within a simultaneous four equation model (the four endogenous variables were profits, concentration, exports and imports). Lee (1986), on the other hand, treated concentration as an exogenous variable in his profits equation and, thus, the insignificant result may be due to model misspecification. Most studies find a negative relationship between import competition (either entered separately or interacted with concentration) and profits, indicating that strong import competition constrains excessive pricing behaviour in the domestic market (Jacquemin et al, 1980; De Melo and Urata, 1986; Chou, 1986).

Other structural variables tend to have a weak effect on industry profitability. Scale economies and capital requirement proxies are seldom significant in the profitability equation for small, open economies. Caves et al (1980: 227) suggest that this might arise because of multicollinearity between these two variables and concentration. Advertising and industry output growth do not appear to be powerful influences in small economies, as they are over the profits of industries in larger economies such as the U.S. and U.K. According to Caves et al (1980: 227) these results are fairly consistent with our general interpretation of industrial organisation in a small, open economy: concentration and other explanatory variables have a significantly reduced impact on profits as domestic prices for a small open economy tend to be determined by foreign markets.

Drawing on previous empirical studies for other small economies and the policy regime, industry profitability is specified as a function of trade-adjusted concentration, barriers to entry (product differentiation and absolute capital requirements), industry output growth, regional market fragmentation, foreign ownership, and government intervention through trade protection, regulatory

constraints on domestic competition, and state ownership of industry.

Concentration

The market concentration hypothesis asserts that profit margins tend to be higher in those markets (other things being equal) where concentration is higher.² The ability of firms to cooperate in raising price above the competitive level is greater in industries where a few sellers dominate. This is mainly because a small number of firms imply lower costs of forming and monitoring a cartel (Stigler, 1964).

We mentioned earlier that it is important to take account of foreign trade in measuring concentration to capture more accurately the extent of market power in Indonesian markets. Therefore, we use the trade-adjusted concentration ratio presented in Chapter 4 as our measure of concentration in the profitability equation. In empirical studies where the measure of seller concentration takes account of foreign trade, its association with profit levels is usually stronger than where trade is ignored (Kirkpatrick et al, 1984: 79).

Several researchers have investigated whether there is some 'critical' or 'threshold' concentration level that separates industries into those that are earning excessive profits and those that are earning normal or competitive profits (Caves and Bradburd, 1982; Rosenbaum, 1994). Put simply, the 'critical concentration' hypothesis asserts that there exists some level of concentration that makes anti-competitive behaviour more likely. Caves and Bradburd (1982), for example, found a critical CR4 equal to 70 per cent in their sample of U.S. manufacturing industries. Ghellinck et al (1988) found three critical CR4s in his study on U.K. manufacturing industries (CR4=35%, 75% and 95%). A number of earlier studies for other developing countries have also found a discontinuous profit relation: Gan (1978) for Malaysia, House (1973) for Kenya and Walgreen (1971) for India. However, most studies find a continuous relationship: profit levels are progressively higher in those industries with higher concentration levels. This is an empirical question which we will leave open in the empirical analysis in Chapter 7.

² Numerous studies have derived profit maximising expressions relating profits with measures of concentration. See, for example, Saving, 1970; Cowling and Waterson, 1976; Encaoua and Jacquemin, 1980; Clarke and Davies, 1982; Neumann et al, 1983.

This interpretation of the positive concentration-profits relationship has been subjected to some criticisms. The main criticism arises from the fact that there does not exist a consensus among theories of oligopoly as to the nature of interdependence and collusive behaviour. Several oligopolistic models show that the positive relation can arise without collusion (e.g. the Cournot model). Some other oligopolistic models do not suggest a positive relationship at all. For example, the Bertrand price-setting model shows that, under conditions of constant marginal costs and no capacity constraints, the equilibrium price is equal to marginal costs, and thus only competitive profits are earned. The Theory of Perfectly Contestable Markets postulates the industry conditions that result when entry is free and exit is costless (fixed capital costs are not sunk or irrecoverable upon exit). Contestability also requires that potential entrants can enter before incumbents can retaliate through price cuts, and can exit before retaliation produces negative profits. When these conditions are fulfilled, price always approximates cost, even where there is only one incumbent firm (Baumol et al, 1982).

Finally, there is an efficiency-superiority explanation for large market shares and apparent excessive profitability of leading firms (Demsetz, 1973). These models explain high concentration in terms of scale and non-scale differences in costs among firms. The non-scale differences arise from superiorities associated, in particular, with the managerial factor: its capability in monitoring team production (Alchian and Demsetz, 1972). Scale differences arise from economies of scale: where there are substantial economies of scale, large firms have lower average costs compared to smaller firms. Thus, efficient firms will grow faster than less efficient firms, and if there are substantial economies of scale, large firms will grow even faster than smaller firms. The result is high concentration and high profits. The high profits are 'efficiency rents': the reward for being efficient.

Barriers to Entry

Investigators of industrial organisation include barriers to entry as explanatory variables in the profitability equation. This is in the belief that high entry barriers protect incumbent firms from new entrants, who would dissipate excess profits in the

long run. Comanor and Wilson (1974:42) state that,

"Where entry barriers are important and persist over time, established firms can reach an equilibrium position in which excess profits are earned. These higher returns represent economic rent, but one associated with the market power of the firm rather than with a scarce input in the production process."

We include the same two barriers to entry as in the concentration equation: capital requirements (AKC) and product differentiation (PD). We postulate a positive relation between these two measures of entry barriers and profits. Product differentiation insulates each seller's market by a downward-sloping demand curve. Such firms therefore face less elastic demand and, thus, process greater market power. Large capital requirements may deter entry to the extent that they are sunk costs (that is irrecoverable upon exit). Large sunk costs of production reduce the contestability of the industry for local entrants, and this in turn will permit the incumbent firm(s) to earn excessive profits. Caves et al (1980:227) suggested that market power is greater in concentrated industries with high entry barriers compared with concentrated industries with low entry barriers. To test this proposition we include two interaction terms in the profit equation: $CR4MX*AKC$ and $CR4MX*PD$. We expect a positive relation between these two interaction terms and industry profits: profits will be higher in concentrated industries with greater product differentiation and capital requirements.

Regional Markets

Seller concentration measured at the national level understates effective concentration for industries that are regionally fragmented. Thus, we would expect the concentration-profits relationship to be stronger in industries with regional sub-markets. Therefore, we include the regional markets (RM) variable in the profit equation. We expect a positive correlation between regional markets and profits.

Industry Growth

Industry growth (GRO) is expected to exert a positive influence on profits. Several

hypotheses support this specification. One is that actual growth is positively correlated with deviations of actual from expected growth and hence positively correlated with windfall profits (losses). However, a negative relation between profits and growth may exist if growth attracts rapid entry (Caves et al, 1980). Several oligopolistic models show that the impact of growth on profits is different between concentrated and unconcentrated industries. For example, Green and Porter (1984) and Haltiwanger and Harrington (1991) show that industry growth will have a greater positive impact on industry profits of concentrated industries because collusion is less likely to break down in rapidly growing industries. Rotemberg and Saloner (1986), on the other hand, show that growth will have a smaller impact on profits in concentrated industries because oligopolistic coordination is more likely to break down during rapid growth if the expected benefits of cheating are greater than the expected penalty imposed by the cartel. The results of empirical studies testing these growth hypotheses are mixed. Domowitz et al (1986 and 1987) found that it was in the more concentrated industries that growth had a greater impact on profits in his sample of U.S. manufacturing industries, while Ghellinck et al (1988) found the opposite result in their study on a sample of U.K. manufacturing industries. Following these studies we also include an interaction term between concentration and growth ($CR4MX \cdot GRO$) in the profit equation. We leave open the direction of this relationship.

Foreign Ownership

Due to the complexities involved in the relationship between FDI and industry performance in developing economies, investigators have not been able to reach a consensus on the effect of MNC on industry profitability (Caves, 1996: 227). One view is that entry of MNCs increases the degree of competition in host countries, suggesting a negative relationship between MNCs and industry profits. The opposite argument suggests that MNCs create additional barriers or compound existing barriers, and thereby reduce competitive pressures in domestic industries. This suggests a positive relationship.

The positive relationship can also arise if MNCs are more efficient and, thus, more profitable than local producers (Lall, 1978; Ramstetter, 1991). The differential profit

rates among MNCs and local firms will increase an industry's weighted average profit rate and, thus, produce the positive relation. Finally, it is important to bear in mind that any relation between profits and MNCs will be complicated by MNCs' transfer pricing practices. Caves (1996: 192-95) showed that, unless tax minimisation is curtailed by other constraints such as avoiding tariffs, MNCs have an incentive to use transfer prices to the maximum extent to place profits in the low-tax jurisdictions. Thus, MNCs' reported profits in a host country may either be over-estimated or under-estimated depending on whether the host country is a low or high tax jurisdiction.

Government Intervention

We include three policy variables, trade protection (TP), state ownership of industry (SOEs) and restrictions on domestic competition (REG)

(a) Trade Policy

The extent to which imports negatively affect profits in Indonesian manufacturing depends on the trade protection structure. In the industrial organisation literature, trade protection has been considered as a barrier to entry which protects existing firms from foreign competition (Esposito and Esposito, 1971:343; Clarke, 1985:103), suggesting a positive relationship between trade protection and profits. Economic theory also predicts that it is in the more concentrated industries that trade protection has a greater impact on industry profits (Jacquemin et al, 1980). In a competitive industry, trade protection will raise the short run profitability of the industry, which in turn will attract new firm entry and thereby drive profits back to the long-run competitive level. Thus, in equilibrium profits are determined by the interaction of protection with concentration. Therefore, we include an interaction term between trade policy and trade-adjusted concentration ($CRMX*TP$). We postulate a positive relationship between the interaction term and industry profits. There is some empirical evidence in support of this hypothesis. Weiss (1993) found that it was in the more concentrated industries that changes in nominal rates of protection had a greater impact on changes in industry profits in Mexican manufacturing industries.

Some investigators (e.g., Round, 1980) have found a negative relation between

protection and profits, on the grounds that protection induces entry of a large number of small firms operating sub-optimal size plants or encourage protected firms to be inefficient (in an X-inefficiency sense).

(b) State Ownership

The relation between industry profitability and state-ownership of industry is ambiguous. A negative relation may be observed if the corporate objective of SOEs is not profit maximisation. SOEs may have other objectives related to social policy and employment that constrain profit maximisation behaviour. Further, the profit maximisation objective may be subject to non-economic constraints on their pricing, input, and output decisions. In addition, the department overseeing its operations may interfere in its day-to-day operations for non-economic reasons that reduce profitability (Pangestu and Habir, 1989). Finally, many SOEs may be less efficient relative to private sector firms because they face a different incentive structure. If the SOEs are being subsidised and protected from competition there will be less incentive to minimise costs and use the most efficient techniques. A positive relation may be observed if government assistance increases profits, and these outweigh any loss resulting from X-inefficiency.

(c) Constraints on Domestic Competition

Finally, we include the seven industry dummy variables to test the effects of anti-competitive constraints on industry profits of the seven industries listed earlier in this Chapter. The direction of the relationships is ambiguous. A positive relation may be observed since leading firms will tend to be less fettered in their market behaviour. A negative relation may exist if restrictions induce firms to become inefficient and thereby reduce industry profits.

These theoretical considerations lead to the following specification of the profitability equation:

$$\Pi = f(\underset{+}{\text{CRMX}}, \underset{+}{\text{CRMX}} * \underset{+}{\text{TP}}, \underset{+}{\text{CRMX}} * \underset{+}{\text{GRO}}, \underset{+}{\text{CRMX}} * \underset{+}{\text{PD}}, \underset{+}{\text{CRMX}} * \underset{+}{\text{AKC}}, \underset{+}{\text{TP}}, \underset{+}{\text{MNC}}, \underset{+}{\text{SOE}}, \underset{+}{\text{PD}}, \underset{+}{\text{AKC}}, \underset{+}{\text{GRO}}, \underset{+}{\text{REG}}, \underset{+}{\text{RM}})$$

Where CRMX is the trade-adjusted CR4 ratio defined in Chapter 4. CRMX*TP,

CRMX*GRO, CRMX*AKC, and CRMX*PD are the concentration interaction terms between concentration and trade policy (TP), industry growth (GRO), capital requirements (AKC), and product differentiation (PD). MNC is foreign ownership of industry, SOE is state ownership of industry, RM is regional market segmentation, and REG are seven dummy variables for the industries in our sample that had been heavily regulated for most of the last decade.

Equation 3: Multinational Enterprise Presence

This section is divided into two parts. First, we briefly review the theory of FDI. Secondly, we present our hypotheses on the determination of the inter-industry differences in multinationals' share of production of Indonesian industry.

Theory

A number of theoretical propositions have been put forward to explain a firm's decision to exploit foreign markets by FDI rather than producing at home and exporting or licensing production abroad (Dunning, 1981; Caves, 1974b and 1996). Most of these theoretical expositions are associated with locational-specific factors and firm-specific factors or proprietary assets. The existence of MNCs requires, first, that locational forces justify dispersion of production so that plants are found in different national markets. Given this dispersion of production there must be transaction-cost advantages to placing the plants under common administrative control, rather than licensing production to a local producer. The locational forces can be divided into cost factors and market factors. The cost factors include the cost of labour, raw materials, and capital, while the market factors include market structure, size of the market, growth conditions, efficiency of local producers etc.

According to the proprietary assets approach to MNC behaviour, firms operating in an imperfectly competitive market tend to develop and possess intangible assets that enable firms to overcome the intrinsic disadvantages of establishing a plant in a foreign country. These assets may be technology, knowledge about how to attain lower costs, or to produce a better product. The firm could possess special skills in styling and promoting its products that make it such that the buyer differentiates it

from those of its competitors. A firm investing abroad requires these monopolistic advantages to offset disadvantages associated with operating in a foreign market. These disadvantages are usually ascribed to the firm's lack of knowledge of the host country's legal system, its political institutions, differences in culture and tastes, differences in the way of doing business, political risks and so on. Firms that possess monopolistic advantages over and above these disadvantages are able to earn rents on their proprietary assets in the foreign markets.

Whether a firm establishes its own plant or licences its proprietary assets to a local producer depends on the transaction costs of transferring proprietary assets. The transaction cost approach asserts, quite simply, that MNCs will exist only if the plants they control and operate attain lower costs or higher revenue productivity than the same plants under separate managements (Caves, 1996:4). These transaction costs arise for at least two reasons. First, the market for transferring proprietary assets is imperfect due to information asymmetry between the owner of the asset and the potential buyer (Rugman, 1980:368). Second, these assets are, at least to some degree, public goods. Once a piece of knowledge has been developed and applied at a certain location, it can be put to work elsewhere at little extra cost and without reducing the capacity available at the original site. In this situation, it is more profitable to the firm possessing these assets to use them rather than to sell them or to give the right to use them (licensing) to a foreign firm. Therefore, the firm tends to internalise these monopolistic advantages, and this gives rise to MNCs.

This application of transaction cost analysis underlies a framework commonly used in research on the MNCs (Dunning, 1981). It asserts the existence of three necessary conditions for the appearance of FDI: (1) the firm can appropriate some value-creating proprietary asset ('ownership'), (2) production processes that employ or apply the value-creating asset are efficiently dispersed among several national markets ("location"), and (3) the decentralised application of the proprietary asset is more efficiently managed within the owning firm than by licensing it at arm's length to another firm ('internalisation'). This framework, developed by Dunning (1981), is referred to as "the eclectic theory of foreign investment" and is followed in our study.

Hypotheses

Drawing on these theoretical propositions, we specify MNC presence as a function of the sources of proprietary assets such as capital and technology-intensity (PC, TI), human capital intensity (HC), economies of scale (EOS) and product differentiation (PD); locational factors, such as concentration (CR4), profits (Π) and growth (GRO) conditions of industry, export-orientation (EX), and regional fragmentation of industry (RM); and finally, government intervention through trade policy (TP), entry regulation (REG) and state ownership of industry (SOEs).

Proprietary Assets

In Chapter 3, we provided some evidence that those MNCs serving the domestic market tend to be concentrated in physical capital-intensive, skilled-intensive and technology-intensive industries, reflecting MNCs' advantages over local firms in these kinds of industries. Therefore, it is expected that the activities of MNCs are concentrated in those Indonesian industries which are characterised by high capital intensity (PC), high technology intensity (TI) and high skill intensity (HC).

Entry barriers generated by the possession of intangible assets create a suitable environment for FDI (Connor and Mueller, 1982). The presence of entry barriers could attract foreign firms because these barriers typically enable firms to achieve high profits and MNCs have less difficulty in overcoming such barriers (Caves, 1996). The two barriers to entry identified in Indonesia are capital intensity and product differentiation. While product differentiation has proven to be a robust statistical explanation of MNCs' activities in developed economies, mixed results have emerged for developing economies. Aswicahyono and Hill (1995) tested this product differentiation hypothesis for FDI in Indonesian manufacturing, using Japanese MNCs' advertising-sales ratios as a proxy. They could not find a significant relation between advertising and MNCs' share of production. Lall and Mohammad (1983) could not find a significant relationship in their Indian study. Given the mixed results of previous empirical studies, no attempt is made to postulate, *a priori*, the direction of the relationship between product differentiation and MNC presence in Indonesian manufacturing.

Economies of Scale

The relationship between economies of scale and FDI is ambiguous. Caves (1996) suggests that economies of scale might be a deterrent to a firm investing abroad. Caves (1996:84) argues that "economies of scale have the least affinity for foreign investment because they induce firms to centralise production and export to foreign markets rather than decentralise and acquire MNC status". Caves did explain that economies of scale might favour MNC operations in some instances. For an assembled product such as automobiles, economies of scale might be modest in the final assembling stage but large in the production of certain components. If there is no smoothly working international arms-length market for the components, MNCs can gain an advantage against single-nation firms by producing these components at a single location and assembling them in individual markets. Given the ambiguous nature of the theoretical predictions, no attempt is made to postulate, *a priori*, the direction of the relationship between economies of scale and MNCs' share of industry production.

Concentration

The industrial organisation literature lends support to the fact that oligopolistic firms are closely related to multinational operations (Caves et al, 1980; Giddy and Young, 1982). This is mainly because product differentiation and capital intensity are associated with oligopolistic market structures. To test whether oligopolistic market structures wield some causal influence on MNCs activities independent of capital intensity and product differentiation, we include the concentration ratio (CR4) as an explanatory variable. We postulate a positive relationship for this variable.

Profit and Growth Conditions

Theory also postulates a positive relation between profits (Π) and industry growth (GRO) and MNC activities. In other words, MNCs are attracted to markets that offer attractive rates of return on capital, or are relatively fast growing (Dunning, 1981, Caves, 1996). Therefore, we include the profit and industry growth variables in the MNC equation.

Export Markets

In Chapter 3, we showed that MNCs are heavily concentrated in Indonesia's export-oriented industries, especially since the 1980s trade reforms. This normally arises because MNCs are better placed to penetrate export markets than domestic firms (Willmore, 1992). Foreign firms have specialised knowledge of and access to export markets, better access to technology, and ability to maintain quality standards. When MNCs are present in a given industry there is a positive spillover to domestic firms which makes them export oriented. For example, when an MNC establishes an export-oriented venture in Indonesia, its international buyers visit the country and local firms may benefit from this. Local firms often acquire the new technology, quality standards and knowledge of export markets from MNCs through joint ventures with them, or through labour turnover between MNCs and pure domestic firms. Thus, for these reasons, we expect a positive relationship between export-orientation and FDI in Indonesian manufacturing, particularly in the post-reform equation.

Government Intervention

We include three policy variables: trade protection (TP), state ownership of industry (SOEs) and entry restrictions on MNCs (REG).

(a) Trade Protection

In Indonesia trade protection tended to attract investment oriented towards the domestic market, particularly before the 1980s reforms. Indeed, prior to these reforms it was commonplace for MNCs to bargain for tariff protection (Hill, 1988). Thus, we expect a positive relationship between trade protection and FDI in the pre-reform period. However, we might not expect a strong positive relationship between MNCs and trade protection in the post-reform equation. Evidence from Indonesia and other countries suggests that MNCs benefit from trade liberalisation because of their worldwide market networks, and sourcing of components and raw materials. Thus, MNCs are less likely to consider trade protection as a positive factor in their decision to invest in a country. Therefore, we do not expect a strong positive relationship between trade protection and FDI in the post-reform equation.

(b) State Ownership of Industry.

Aswicahyono and Hill (1995) found that a large state enterprise sector crowds out private sector investment in the industry and deters private sector investment to the extent that private investors fear that the government will bias commercial conditions to the benefit of their own companies (except where there are MNC-SOE joint ventures). We therefore postulate a negative relation between state ownership of industry (SOEs) and FDI.

(c) Entry Restrictions

Before the 1980s investment reforms, a large number of industries were closed to FDI (Chapter 2). We therefore include a dummy variable in the pre-reform equation to control for entry prohibitions on foreign firms. The dummy variable is equal to one if entry was prohibited in the industry, otherwise it is zero. We expect a negative coefficient on the dummy variable in the pre-reform MNC equation. By 1993, many of the restrictions on FDI were removed. To test the impact of the removal of these restrictions on the pattern of FDI, we include the same dummy variable in the post-reform equation. We do not expect a negative relationship between FDI and past entry restrictions in the post-trade liberalisation equation (see Table 6.1 for the list of industries closed to foreign firms in our sample).

Regional Market Segmentation

The other important trade barrier encouraging FDI is transport cost. If transport cost is low a firm is likely to locate production at home and to serve the foreign market by exports. But if transport cost is high it may not be profitable for the firm to export. Therefore, from the host country point of view it can be expected that FDI will be greater in industries regionally fragmented because of high transportation costs (Caves et al, 1980). Thus, we expect a positive relationship between regionally segmented industries (RM) and FDI.

The above theoretical considerations lead to the following specification of the foreign ownership (MNCs) equation:

$$MNC = f(CR_4, TP, EX, REG, SOE, PC, HC, TI, \Pi, GRO, PD, EOS, RM)$$

Where CR₄ is concentration, TP is trade policy, EX is export-orientation, REG is regulation restricting MNCs entry into an industry, SOE is share of state ownership of industry, PC is capital intensity, HC is human capital intensity, TI is technology intensity, Π is profitability, GRO is industry output growth, PD is product differentiation, EOS is economies of scale, and RM is regional markets.

Equation 4: Export Orientation

Economic theory offers a number of explanations of the pattern of trade in manufactures between developed and developing countries. The traditional factor proportions theory implies that labour intensity, in particular unskilled labour requirements, will be an important characteristic of less developed countries' (LDCs) manufactured exports. Alternative theories of international specialisation suggest a range of factors will influence the composition of developing countries' manufactured exports, depending to a large extent on the stage of industrialisation. Kirkpatrick et al (1984: Ch 2) note that the product cycle and technology diffusion approaches emphasise the dynamic nature of competitive advantage, and suggest that established LDCs exporters (e.g., the NICs) will have an increasing advantage in the production of standardised, fairly capital-intensive products based on a mature technology (e.g., steel, shipbuilding, certain engineering products, motor vehicles), while 'second tier' LDC exports consists of labour-intensive, subcontracted assembly and processing activities based on imported inputs. The internationalisation of production through the activities of MNCs implies that the 'sourcing' of productive activities will be determined by the comparative costs of different processes in the production cycle, rather than by the characteristics of the final products (ibid:23). The availability of low-cost labour will influence the relocation of labour-intensive subcontracting and assembly activities in LDCs for exporting to other countries (Helleiner, 1973; Nankani, 1979; Kirkpatrick and Yamin, 1981). Finally, recent theories have

emphasised the influence of imperfect competition (product differentiation and economies of scale) on the pattern of intra-industry trade between countries (Helpman and Krugman, 1985; Krugman, 1992).

As explained in Chapter 3, Indonesia began exporting manufactured products much later than the newly industrialised economies of South Korea, Taiwan, and Singapore, and the rapidly growing economies of Thailand and Malaysia. Manufactured exports as a share of total manufacturing production increased from around 3 per cent in 1981 to 23 per cent in 1994. In Chapter 3, we showed that Indonesia's changing structure of manufactured exports is typical of a labour-abundant, developing economy that has recently liberalised its economy. The share of total manufactured exports emanating from labour-intensive industries has increased from 41 per cent in 1986 to 61 per cent by 1994. Conversely, the share of resource-intensive products (mainly plywood) has declined from 46 per cent in 1986 to 25 per cent in 1994. Exports of manufactured products have also diversified in the 1990s. The share of total manufactured exports emanating from the largest three products (textiles, garments and plywood) has declined from 73 per cent in 1986 to 38 per cent in 1994. Substantial increases in exports occurred in labour-intensive industries such as electronics, footwear, furniture, yarn, jewellery, and toys.

Drawing on these explanations of international trade and Indonesia's structure of exports, we specify export-orientation as a function of capital-intensity (PC), human capital (HC), natural resources (RI and WP), industrial concentration (CR4), economies of scale (EOS), product differentiation (PD), consumer-goods (CG), regional markets (RM), multinationals (MNCs); and trade policy (TP).

Factor Intensities

The orthodox factor proportions theory predicts that a labour abundant country like Indonesia has a comparative advantage in labour-intensive commodities and will tend to export such commodities. Having emphasised the inadequacy of the simple Heckscher-Ohlin theory to explain actual trade patterns, Baldwin (1971) and others argued for the inclusion of human capital as separate factor. Developing countries at the earlier stages of industrialisation typically have scarce human capital resources.

Therefore, in the context of manufactures, Indonesia is expected to have a comparative advantage in exporting commodities that are relatively intensive in unskilled labour. The 'technological gap' and 'product cycle' theories also provide support for the hypothesis that Indonesia's exports are overwhelmingly labour-intensive in character. These views of international trade argue that technological developments have an important influence on the pattern of trade and international competitiveness (Hirsch, 1967; Vernon, 1966). Technology is not a freely and instantaneously available good, and countries that innovate first have an initial competitive advantage in new products. As technology becomes internationally diffused and the production process becomes standardised, competitive advantage shifts to countries with lower cost, unskilled labour. Thus, we expect an inverse relationship between physical capital (PC), human capital (HC) and export intensity.

The factor proportions theory also predicts that a natural resource-rich country will have a comparative advantage in resource-intensive commodities and will tend to export such commodities. In the context of manufactures, Indonesia is expected to have a comparative advantage in resource-based commodities. However, we observed in Chapter 3 that most of Indonesia's resource-based manufactures are forestry-based. In view of this we include a variable for resource-intensive manufactures (RI) and a dummy variable for wood-processed manufactures (WP).

Economies of Scale

Much of the recent theoretical literature on trade flows emphasises the importance of economies of scale and imperfect market structures. This literature asserts a positive relation between economies of scale and a country's exports (Koo and Martin, 1984:174). Several researchers have developed models which show that countries tend to export the products of industries for which they have large domestic markets.³ However, this view is not relevant to the new 'platform' industries in Indonesia, such as plywood and electronics where a large proportion of the production is exported.

Consumer Goods and Product Differentiation

Stage of production theories of international trade suggest that developing economies

³ Krugman (1980, 1993), Helpman and Krugman (1985) and Venables (1985).

will specialise in the export of manufactured consumer goods. Hufbauer (1970:181-2) writes:

'The newly developing country, so the argument runs, will produce for itself and may even export consumer goods, while the advanced nation will specialise in exporting producer goods. This sequence supposedly results from the "natural" practice of industrialising via backward integration.'

This view implies that the export share of Indonesian industry should be greater in consumer good industries. However, Kirkpatrick et al (1984: 23) noted that the internationalisation of production through the activities of MNCs implies that the 'sourcing' of productive activities will be determined by the comparative costs of different processes in the production cycle, rather than by the characteristics of the final products. We test this hypothesis by including a variable representing consumer goods industry (CG). Recent theoretical literature has postulated a positive relation between product differentiation (PD) and trade flows (Krugman, 1992). However, it seems prudent to accept the commonplace observation that Indonesia's exports are not highly product differentiated. We include product differentiation (PD) and expect a negative relationship with export intensity.

Concentration

Most of the recent formal studies of trade take place in the context of models of monopolistic competition. According to Koo and Martin (1985:177), "perhaps for this reason, they have relatively little to say about the impact of market concentration on trade flows". The received theory of international trade, however, does offer some guidance. Koo and Martin (1984) noted that a monopolist who can price discriminate and dump may export more than a competitive industry. This suggests a positive relationship between concentration and export intensity. But if dumping is not allowed, the monopolist might choose to focus attention on the domestic industry and export less than a competitive industry. This suggests a negative relationship. Recent literature has emphasised domestic competitive pressures as a positive influence on the flow of trade between countries. Helpman and Krugman (1985) presented a

simple model that showed the home industry will be a net exporter if it has a larger number of firms (hence lower concentration) compared with the foreign counterpart industry. A similar result can arise if higher concentration leads to X-inefficiency resulting from the failure of firms to minimise costs (Round, 1980: 63). Given the ambiguous theoretical predictions no attempt is made to postulate, *a priori*, the direction of the relation between concentration and exports in Indonesian manufacturing.

Multinational Enterprises

Recent research has investigated the influence of MNCs on developing countries' pattern of trade (Willmore, 1992; Blomstrom, 1990). Most empirical evidence shows that MNCs are positively related to a country's export performance. This arises for at least two reasons. First, MNCs invest in export-oriented projects in response to a developing economy's relatively low wage cost. Second, MNCs possess proprietary-assets that reduce the costs of exporting. These include organisational and international marketing skills, and direct access to the world's largest markets. For example, Indonesian joint ventures with Japanese textile companies enjoy access to world markets through links with Japanese trading companies that reduce the costs of exporting (Thee and Pangestu, 1994).

However, the relationship between MNCs and exports depends on the type of FDI: whether it is an export-oriented investment or import-substituting investment. The later type of investment is unlikely to be instrumental in promoting exports. We observed in Chapter 2 that before the trade policy reforms most FDI was located in import-substituting industries (partly as a response to trade protection). Thus, we do not expect a positive relation between exports and MNCs in the pre-reform equation. By 1993 MNCs have shifted their interest to export activities (partly as a result of trade and foreign investment policies reform) and, thus we expect a positive relationship between MNCs and export intensity in the post-reform equation.

Regional Markets

It has been postulated in the literature that high domestic and international transportation costs reduce the volume of trade (Rousslang and To, 1993). If transport

cost is high it may not be profitable for the firm to export. Therefore, it can be expected that exports will be lower in industries with regionally segmented markets because of high transportation costs (Caves et al, 1980). Therefore, we expect a negative relation between regional markets and export orientation.

Trade Policy

Government intervention through tariffs and non-tariff barriers, by changing relative prices, distorts the pattern of trade based on a country's comparative advantage (Deardorff, 1984). The imposition of a tariff on imports can adversely affect exports in three ways. Firstly, the increase in price resulting from the protection on intermediate inputs embodied in exports has to be absorbed entirely by exporters. Secondly, protection also increases the cost of labour for exporting industries. When the import-competing sector is given higher protection, the resultant higher commodity prices raise costs of living, causing labour to demand higher nominal wages. Third, protection will divert sales away from the export market to the domestic market since the latter becomes more profitable under protection.

Fane and Phillips (1991) clearly demonstrate that the structure of protection in the mid-1980s adversely affected Indonesian exports (refer back to Table 2.3). The duty exemption and drawback facility introduced at the beginning of 1986 removed most of the adverse effect of protection on intermediate inputs embodied in exports (Thee and Pangestu, 1994:10). However, as discussed in Chapter 2, Indonesia's foreign trade regime may still adversely affects the firm's incentive to export. Wymenga (1991: 140) showed that export oriented textile and garment firms, though having access to tradable inputs at international prices, nevertheless received negative effective protection, as their non-tradable intermediate inputs still had to be purchased at above international benchmark prices. On the other hand, domestic market-oriented textile and garment producers continue to enjoy high effective protection. Thee and Pangestu (1994: 13) observed that, under such a protective trade regime, domestic market-oriented textile and garment producers will not have a great incentive to shift to the less profitable export markets.. Therefore, we postulate a negative relation between protection and export intensity.

The above theoretical considerations lead to the following specification of export intensity:

$$EX = f(\underline{PC}, \underline{HC}, \underline{RI}, \underline{WP}, \underline{EOS}, \underline{PD}, \underline{CG}, \underline{CR4}, \underline{MNC}, \underline{RM}, \underline{TP})$$

Where PC is capital intensity, HC is human capital, RI is resource intensity, WP is wood-based manufactures, EOS is economies of scale, PD is product differentiation, CG is consumer goods industries, CR4 is seller concentration, MNC is the share of foreign ownership of the industry, RM is regional market segmentation, and TP is trade policy.

Equation 5: Import Penetration

We now consider the determinants of import penetration (IM). The variable is symmetrical with EX in that it reflects both the comparative advantage position of Indonesian industry vis-à-vis its foreign competitors and the extent to which natural and artificial barriers to trade limit the international movement of goods. Therefore, some independent variables can be treated symmetrically.

We expect that physical capital (PC), and human capital (HC) will be positively related to import penetration. Conversely, we expect resource intensity (RI and WP) to be negatively related to import penetration. We also include technology intensity (TI) in the import equation. The empirical evidence from Indonesia and other developing economies shows that developing countries are net importers of technology for the simple reason that they have a comparative disadvantage in technology products vis-a-vis industrialised countries (Soesastro, 1998). Therefore, we expect a positive relationship between technology and import penetration. The variables indicating the propensity to enter into international trade should again be included, with regional markets (Reg Mkts) and trade protection (TP) negatively related to import penetration.

The influence of economies of scale (EOS) remains ambiguous. A negative relation might be expected if the lower average costs achieved through economies of scale deter competing imports. However, since Indonesia's market is smaller than those of its leading trading partners, such goods might be produced elsewhere at a cheaper cost, and we therefore might observe a positive relation. Consumer goods (CG) and (PD) product differentiation are expected to have a negative relation with import penetration. Product differentiation can impede entry by imports since the foreign exporter must incur the fixed costs of creating a goodwill asset in the national marketplace. Furthermore, the analysis of multinational companies raises the presumption that the firm skilled in product differentiation and promotion of a product will choose to serve a foreign market by means of local production instead of exports. MNCs are expected to have a positive relationship with import penetration because of the prevalence of intra-firm trade and various forms of international sourcing in arm's length trade (Willmore, 1993, Athukorala and Hazari, 1988). Finally, the relation between concentration (CR) and import penetration is ambiguous. Economic theory suggests that imports will be inflated by the profit maximising actions of either a monopolist who competes with imports that are an imperfect substitute for its own output, or a risk neutral monopolist who faces a stochastic price of perfectly substitutable imports. Pagoulatos and Sorenson (1976) confirmed this relation for the United States, as did Baumann (1976) for Canada. A negative relation might be observed if concentration proxies entry barriers that discourage importers activities. This might arise if producers have established exclusive dealerships and territories within the distribution chain (Caves et al, 1980).

The above theoretical considerations lead to the following specification of import penetration:

$$IM = f(PC, HC, RI, WP, TI, EOS, PD, CG, CR4, MNC, RM, TP)$$

Where PC is capital intensity, HC is human capital, RI is resource intensity, WP is wood-based manufactures, TI is technology intensity, EOS is economies of scale, PD is product differentiation, CG is consumer good industries, CR4 is seller concentration, MNC is share of foreign ownership of industry, RM is regional market

segmentation, and TP is trade policy.

Equation 6: Trade Protection

This section is divided into two parts. In the first part we will briefly review the theories of protection. The second part presents our hypotheses on the determinants of inter-industry differences in protection.

Comparative Advantage/Adjustment Pressures

A good starting point in the discussion on protection is the theory of comparative advantage. Stopler and Samuelson (1941) suggested that the benefits of protection accrued to the factor of production used intensively in the import substitute sector. In the simple two-sector model, this should result in the import substitute sector being protected vis-à-vis the export sector. In a multi-sector economy the model is difficult to generalise. Greenaway and Milner (1994:400) suggested that protection might accrue on a 'ladder of comparative disadvantage' basis. In other words, if labour is the scarce factor, the more labour intensive the activity concerned, the greater the protection conferred. According to Greenaway and Milner (*ibid*: 400), Corden's (1974) analysis of the 'conservative social welfare function' fits well with this interpretation of the structure of protection. It basically suggests that governments will use trade policy instruments in an endeavour to ensure that particular groups do not suffer sudden and severe incomes losses as a consequence of changes in trade flows. This view, therefore, focuses on the supply of protection and emphasises adjustment to changes in comparative advantage. When adjustment pressures are severe, there is the greatest likelihood of protection.

Political Economy Explanations

The three principal political-economic theories are the interest-group model, national policy model and the 'adding machine' model. Each theory implicitly or explicitly is embedded in a particular theory of the way political systems and policy-making processes operate. It is important to emphasize that, in assessing these models' explanatory power, no single model is likely to explain the structure of protection.

Governments act for a variety of reasons and in response to a number of pressures, and these influences vary over time. Moreover, it is no simple matter to discern why, in retrospect, governments took particular decisions. Political scientists often examine the issue with reference to the statements and behaviour of key policy-makers, and the actions of coalitions in their attempt to influence policy. Economists tend to favour quantitative approaches and "revealed outcome" analysis, of the type undertaken in this study. A detailed treatment, beyond the scope of this study, would draw on these various analytical frameworks, both quantitative and qualitative, to address the question.

The interest group model. This model postulates that industries' protection levels are the result of interest group pressures (e.g., Cheh, 1974; Caves, 1976; Brock and Magee, 1978). Implicitly, the structure of protection depends on the benefit and cost of pressure groups in organising to secure protection. In this theory it is assumed that protection generates profits and rental income. The interest group model sees the analysis of protection as a political market comprising both demand and supply components, with demand originating from the industries seeking protection and supply granted by the government. Interest groups will allocate resources to lobbying until the marginal cost of this lobbying equals the expected marginal gain from these activities. From the supply side, it is assumed that politicians are motivated by self interest, that is re-election. Some writers have proposed a more elaborate utility function which includes politicians' personal wealth.

The national policy model. This model, formulated by Caves (1976) assumes that governments have a particular policy preference, often based on some ideological or analytical framework, which may then transcend sectional or personal interests. Governments may take the view that there are particular market failures which need to be solved, or there may be other goals which deserve a higher priority than short-run efficiency maximisation. Examples often discussed in the context of developing countries include the pursuit of rapid industrialisation, arguments based on infant industry notions, or the development of technological competence. Non-economic goals usually refer to some distributional considerations, such as employment creation or regional development. In these cases, protection will be granted in accord with

sectoral priorities consistent with this perception of "national interest".

Adding machine model. In this model governments act to maximise their chances of re-election (Downs, 1957; Caves, 1976). It indicates that each policy is accepted or rejected on the basis of the number of voters expected to accept it. This model is based on the assumption that government survival depends on success in a majority of geographically defined districts, and is therefore suited to an electoral system. This model is not suitable for our study owing to the fact that the concept of vote-buying is hardly apposite to Indonesia. Moreover, the country has not in the past employed the district system in its general elections.

The approach in our study is to identify the determinants of inter-industry differences in ERPs, and to make a comparison of their relative strength between the pre-reform and post-reform periods. We do not intend to test one model against another. We now move on to discuss the hypotheses concerning the determination of inter-industry differences in trade protection.

Hypotheses

Capital Intensity (PC)

The expected sign of this variable is ambiguous. It is commonly asserted in developed countries studies that the sign of this variable is negative. The simplified, two-sector Stolper-Samuelson (1941) model demonstrates that the scarce factor has the most to gain from protection. To the extent that labour-intensive industries are import-competing industries in high-wage economies, this constitutes a motive for seeking protection. According to the interest-group model, pressure groups can make a stronger claim for protection if the industry concerned is characterised by high labour intensity.

However it is not obvious that such a relationship will exist in Indonesia. First, Indonesia has a comparative advantage in labour-intensive, low wage industries and, therefore, these industries are unlikely to require protection. Second, workers have little influence on political processes: there is no independent, organised trade union system which could lobby for protection, and the voting aspect is not important. On

the contrary, it is more likely that capital-intensive industries, to the extent that they are not internationally competitive, will demand protection, implying a positive relationship. Additionally, lobbying activities may be easier to organise in capital intensive industries since most of these industries are characterised by a small number of firms. In addition to the interest group model, we might also invoke the national-interest model here, given that the government sees several capital-intensive industries as being 'strategic' to the country's economic development.

The above arguments are posited in the context of a highly simplified two-factor model. Relaxing this assumption, and allowing for example the management and coordination of large employment activities through producer associations, it is possible that labour-intensive industries may seek protection (Basri and Hill, 1996:249-50). Pangestu and Boediono (1986:35) argued that, in the late 1970s and early 1980s, the government granted protection to labour-intensive industries on equity grounds.

Modern versions of the H-O-S model recognise that labour is not homogenous - activities may be intensive in skilled or unskilled labour - and production processes can be intensive in technology. Thus, in addition to physical capital, we include human capital (HC) and technology intensity (TI) variables in the protection equation. The expected sign of the human capital variable is ambiguous for the same reasons as physical capital. The expected sign of the technology variable is also ambiguous. A positive sign might be observed if comparative disadvantage/adjustment considerations predominate in fashioning the structure of protection. We might also invoke the national interest model here, given the government's proclivities to support 'show case' high-tech industries, and frequent rhetoric on encouraging value added production processes, which more often than not refers to technological-intensive products in public discussions in Indonesia.

Industry Size

It is assumed that larger industries will have more political influence through scale economies in lobbying. The very large industries will have a discernible impact on national economic fortunes. In the latter case, a positive association could be

construed as support for both the interest-group and national policy models.

Growth and Profitability

A high growth industry is less likely to demand protection since it is in a position to compete with imports. In addition, high growth suggests the possibility of many new entrants. In such a situation there is less scope for establishing coalitions of firms for the purpose of lobbying government for assistance. Thus, the relationship is expected to be a negative one. By similar reasoning, profitability of an industry may be negatively related to protection.

Seller Concentration

The interest group model postulates a positive relationship between concentration and protection. Theory tells us that the benefits to the protected firms may be greater if the industry is highly concentrated since, other things being equal, the costs of organisation and lobbying will be lower. In addition, the expected rents from protection may be greater in concentrated industries if entry can be blocked. In purely competitive markets, protection will attract new entrants, which in turn will dissipate most of these rents in the long run.

Regional Markets

Another aspect of concentration that can influence inter-industry variations in protection is geographic concentration of firms. Industries tend to be more affected by import competition if they have less natural protection. In terms of the interest-group model, national industries will seek more protection than regionally fragmented industries. In addition, regional concentration of sellers makes it easier to organise and lobby more effectively than is the case for industries that are regionally fragmented. Thus, we expect a negative relationship between regional market segmentation (RM) and protection.

State Ownership

This is a straightforward variable. Governments are expected to favour industries in which their own firms are heavily involved. Such protection can be expected owing to the lobbying capacity of senior state enterprise management, many of whom

themselves have a bureaucratic background. As another instance of where the national interest model could also apply, governments may simply protect these firms because it is believed that the industry in which they operate is inherently desirable for distributional goals, as an infant industry, or because of the presence of externalities. One caveat that applies to all these arguments is that state dominated industries may also be subject to a range of non-economic objectives, such as price stabilisation, a requirement that they locate in uneconomic regions, and so on, for which they receive implicit assistance (credit assistance, guarantees against insolvency) which are not manifested in the form of protection (Basri and Hill, 1996:250).

Foreign Ownership

We expect that the relationship between MNCs and trade protection to change between the pre-reform and post-reform periods. In Indonesia, as in many other developing economies, multinationals often negotiated entrance on the basis of expected profitability, one element of which is likely to be fiscal incentives and protection from competition. Therefore, the larger the foreign presence in an industry, the more likely is protection to be offered. "Tariff bargaining" by foreign firms was quite common in Indonesia during the era of high protection through to the mid-1980s (Hill, 1988). It has become less common in recent years as protection has fallen, and as these firms' interests have shifted to export orientation (Basri and Hill, 1996:250). Further, given their world-wide market networks and sourcing of raw materials and components, MNCs are better placed to benefit from trade liberalisation. Thus, MNCs may be less likely to resist tariff cuts. Therefore, we do not expect a strong positive relationship between MNCs and trade protection in the post-reform equation.

Imports and Exports

We expect a positive relationship between imports and protection, and a negative relationship between exports and protection. Within the simple two-factor H-O-S model, one can infer comparative advantage from trade shares - a relatively high value of imports (exports) relative to output being indicative of comparative disadvantage (advantage). Thus, industries with a high import share (IM) are likely to face a greater competitive challenge and therefore greater potential adjustment pressures than those with high export shares (ES). Thus, we expect import-competing

industries to seek protection. The national interest model can be invoked here. The government might grant protection on infant industry grounds. These arguments are more relevant to Indonesia in the high protection era through to the mid-1980s when the government was pursuing an import-substitution strategy. We might expect a weaker relationship in the 1990s as protection has fallen. While we expect a negative relationship between protection and exports, this relationship should be stronger in the 1990s as a result of the reform process.

Historical Protection Levels

The interest group model suggests that current levels of protection could be positively correlated with past levels of protection because there will be an incentive for firms in highly protected industries to resist trade liberalisation (Lavergne, 1983: 129). While Basri and Hill (1996:255) contended that political opposition, in the form of interest-groups, will be a major obstacle to further trade liberalisation in the 1990s, they argued that national interest transcended these sectoral interests during the 1980s trade policy reforms when they stated (ibid:255),

'Interest group dynamics have not been the sole element in the policy-making equation. Seen in this light, the national interest model may still have some relevance, in the sense of explaining broad average movements in protection, as distinct from inter-sectoral variations at a given point in time. When there was a politico-economic imperative for trade reform, as in Indonesia in the mid-1980s, national interest to some extent transcended these sectoral interests, and almost all manufacturing protection rates declined.'

To test these propositions for Indonesian manufacturing industries, we include past levels of protection as an explanatory variable in the protection equation. We would expect a positive relationship in the pre-reform equation since high protection persisted through to the mid-1980s. However, given that interest-group dynamics have not been the sole element in the policy-making equation during the reform process, we leave open the direction of the relationship in the post-reform equation.

The above theoretical considerations lead to the following specification of the protection equation:

$$TP = f(PC, HC, TI, GRO, \Pi, IZ, CR4, RM, EX, IM, MNC, SOE, TP(t-1))$$

Where PC is capital intensity, HC is human capital intensity, TI is technology intensity, GRO is industry growth, Π is industry profitability, IZ is industry size, CR4 is concentration, RM is regional markets, EX is exports, IM is imports, MNC is share of foreign ownership of industry, SOE is share of state ownership of industry, and TP(t-1) is historical protection.

5.4 Summary

Recent literature has emphasised the complexity and interdependence of the three components of organisation: market structure, conduct and performance. The recognition of the interdependence of the various aspects of market behaviour has resulted in the use of the simultaneous equations model rather than single equation models in recent studies. The S-C-P model presented in this Chapter explicitly incorporates the interdependence between five variables that we deem to be relevant to the conditions of Indonesian manufacturing. These are seller concentration, industry profitability, export orientation, import penetration, foreign-ownership, and trade policy.

Our S-C-P model hypothesises that the six variables will be jointly determined within a given market. For example, high seller concentration is expected to lead to relatively high industry profits (the market power hypothesis). However, the line of causality may also be reversed. Highly profitable firms may increase concentration in the market by increasing outlay of advertising or by building larger production capacity. Thus, concentration and profits might be jointly determined variables within a given market. Export expansion is expected to reduce concentration as the industry can support a larger number of viable firms. However, the relationship might also be reversed. Low concentrated industries may export a larger share of their production

compared to high concentrated industries because lower concentrated industries have greater domestic competitive pressures, which in turn has a positive influence on exports. Thus, concentration and export-orientation might be jointly determined variables within a given market. The estimation results of our S-C-P model are presented in Chapter 7.

Chapter 6

Data Base, Variable Measurement, and Estimation Technique

6.1 Introduction

This Chapter begins with a description of the data base, followed by a discussion of the measurement of the variables of the structural model developed in the preceding Chapter. Finally, the econometric procedures used in the estimation of the model are explained.

6.2 Data Base

The data base for the estimation of the econometric model developed in section 5.3 is derived from the following major sources:

- (1) The annual manufacturing surveys, 1985 and 1993, of medium and large-scale establishments (defined as establishments with 20 or more employees) published by the Central Bureau of Statistics (Badan Pusat Statistik or BPS).
- (2) The 1985, 1990 and 1993 Input-Output Tables published by BPS.
- (3) Other quantitative data (these sources are discussed in the Chapter).
 - (i) Effective rates of protection are taken from Fane and Phillips (1991) and Fane and Condon (1996).
 - (ii) U.S advertising-sales ratios are taken from Ornstein (1976)
 - (iii) R&D expenditure-sales ratios are taken from the Australian Bureau of Statistics
 - (iv) Estimates of capital stock are taken from Aswicahyono (1998)
- (4) Qualitative data collected from:
 - (i) The Investment Coordinating Board (BKPM)
 - (ii) Other published sources referred to in earlier Chapters
 - (iii) Field work interviews

The construction of the data base was a component of this research project. The Central Bureau of Statistics provided us with the computer data tapes of all annual manufacturing surveys from 1975 to 1993. These tapes contain data on establishments surveyed by BPS in these years. The annual manufacturing surveys attempt to enumerate all establishments that employ 20 or more workers. Establishments are classified into 119 ISIC four and five-digit industries. A rich set of data is collected in these surveys including the value of gross output, raw materials, fuel, electricity, employment (numbers), wages and salaries, indirect taxes, investment in buildings, machinery, motor vehicles and inventory, and information on ownership (foreign, private and state ownership). The surveys also provide us with each establishment's district or *kabupaten* and provincial location. By LDC standards, the BPS annual manufacturing survey is considered as one of the best (and most accessible) in the region.

There are a number of limitations in using the annual manufacturing survey, however. The major one is the substantial under-enumeration of firms up to the late 1980s. In the 1985 Industrial Census, BPS discovered an additional, hitherto unenumerated 6,641 establishments. Of these 6,641 establishments, only 842 stated that they had started commercial production in that year. The remaining 5,799 said they had started earlier, 1636 of them earlier than 1975. The discovery of these 6,641 establishments almost doubled the number of establishments registered with BPS at the time (Jammal, 1993:1). The discovery of these establishments occurred because in 1985 BPS undertook a door-to-door enumeration of firms, while in previous years field procedures were deficient in identifying new establishments and merely replaced establishments which ceased operations (Jammal, 1993:1). This finding motivated BPS to revise the annual surveys. The procedure consisted of three steps. First, 'fictitious' or 'implausible' establishments were removed from the surveys. Second, a sample of discovered establishments were surveyed for historical data on output, raw materials and labour. Third, established statistical techniques were used to estimate the historical values of the three variables of the remaining newly discovered establishments.¹ The end product is known as the 'backcasted' annual manufacturing survey.

¹ See Jammal (1993) for an explanation on the techniques used to estimate these historical values.

A major limitation of the backcasted survey is that the historical values are estimated for three variables only: gross output value, inputs and employment numbers. Since 1985, BPS had frequently updated the register of firms. By 1994, BPS officials were confident that most firms were now on the register and, thus, the major problems associated with under-enumeration of establishments in earlier surveys were no longer present.² As a consequence, care has to be taken when devising variables from the earlier manufacturing surveys. Variables such as average wages, MNCs and SOEs' share of industry output had to be measured using data from the annual surveys. All other variables are measured using data from the backcasted survey such as, concentration ratios, regional market segmentation, industry output size, industry output growth, value added, and economies of scale.

A second problem with the annual and backcasted surveys is that the data refer to establishments and not enterprises. Thus, the concentration ratios will be underestimated in those industries where firms own and operate more than one establishment. This issue and others related to estimating concentration ratios were discussed in Chapter 4. A third limitation of the surveys is that many other important variables relevant to our study are not collected, or have only recently being collected, or are incomplete. Promotional (advertising and sales promotion) expenditure, for example, was only reported as a separate expense item in the 1993 annual manufacturing survey. Prior to this, promotional expenses were lumped together with other expenses such as management fees, royalties, telephone expenses etc. Research and development expenditure is not reported in the surveys. No information is provided on the skill content of employees. The surveys only classify employees according to whether they are production or non-production workers, and male or female. The percentage of output exported by establishments has only being reported in the annual surveys since 1990, and the data are still rather weak. The oil and gas refining sector is not included in our sample because the sector was only included in the manufacturing survey as a separate industry (ISIC 353) after 1990. Thus, we do not have complete data on the oil/gas processing sector prior to 1990. Finally, the surveys do not provide information on vertical relationships between firms, an aspect

² Interview with project team consultant, Mr. Alex Korneš, April 1994.

of market structure that is important in structure-conduct-performance studies but ignored here because of the lack of data.

Trade data (exports and imports) and the resource intensity ratios are extracted from the 1985 and 1993 Input-Output Tables. Effective rates of protection for 1987 and 1993 are taken from Fane and Phillips (1991) and Fane and Condon (1996) respectively.

Qualitative data on the types of regulations come from a variety of sources such as BKPM's priority and negative investment lists, fieldwork interviews, Indonesian business publications and other studies referred to in earlier chapters. Finally, we use overseas data to proxy some structural characteristics (technology intensity and product differentiation) of industries, on the valid assumption that industry rankings, if not absolute values, are internationally transferable (Lary, 1968).

The sample size is 67 industries. This sample is smaller than the sample of 102 industries used in the descriptive analysis in Chapter 4. The main reason is the unavailability of ERP estimates and export and import data for all 102 industries. Effective rates of protection and trade data are available for 87 I-O industries, of which around 68 are exactly matched with our ISIC industries from the annual manufacturing survey. In the earlier stages of our data collection we attempted to calculate export intensity and import penetration ratios from the Indonesian Trade Statistics. We encountered a number of key problems. First, the trade statistics categorise products according to their SITC (Standard International Trade Classification). The industry output figures are taken from the annual manufacturing surveys, which classify industries according to their ISIC. Thus, we encountered concordance difficulties between the SITC trade statistics and the ISIC annual surveys for several industries. Secondly, of those industries that we could harmonise, around 15 of them produced export intensity ratios greater than one. These industries are unlikely to be re-exporting industries and so their ratios are not sensible. This probably arises because exports are valued at f.o.b while output is valued at producer prices.

Plywood (ISIC 33113) was dropped from the sample, because it is an extreme export

industry (about 95 per cent of plywood production is exported) and, thus, not relevant to the analysis of competition in the domestic market. The sample of 67 industries includes industries from all the major industry groups (ISIC 31 to 39), and accounts for around 80 per cent of total manufacturing value added in 1993.

6.3 Variable Measurement

Endogenous Variables

Six endogenous variables are included in the model. These variables are discussed below.

Industry Concentration (CR4)

The two widely used measures of concentration in the industrial organisation literature are the four-firm concentration ratio and the Hirschmann-Herfindahl index. In this study we use the domestic four-firm concentration ratio (CR4) and the foreign trade-adjusted CR4 (CR4MX). The domestic and foreign trade adjusted CR4 ratios were defined in Chapter 4. Our choice is guided by the CR4's intuitive appeal and for comparative purposes with other S-C-P studies.

Profitability(Π)

In the empirical literature, profitability is usually measured by accounting rates of return (current profits divided by equity or total assets), or rates of return on sales (price-cost margins). Accounting rates of return are not available, because of the lack of reliable data on equity or assets in the annual manufacturing survey.

In our study we use two common measures of price-cost margins. The first one is the ratio of gross profits to sales;

$$PCM1 = \frac{\text{value of output} - \text{inputs} - \text{wages and salaries}}{\text{value of output}}$$

Gross profit (or non-wage value added) is computed as the value of output minus inputs, and wages and salaries. Inputs include raw materials, fuel and electricity. Wages and salaries are calculated by taking the average wage and salary per employee from the annual manufacturing survey and multiplying by employment numbers

provided in the backcasted survey. A criticism of this measure of PCM is that the denominator (value of output) of PCM1 is sensitive to fluctuations in prices of inputs and the business cycle effects: A decline in input prices will increase PCM1, while an increase in input prices will reduce PCM1. Therefore, PCM1 may not be an accurate measure of market power. To overcome this problem investigators use a second measure of PCM: the ratio of gross profits to value added (Dowrick, 1990):

$$PCM2 = \frac{\text{value of output} - \text{inputs} - \text{wages and salaries}}{\text{value added}}$$

A problem with both measures of PCMs is that our cost data refer to average costs and not marginal costs. If there are no fixed costs, then average costs will equal constant marginal costs over the relevant range of output. If there are fixed costs, then average costs will deviate from marginal costs, and our measures of PCM will not be an accurate measure of market power. In S-C-P studies of the kind undertaken here, researchers normally control for this possibility by including a measure of economies of scale in the profit equation (Neumann et al, 1983). Another problem with PCMs is that they are sensitive to the business cycle. Empirical studies using panel data (cross-sectional and time series data together) for U.S manufacturing industries show that PCMs are positively correlated with the business cycle, and this is more pronounced for concentrated industries (Domowitz et al, 1986). Thus, there is a potential bias when using cross-sectional data to estimate the relationship between concentration and PCMs. It is important, therefore, to bear this limitation in mind when interpreting the results in Chapter 7.

Trade Variables (EX, IM)

The export-orientation variable is measured as the ratio of exports to industry output, valued at producer (or factory) prices. Import Penetration (IM) is measured in two ways. One, which we call IMDC, is defined as:

$$IMDC = \frac{M}{Q + M - X}$$

where M is imports, X is exports and Q is domestic production. The major limitation of this ratio as a measure of competitiveness of domestic industry is its dependence on

exports. For instance, for an industry in which export expansion has outpaced the increase in imports, the ratio indicates that its international competitiveness has deteriorated when in fact the opposite has occurred. On the other hand, the ratio understates the loss of competitiveness in a protected industry in which export growth has collapsed, even if import growth has slowed to a virtual standstill (Athukorala and Hazari, 1988:50). By excluding exports from consideration, and using the ratio of imports to domestic production as a measure of import penetration, we can overcome this limitation (Athukorala and Hazari, 1988:50-51). We call this measure the import-domestic production ratio (IMDP).

Trade Protection (TP)

In previous studies for other countries two alternative measures have been used: the nominal rates of protection (NRP) and the real effective rates of protection (RERP). According to Caves et al (1980:72) the effective rate of protection is theoretically superior, because it is designed to measure the extent to which the whole structure of tariffs enlarges the value-added slice that can be provided by an industry. The advantage of RERPs over the more familiar ERPs is that RERPs allow for the effects of protection on the general price level, and hence on the real exchange rate, whereas ERPs do not (refer back to the discussion on RERPs, Chapter 3).

A comparable set of real effective rates of protection for 87 Indonesian manufacturing industries has been estimated by Fane and Phillips (1991) for 1987 and Fane and Condon (1996) for 1993.³ The 1987 RERPs were estimated after the first reform package of May 1986, but before the second reform package of December 1987. In our study we treat the 1987 RERPs as proxies for the RERPs prevailing at the beginning of the reform period.

A common problem faced by studies is that available measures of RERPs often do not incorporate the influence of non-tariff barriers. Fortunately, this problem is not as serious in the Indonesian context because the estimates have been adjusted for most important non-tariff interventions. These estimates take into account tariffs, the

³ Fane and Phillips (1991) and Fane and Condon (1996) estimated NRPs and RERPs for 138 tradable sectors based on the 1985 and 1990 Input-Output Tables. Of these 138 sectors, 87 are manufacturing industries.

various quantitative restrictions on imports and exports, subsidies, and local content schemes (Fane and Phillips, 1991; Fane and Condon, 1996). The forms of intervention which are not incorporated in the estimates because of the non-transparent nature of policy-making in Indonesia include firm-specific subsidies to SOEs and other private-sector firms, government purchasing preferences, pricing of infrastructure services, and bank loans at concessional interest rates.

A major limitation of the estimated average RERPs is that the duty rebates given to export producers are not captured in the RERP estimates. The duty exemption and drawback facility for export-oriented firms provide free access to imported intermediate inputs for these firms. However, as domestic market-oriented firms still have to purchase their intermediate inputs in the protected domestic markets, the ERP for these two categories of firms differ from one another. Ideally, we need separate ERP estimates for export-oriented firms and domestic market-oriented suppliers. However, these are unavailable.

Foreign Ownership (MNCs)

In Chapter 2, we presented and discussed the operational definition of ownership for Indonesian manufacturing devised by Aswicahyono and Hill (1995). We use this definition to calculate the foreign-ownership variable. To remind the reader, the definition of foreign-ownership devised by Aswicahyono and Hill (1995) is:

$$MNCs = F + FP + (1 - D1) * (GF + GFP)$$

where F is wholly foreign owned, FP is foreign-private joint venture, GF is government-foreign joint venture and GFP is government-foreign-private joint venture. Each ownership group is measured in terms of its share of industry production. D1 is a dummy variable equal to one if the industry is sugar processing, fertiliser, basic metals and ship building, otherwise it is zero.

Exogenous Variables

Over 15 exogenous variables are included in the model. Exogenous variables are those which have pre-determined values in our model. The exogenous variables are discussed below.

State Ownership (SOEs)

In Chapter 2, we measured state ownership as:

$$SOEs = G + GP + D1 * (GF + GFP)$$

where G is wholly state owned, GP is government-private joint venture, GF is government-foreign joint venture and GFP is government-foreign-private joint venture. Each ownership group is measured in terms of their share of industry production. D1 is defined above.

Economies of Scale (EOS)

In the absence of direct measures of economies of scale based on engineering data, investigators have used various statistical proxies to represent economies of scale. We follow Caves, Khalilzadeh-Shirazi and Porter (1975) and use the minimum efficient plant scale (MES) and the cost-disadvantage ratio (CDR) variables to estimate economies of scale. Their measure of EOS is the most widely used measure in the kind of SCP studies undertaken here. Caves et al (1975) define EOS as:

$$EOS = (1 - CDR) * MES$$

Where:

MES is the average plant size of the largest plants accounting for 50 per cent of the industry's production. Plant size is measured by the value of output.

$$CDR = \frac{(VA/L)^S}{(VA/L)^L}$$

$(VA/L)^S$ is average value added per labour of the smallest plants accounting for 50 per cent of industry output,

$(VA/L)^L$ is the average value added per labour of the largest plants accounting for 50 per cent of industry output.

Davies (1980) showed that the measure of MES might lead to misspecification of the concentration equation because both MES and concentration are estimated from the number and size distribution of plants in the industry, and thus are highly correlated with each other. By interacting CDR with MES, Caves, Khalilzadeh-Shirazi and Porter's (1975) measure of EOS reduces this misspecification identified by Davies (1980).

The CDR ratio attempts to proxy the slope of the average cost curve below the minimum efficient scale. In this way, the MES provides a floor for the number of efficient establishments only when the cost disadvantage of small plants is appreciable. If there is no cost disadvantage between large and small firms, the CDR term will equal one and EOS will equal zero.

We measure MES and CDR using Indonesian establishment data from the annual manufacturing surveys. These statistical proxies may reflect many other influences beyond the purely technological variables that they were originally proposed to capture. The CDR ratio, for example, will reflect the influence of the small domestic market, regional fragmentation, protection, and product differentiation. Additionally, plant sizes are typically smaller in developing economies than in large developed economies (Kirkpatrick et al, 1984). Establishment sizes may be smaller in LDCs because more plants use an older technology with a lower MES or because differences in relative factor prices render more appropriate an alternative technology with a lower MES. Thus, there is a potential for mis-measurement of the economies of scale variable using Indonesian establishment data. Caves et al (1980:46) argued that there is a case for using U.S data to measure CDR;

'the small size of the Canadian economy and the possibility that substantial proportions of capacity in some industries are of inefficiently small scale argue convincingly that that CDR measured from U.S. data is more likely to contain information about the true cost curve. The case of MES is slightly less clear, because differences between U.S. and Canadian factor prices and industries' output mixes could cause relevant information to be contained in the variable measured from Canadian data (MES_C) that is lost when it is measured from U.S. data (MES_U). Therefore, both were employed. They gave similar results in the regression analysis, but MES_C proved somewhat more significant statistically'.

While the authors were concerned with Canadian manufacturing industries, their argument is of general relevance to other small economies like Indonesia.

Unfortunately, U.S. data on CDR for a comparable set of industries were not available to us. Like most other SCP studies on small economies, we use Indonesian data to estimate CDR. This weakness of CDR as a statistical proxy should be borne in mind when we discuss the regression results in Chapter 7.

Industry Size (IZ) and Growth (GRO)

We measure industry size by the value of industry output. Industry growth during the pre-reform period is represented by the average annual percentage change in industry output between 1978 and 1985. Industry growth during the post-reform period is represented by the average annual percentage change in industry output between 1985 and 1993. We deflated industry output value using the wholesale price index published by BPS between 1985 and 1993. The wholesale price index is calculated for manufacturing industries at the three-digit ISIC level.

Regional Fragmentation (RM)

The degree of regional fragmentation of an industry is measured by the inverse of the Hirschmann-Herfindahl index (HHI) of plant dispersion across Indonesia's 27 provinces. The HHI is calculated as follows:

$$HHI = \sum_{i=1}^{27} \left(\frac{n_i}{N_j} \right)^2 \quad \text{where } n_i \text{ is the number of plants in province } i. N_j \text{ is the total number}$$

of plants in industry j . The value of HHI varies between 0 and 1. The number equivalent of provinces with plants in industry j is obtained by taking the inverse of HHI (i.e. $1/HHI$). The value of the inverse of HHI lies between 1 and positive infinity. Thus, the greater the number of equivalent provinces with plants, the greater is the degree of regional fragmentation in industry j .

Our measure of regional segmentation assumes that provinces proxy regional markets. Clearly, one could show examples where regional markets do not coincide with provincial boundaries. Unfortunately, in the absence of detailed knowledge of individual industries and their regional sub-markets it is not possible to adjust for this. Therefore, owing to the arbitrary nature of provincial boundaries, it is important to bear this limitation in mind when interpreting the results reported in Chapter 7.

Factor Intensities (PC, HC, RI, WP)

Physical capital intensity is measured by the ratio of capital stock to employment (PC). The annual survey does not provide reliable estimates of capital stock. Thus, researchers have to use established mathematical techniques to estimate capital stock from investment data reported in the surveys. Aswicahyono (1998) has estimated capital stock values for each ISIC four and five-digit industry from the reported values of investment in the annual surveys and has provided us with this data.

An alternative measure of capital intensity used in some previous studies is the ratio of non-wage value added to employment. A major limitation of this measure is that it is not a pure measure of capital intensity (Spence, 1977:250). For example, value added can be written as $VA=rK+wL$, where r is the return to capital and w the wage rate. Non-wage value added can be written as $NWVA=rK$. It follows that $NWVA/L = rK/L$. Therefore non-wage value added per worker is determined by (1) capital-labour ratio and (2) all the factors that affect the rate of return to capital, including barriers to entry and oligopolistic collusion, and business cycle effects.

Various measures have been used to represent human capital in studies of trade patterns. These measures may be divided into two groups: skill-group measures and wage-differential measures. Both of these measures have disadvantages as measures of human capital. The skill-group measures are deficient since they do not reflect the capital accumulation involved. The major difficulty with wage-differentials is that any measure of wage may be distorted by labour market imperfections (Stern, 1975:13). Our data base does not include skill differentials. In the absence of an appropriate alternative measure, we employ the following measure of human capital:

$$HC=w/L \quad \text{where } w/L \text{ is average wage per employee.}$$

A common drawback of these measures is that they reflect only the direct component of factor intensities. As Deardorff (1984:480) has shown, direct plus indirect factor intensities are the appropriate determinants of trade, since it is these that determine autarky prices. The indirect component, or the factor intensities of inputs which are

used in the production of finished commodities have been ignored due to data limitations.

Resource intensity (RI) is usually measured by the ratio of direct and indirect purchases of domestic inputs from agriculture, fishery, forestry, and mining industries to the total value of purchased inputs (Koo and Martin, 1984). The source is the Input-Output Tables, 1985 and 1993. We observed in Chapter 2 that most of Indonesia's exports of resource-intensive manufactures are forestry-based products. Thus, we include a dummy variable equal to one if the industry is forestry-intensive, zero otherwise. These manufacturing industries in our sample are: saw milling (ISIC 33111), wooden building materials (ISIC 31112), wood furniture (ISIC 33210), other products made from wood (ISIC 33120, 33140), paper and carton (ISIC 34112), paper and carton products (ISIC 34120).

Technology Intensity (TI)

A number of measures have been used to proxy technology intensity. These include the ratio of research and development expenditure to sales, the ratio of scientists and engineers to total employees and the number of patents. The most commonly used measure is the research and development ratio (TI). This is a proxy measure of short-term comparative cost advantage of new products. It is used in studies of trade patterns with the assumption that the stock of innovations is correctly represented by current R&D expenditure (Baldwin, 1971; 128). These ratios are not reported in the Indonesian annual manufacturing surveys, nor are they available in any other source known to the author. Further, as in most other developing countries, domestic firms and MNCs undertake little research and development in Indonesia, except for minor adjustments to imported technology (Soesastro, 1998). Thus, for Indonesia there is a case for using measures from developed countries to proxy the technological intensity of an industry, especially since most R&D expenditure and innovations occur in the industrialised economies. However, we should attach a caveat to this argument: an industry which is technology-intensive in a high income country can be very labour-intensive in a developing economy. A good example of this is electronics, which is predominantly assembling activities in Indonesia. We use the ratio of research and development expenditure to sales of Australian counterpart industries. This data are

available for 1985 and 1993 at the Australian Statistics Industry Classification (ASIC) three and four-digit level (Australian Bureau of Statistics). Data for U.S. counterpart industries are preferable but were not available at the time of writing.

Absolute Capital Cost Requirement (AKC)

Following Caves et al (1980) we measure the capital cost of establishing a plant of MES size as;

$$AKC = \frac{K}{Q} * MES$$

Where K is capital stock estimated by Aswicahyono (1998),

Q is the value of industry output,

MES is the minimum efficient plant size, defined above.

Product Differentiation (PD) and Consumer-Goods Industries (CG)

We proxy product differentiation by the ratio of advertising expenditure to sales of U.S. counterpart industries.⁴ Our choice is guided by two considerations. First, promotional expenditure (advertising, sales promotion activities) is reported in the Indonesian annual manufacturing survey for the first time only in 1993. Advertising restrictions until 1989 mean that the 1993 ratios are unlikely to be representative of the state of advertising activities in the mid-1980s. Second, and more substantive, U.S. advertising sales ratios should be a better indicator of product differentiation. In using U.S. advertising sales ratios, we make the assumption that product differentiation of an industry is similar across countries. The source for U.S. advertising sales ratios is Ornstein (1976). We make the assumption that the rank of U.S. industries by advertising-sales ratios remains stable over time. Where there is no U.S. counterpart industry, we use the 1993 promotion-sales ratio of the Indonesian industry (we use Indonesian data for 11 industries).

We use a number alternative measures to proxy consumer good industries. First, we use a dummy variable equal to one if the industry is a consumer goods industry, zero

⁴ Advertising sales ratios, however, are imperfect measures of product differentiation. Geroski (1991:171) points out that advertising is often used by firms to compensate for a lack of product differentiation.

otherwise (a procedure followed by Caves et al, 1980). Second, we use the percentage of total output sold to households (Koo and Martin, 1984). The classification of industries by consumer goods and producer goods is made on the basis of an examination of the proportion of output sold to households and producers using the 1985 and 1993 Input-Output Tables. In the empirical literature there are a number of criteria for classifying an industry into consumer goods or producer goods. Scherer (1980) defined a consumer goods industry as one where firms sell more than two thirds of output to households. Other investigators (Ornstein, 1976; Levy, 1985) define a consumer goods industry as one where firms sell more than half of output to households. In order to explore the sensitivity of results to the choice of measure, we use three alternative measures of consumer goods industries:

(1) Dummy variable $Cg1 = 1$, if more than two-thirds of industry output is sold to households, otherwise zero (Scherer's classification).

Dummy variable $Cg2 = 1$, if more than half of industry output is sold to households, otherwise zero (Ornstein's classification).

$Cg3$ = percentage of industry output sold to households

The proportion of industry output sold to Indonesian households is calculated as follows:

$$\text{Consumption ratio} = \frac{\text{household consumption (I - O 301)}}{\text{output value(I - O 600) - export value(I - O 305)}}$$

We deducted exports from industry output because we do not have information on the proportion of output sold to households in foreign markets. We ignore imports as they are not included in household consumption (I-O 301) and domestic output (I-O 600).

Constraints on Domestic Competition (Reg)

Following our discussion in Chapter 5, we include 7 industry-specific dummy variables in the concentration and profitability equations. The industry-specific dummy variables are for sugar processing (ISIC 31181), cooking oil (ISIC 31150), noodles (ISIC 31179), alcoholic drinks (ISIC 31310/30), fertiliser (ISIC 35120), cement (ISIC 36310), and basic metals (ISIC 37100).

As discussed in Chapters 2 and 5, direct foreign ownership was restricted in numerous industries up to the mid-1980s. Liberalisation of the investment regime since the late 1980s had opened up most sectors to foreign direct investment. We have attempted to capture the impact of Indonesian government policies on FDI in two ways. First, as noted above, we used the definition of foreign ownership used by Aswicahyono and Hill (1995) in their study on the determinants of FDI in Indonesian manufacturing in 1985. Second, we introduce a variable designed to incorporate the effects of prohibitions on entry of foreign firms. For this, we draw on the study of Aswicahyono and Hill (1995), which listed industries closed to foreign investors in the mid-1980s, and the documentation of the government's regulatory agency, BKPM, to determine which industries have been closed to foreign investors in our sample of industries. Table 6.1 lists the sectors in our sample in which foreign entry was prohibited (at least through *direct ownership*, as distinct from some sort of arm's-length arrangement) for all or the major part of the period under study. For these industries, we propose a dummy variable (Reg) equal to one if entry was prohibited, otherwise zero. To test the impact of the removal of these prohibitions on the pattern of FDI, we include the same dummy variable (Reg) in the post-reform equation. It needs to be emphasised that there is a foreign *presence* in some of these industries (especially motor vehicles), mainly through strongly developed licensing arrangements. But our primary purpose is to detect and explain inter-industry variations in foreign *ownership*.

Table 6.1

Industries Closed to Foreign Direct Investment

Sector	ISIC	Pre-Liberalisation Period (up to mid-1980s)	Liberalisation Period (early 1990s)
Noodles	31171	X	
Alcoholic beverages	3131/20/30	X	X
Clove cigarettes	31420	X	X
White cigarettes	31430	X	
Garments	32210	X	
Building materials	33112	X	
Soaps and detergents	35231	X	
Consumer electronics	38320	X	
Motor vehicles	38430	X	
Motor cycles	38440	X	

X indicates sector closed to foreign firms. There were several industries with substantial FDI during the period under study, but were closed to further foreign investment. In our sample of 67 industries, these included beer (ISIC 31130) and white cigarettes (31430). We included these two industries in the dummy variable on the grounds that entry prohibitions may have deterred additional FDI.

In our sample, a total of 12 industries had entry prohibitions on foreign investment. By the mid-1990s, entry prohibitions on FDI were removed from all these industries, except for the two sectors listed in Table 6.1.

Source: Aswicahyono and Hill (1995) and Negative Investment List, BKPM, various issues.

6.4 Estimation Technique

We have postulated a model where simultaneity is explicitly incorporated. There are several well-known econometric techniques which can be used to estimate a simultaneous equations model. These econometric techniques fall into two main categories: 'systems methods' and 'single-equation methods'. The systems methods, of which three-stage least squares (3SLS) and full information maximum likelihood (FIML) are the best known, estimate all the identified⁵ equations in a system simultaneously.⁶ The disadvantage of these methods is that they require detailed specification of the equation system and are highly sensitive to specification error (Intriligator, 1978:419). Since these methods estimate all equations simultaneously, an error in one equation or variable can be transmitted throughout the whole system, resulting in biased estimates of the coefficients of the variables in the system. Therefore, the common practice in estimating simultaneous equations systems has been to adopt a risk-averse position by resorting to single-equation methods. These methods estimate a system of simultaneous equations by estimating each identified

⁵ The necessary (but not sufficient) condition for the j th equation to be identified in the system is $K \geq N_j$, where K = all predetermined variables in the equation system, N = number of parameters to be estimated in the equation j . If $K = N_j$, j is just identified, if $K > N_j$, j is over-identified (Theil, 1971:448).

⁶ These methods are explained in most econometric texts. See, for example, Intriligator (1978, Chapter 11).

equation separately. Single-equation methods include the instrumental variables (IV), the reduced form method or indirect least squares (ILS), two stage least squares and limited information maximum likelihood (LIML).

In the present study, the 2SLS technique is used to estimate the structural model. The 2SLS estimates are less sensitive to the presence of multicollinearity among regressors and misspecification of the equations compared to the other single-equation methods (Johnston, 1972:409-420). In addition, several studies have shown that the 2SLS method ranks the best on the basis of asymptotic efficiency and the consistency of estimators for small samples.⁷ Moreover, this method can be applied to both exactly identified and over-identified models.⁸ In this method, endogenous variables which appear as an explanatory variable in the model are replaced by a linear combination of exogenous variables of the model, and this combination is used as the explanatory variable in lieu of the original value. Firstly, endogenous variables are regressed on all the exogenous variables in the equation system. Secondly, the predicted or estimated values obtained from the first stage regressions are used instead of actual values whenever an endogenous variable is included as an explanatory variable in another equation.

While economic theory provides guidance on the choice of explanatory variables and the direction of causation between the variables in an economic relationship, it is of little help with regard to the choice of functional form. The misspecification of functional form in an econometric model will generally result in inconsistent parameter estimates. Therefore, diagnostic tests should be performed to determine whether the model has been correctly specified. We employ Ramsey's regression specification error test (RESET) to examine each equation for functional form misspecifications. Two non-nested tests (the J-test, and the F or encompassing test) are applied to select a particular specification over one or more alternative models. If the variance of each disturbance term varies across industries, heteroskedasticity is considered to be present. We have also employed a number of heteroskedasticity tests. Finally, two informal methods are used to detect multicollinearity between independent variables. First, we examine the correlation matrix to see whether any pairs of independent variables are highly correlated. Secondly, we apply a test of multicollinearity suggested by Farrer-Glaubar (Johnston, 1972:163).

⁷ See Intiligator (1978:416-20) for a summary of these studies.

⁸ Some of the estimation techniques mentioned above (e.g indirect least squares) are defined only for 'exactly identified' equations.

Chapter 7

Empirical Results: Structure-Conduct Performance Model

7.1 Introduction

This chapter analyses the results of the structural model specified in Chapter 5 under two different trade and investment policy regimes. The regression results presented in the Chapter are the statistically robust 2SLS results. The results are reported in Tables 7.1 to 7.10.

For a number of dependent variables, we tested two alternative measures. These are price-cost margins (PCM1 and PCM2), import penetration (IMDP and IMDC), and the rate of protection (RERP and NRP). In each case, we selected one over the other using non-nested model selection tests, which compare the specification of one model against one or more non-nested alternative models (Chapter 6).

The remainder of this Chapter is divided into eight sections. Sections 2 to 7 discuss the results of the six equations specified in Chapter 5. Section 8 presents the Chow test for structural change in the model between the two years. Section 9 summarises the main findings of the study.

7.2 Industry Concentration

Table 7.1 reports the 2SLS estimates of the determinants of industrial concentration in Indonesian manufacturing in 1985 and 1993. The elasticities derived from the regressions are reported in Table 7.2. They tell us the percentage change in the concentration ratio due to a percentage change in an explanatory variable. All equations reported in Table 7.1 are in linear form. In all cases, the linear specification

was preferable to alternative specifications (e.g., the log-linear) in terms of Ramsey RESET test for functional form misspecification (Chapter 6). Regressions (3) and (4) are our preferred specification of the concentration model based on the higher adjusted R^2 . We dropped the seven industry-specific dummy variables on the grounds that they gave unsatisfactory results in terms of coefficient signs and conventional tests of significance.¹

The coefficients of the conventional industrial organisation variables (economies of scale, industry size, absolute capital cost, product differentiation and regional market segmentation) have the expected signs, and all are statistically significant in 1985 and 1993 (equations (1) to (4)). The coefficient on the economies of scale (EOS) variable is positive, supporting the hypothesis that larger economies of scale lead to higher concentration of the industry. The EOS elasticity values for 1985 and 1993 are reported in Table 7.2. The elasticity value of 0.141 in the 1993 equation (4) tells us that, at the sample mean values of economies of scale and concentration, a 10% increase in economies of scale causes concentration to rise by 1.41%. The coefficient on the industry size (IZ) variable is negative, supporting the hypothesis that the larger the industry size, the lower is the degree of industrial concentration. The industry size elasticity value of -0.166 in the 1993 equation (4) tells us that a 10 per cent increase in the size of the industry causes concentration to fall by 1.66 per cent. These two results confirm our hypothesis that Indonesia's small domestic market size gives rise to high seller concentration of manufacturing industries. The coefficient of the regional market segmentation (RM) variable is negative. This result suggests that concentration measured at the national level is lower in regional industries, because firm sizes are constrained by the smaller sizes of the regional markets.

¹ The poor performance of the industry-specific dummy variables does not reject the hypothesis that regulatory constraints on competition had influenced the concentration levels in these industries. Our cross-sectional test of the effect of regulation on concentration is probably inadequate for this purpose. As discussed in Chapter 5, one should approach a cross-sectional test of the effect of regulation on concentration cautiously, because regulations may affect market structures *indirectly* through other determinants, and thus may not show up as statistically significant in the econometric analysis when in fact they are important. For example, entry and exit regulations are likely to affect the number and size distribution of plants in an industry and, thus, influence our measure of economies of scale, which in turn influence the concentration level of an industry.

Table 7.1: Determinants of Industrial Concentration: 2SLS Results

Independent variables	Pre-trade reform 1985 equation (1)	Post-trade reform 1993 equation (2)	Pre-trade reform 1985 equation (3)	Post-trade reform 1993 equation (4)
Constant	0.379 (1.10)	0.430 (2.24) b	0.353 (2.96) a	0.412 (2.50) a
RERP	0.023 (0.63)	0.013 (0.57)	0.025 (0.95)	0.008 (0.50)
PCMI	0.894 (1.37) c	0.826 (1.27)	0.858 (1.29)	0.614 (1.17)
IMDP	0.004 (0.21)	-0.083 (0.60)		
EX	-0.05 (0.05)	0.052 (0.21)		
MNC	-0.077 (0.41)	-0.122 (0.31)		
SOE	-0.075 (0.23)	-0.002 (0.01)		
EOS*	0.00005 (1.37) c	0.00003 (2.31) b	0.00004 (1.34) c	0.00003 (3.49) a
AKC*	0.0004 (1.86) b	0.0001 (1.65) c	0.0004 (2.56) a	0.0001 (2.49) a
IZ*	-0.000002 (2.49) a	-0.000006 (3.64) a	-0.000002 (3.79) a	-0.000001 (4.55) a
RM	-0.035 (1.73) b	-0.044 (2.10) b	-0.032 (2.20) b	-0.035 (2.03) b
PD	1.582 (1.66) c	1.807 (1.57) c	1.575 (1.84) b	1.983 (2.01) b
Adjusted R ²	0.44	0.37	0.49	0.43
H-test(a)	0.139	0.043	0.293	1.298

Notes: All equations are in linear form.

*The coefficients of EOS, AKC and IZ were multiplied by 10,000 to improve presentation. t-ratios are given in parentheses. Significance levels (one-tail test) are a=1%, b=5%, c=10%.

(a) Heteroskedasticity test. Chi-square test under 2SLS (critical value at 1% is 6.63).

Table 7.2 Elasticities²

Independent Variable	Elasticities Evaluated at Sample Mean Values (from equations (3) and (4))	
	1985	1993
EOS	0.044	0.141
AKC	0.071	0.041
IS	-0.124	-0.166
PD	0.054	0.068
RM	-0.191	-0.190

Only elasticities of statistically significant explanatory variables are reported.

The coefficients of the two variables representing barriers to entry (product differentiation and absolute capital costs) are positive. The result for product differentiation provides support for the hypothesis that product differentiation acts as a barrier to entry in Indonesia's manufacturing industries. The result for the capital cost (AKC) variable lends support to the hypothesis that the high capital cost of establishing a plant of minimum efficient scale increases the level of concentration in Indonesia's manufacturing industries. The elasticity value of 0.41 in the 1993 equation (4) tells us that a 10 per cent increase in absolute costs of capital causes concentration to rise by 0.41 per cent.

The real effective rate of protection (RERP) coefficient has the positive sign, but is not statistically significant, either in 1985 or in 1993. This result suggests that trade policy has not had a *direct* effect on concentration levels. Our finding runs counter to the conventional hypothesis that high protection increases the number of firms that can survive in a protected industry, which in turn lowers seller concentration (Caves et al; 1980). Empirical findings for other developing countries are mixed. Mooney (1984) found a negative relation between effective rates of protection and concentration in Brazilian manufacturing industries, while Kalirajan (1993) found a positive relation between concentration and protection in Malaysian manufacturing. As discussed in Chapter 5, one should approach a cross-sectional test of the effect of protection on concentration cautiously, because protection may take time to affect market structures. Further, protection may affect market structures *indirectly* through

² The elasticity of concentration with respect to an explanatory variable is calculated as follows:

$\frac{dCR4}{dX} * \frac{\bar{X}}{CR4} = \alpha * \frac{\bar{X}}{CR4}$ where α is the coefficient of the explanatory variable X, and $\bar{X}$ and CR4 are the sample mean values of X and CR4 respectively.

other determinants, and thus the protection variable may not show up as statistically significant in the econometric analysis when in fact it is important. For example, trade protection is likely to affect the number and size distribution of plants in an industry (by altering relative prices), and thus influence our measure of economies of scale, which in turn influence concentration of the industry.

The performance (PCM1) variable has the expected positive sign, but does not attain statistical significance even at the 10 per cent level, in both 1985 and 1993. Thus, there is no evidence that high industry profits induce firms to undertake actions that might increase concentration (e.g., increase capacity, greater advertising outlays, etc).

According to equations (1) and (2), the foreign trade variables have no significant effect on concentration, either in 1985 or in 1993. The insignificant export coefficient (EX) is consistent with the proposition advanced in Chapter 4 that the high labour intensity (the inverse of the absolute capital costs variable) of most of the export-intensive industries is a major explanation of the lower levels of concentration in these industries. The sign of the import (IMDP) coefficient switches from positive in 1985 to negative in 1993, but remains insignificant in both years. This result rejects the hypothesis that greater import competition resulting from trade liberalisation displaces less efficient local firms, which in turn increases concentration. As can be seen in a comparison between equations (1) and (2) and (3) and (4), the regression results are remarkably resilient to the omission of the trade variables.

Our results for the foreign trade variables are consistent with the mixed results found in studies of other developing economies. De Melo and Urata (1986) could not find any significant effect of foreign trade on concentration in Chilean manufacturing industries, either before or after trade liberalisation. Chou (1986) could only find a significant negative relation between export intensity and concentration in Taiwanese manufacturing industries.

The coefficient of foreign ownership variable (MNC) is positive as expected, but it is not statistically significant in either of the two years. The state ownership (SOE) variable shows erratic sign changes between the two years, and is not statistically

significant in both cases. These results indicate that the presence of MNCs and SOEs do not have any significant effect on industrial concentration over and above the other variables considered in the analysis. The positive correlation between the ownership variables and concentration noted in earlier Chapters arises because they share common structural determinants: the variables that determine concentration also determine the share of MNCs and SOEs in industry production. The state ownership variable is also a policy variable and policy influences are difficult to capture in cross-sectional studies. The poor performance of the ownership variables may also be the result of measurement problems associated with the definitions of SOEs and MNCs discussed in Chapter 6.

There is no statistical evidence of any obvious impact of the policy reforms on concentration. For example, the trade variables remain insignificant in the 1993 equation. However, the policy reforms may affect concentration through other variables in the concentration equation. We do observe marked declines in the absolute values of the capital cost and industry size coefficients.³ The decline in the value of the capital cost coefficient shows that the concentration-increasing effect of larger capital cost requirements is smaller in 1993 compared to 1985. The decline in this variable's coefficient may be due to financial liberalisation and, in particular, the removal of entry restrictions on private (including foreign) banks in the 1980s. A study by Goeltom (1995) shows that financial liberalisation has improved smaller firms' access to capital. This result is also consistent with Stigler's (1968) argument that capital costs should not be a barrier to entry in a well functioning, efficient financial sector. This result may also be the outcome of opening up sectors to FDI, where capital costs are less of an entry barrier for large MNCs.

The results for the industry size (IZ) variable show that industry size has a negative effect on the degree of industry concentration. The magnitude of this impact seems to be smaller in 1993 compared to 1985. This may reflect the impact of trade liberalisation. There are several mechanisms by which trade liberalisation could reduce the influence of industry size on concentration. The obvious one is that access

³ In section 7.8, we report tests for structural change in the coefficients of the concentration equation. The tests show that the coefficients of the industry size and capital cost variables are statistically smaller in 1993 compared to 1985.

to export markets increases the chances that producers will fully attain the available economies of scale, which in turn enlarges the size of firms. Consequently, the negative influence of industry size on concentration should be smaller in export-oriented industries. However, we could not find support for this proposition in our 1993 equation. Our export variable had the positive sign, but was not significant.⁴ Another mechanism may be through productivity improvements. If trade liberalisation induces firms to become more efficient, then efficient firms should grow faster than less efficient firms for any given initial industry size. Thus, the negative effect of larger outputs might be smaller in a more competitive environment. De Melo and Urata (1984) speculated that productivity gains of firms increased concentration of Chilean manufacturing industries after trade liberalisation. Finally, the decline in the influence of market size and capital costs on concentration may also reflect the process of rapid growth and industrialisation that has been occurring in the last three decades.

7.3 Profitability

The 2SLS estimates of the determinants of inter-industry differences in profitability are reported in Table 7.3. Table 7.4 reports the elasticities of the significant independent variables. The dependent variable is the price-cost margin and is defined as the ratio of gross profits to sales (Chapter 6):

$$PCM1 = \frac{\text{value of output} - \text{inputs} - \text{wages}}{\text{value of output}}$$

All equations reported in Table 7.4 are in linear form. In all cases, the linear specification was preferable to alternative specifications (e.g., the log-linear) in terms

⁴ In an alternative specification of the concentration equation we replaced the export intensity variable with an export-oriented industry dummy variable on industry size, $EX1 = IZ * \text{dummy}$, where the dummy equals 1 if the industry is an export-competing industry, otherwise zero. Export-competing industries are listed in the Appendix to Chapter 6. This variable tests whether the slope of the industry size variable is different for export-competing industries (Caves et al, 1980). A positive coefficient of $EX1$ indicates that the negative effect of industry size is weaker in export-competing industries. A negative sign of the coefficient indicates that the negative influence of industry size is stronger in export-competing industries. In the 1993 concentration equation the coefficient of $EX1$ was positive but statistically insignificant at the 10 per cent level, rejecting the hypothesis that industry size has a different effect on concentration in export-competing industries compared to manufacturing industries as a whole.

of Ramsey RESET test for functional form misspecification. Regressions (2) and (4) are our preferred specification of the profits model based on the higher adjusted R^2 . We removed the seven regulation dummy variables, economies of scale (EOS), consumer goods industry (CG) and the interaction terms (except for the concentration-RERP interaction term) on the basis that their t-ratios were extremely low, indicating that these variables have no explanatory power. The results of the non-nested test also suggest that these variables should be deleted from the model. The foreign ownership (MNC) and state ownership (SOE) variables showed erratic sign changes under different specifications, and were always statistically insignificant. This indicates that the variables are not robust and should be dropped from the model. In the experimental stages of our econometric work we explored whether a critical concentration ratio existed in our sample of industries, but could not find one. We accept the null hypothesis that the concentration-profits relation is a continuous one.

Ship building (ISIC 38411) is identified as an outlier in the 1993 equation.⁵ An outlier is an observation that has undue influence on the estimation results. Other factors (particularly unobservable or non-quantifiable factors) may explain its current profit level. We control for this outlier by including a dummy variable in the model. We define a dummy equal to one, if the industry is ship building, zero otherwise.

In the pre-trade reform 1985 equation (1) the foreign trade-adjusted concentration (CR4MX) variable has a positive sign, but it is not statistically significant.⁶ This finding is consistent with the highly restrictive foreign trade regime of Indonesia's manufacturing sector in the mid-1980s. Many industries were protected by import quantity restrictions (QRs). With QRs more binding in these industries, it is not surprising to find an insignificant relation between trade-adjusted concentration and profitability. A similar result was also found in a previous study on trade liberalisation in Chilean manufacturing (De Melo and Urata, 1986).

⁵ We identified ship building as an outlier on the basis of an extremely high residual term.

⁶ In the experimental stages of the econometric work we also included CR4, RERP and imports (MS) separately (i.e. as additive terms rather than interaction terms) as independent variables in the profit equation. These variables were insignificant in the 1985 equation, indicating that they should enter the statistical specifications as interaction terms. In the 1993 equation the unadjusted CR4 variable was weakly significant, while the RERP and import variables were statistically insignificant.

In equation (2), we replace CR4MX and RERP with an interaction variable, CR4MX*RERP. The interaction variable is positive, and is statistically significant at the 5% level of significance. This result supports the hypothesis that protection and industrial concentration interact to determine the level of industry profits in 1985. In other words, it is in more protected industries that concentration has a greater impact on profits. The interaction variable elasticity derived from regression (2) is reported in Table 7.2. The elasticity value of 0.212 tells us that a 10 per cent increase in the concentration-RERP interaction term will cause industry profits to increase by 2.1 per cent.

Table 7.3: Determinants of Profitability: 2SLS Results

	Pre-trade form 1985 equation (1)	Pre-trade form 1985 equation (2)	Post-trade form 1993 equation (3)	Post-trade form 1993 equation (4)
CR4MX	0.068 (0.81)		0.166 (1.46)c	
CR4MX*RERP		0.314 (2.74)a		0.371 (1.48)c
RERP	0.236 (1.46)c		0.008 (0.05)	
GRO	-0.187 (1.86)b	-0.198 (2.48)a	0.086 (1.27)	0.088 (1.33)c
PC	0.00002 (3.96)a	0.00001 (4.10)a	0.000003 (0.62)	0.000006 (1.39)c
PD	-0.320 (0.61)	-0.435 (0.97)	-0.319 (0.45)	-0.259 (0.38)
RM	0.001 (0.05)	-0.005 (0.78)	-0.010 (0.79)	-0.005 (0.50)
Ship building	0.046 (0.46)	0.013 (0.15)	0.232 (2.86)a	0.343 (2.95)a
Constant	0.167 (1.97)b	0.251 (5.77)a	0.207 (3.22)a	0.227 (4.23)a
Adjusted R ²	0.24	0.38	0.05	0.11
H-test(a)	6.62	4.33	0.794	0.206

Notes: All equations are in linear form

t-ratios are given in parentheses. Significance levels are a=1%, b=5%, c=10%.

(a) Heteroskedasticity test. Chi-square test under 2SLS (critical value at 1% is 6.63).

Table 7.4: Elasticities

	Elasticities Evaluated at Sample Mean Values (equations (2) and (4))	
	1985	1993
CR4MX*ERP	0.212	0.102
GRO	-0.221	0.100
PC	0.121	0.065

Only elasticities of statistically significant explanatory variables are reported.

We now turn to the results of the market power variables in our post-trade reform (1993) equations (3) and (4). In equation (3) the coefficient of the foreign trade-adjusted concentration (CR4MX) variable is positive, and statistically significant. The distortion caused by QRs in the denominator of CR4MX is minimal in our 1993 sample. Only four of the 67 industries had QRs in 1993, and the output coverage of QRs in two of these industries was less than 5 per cent. This result for 1993 provides support for the market concentration hypothesis that high trade-adjusted concentration leads to higher profits. The interaction term (CR4MX*ERP) in equation (4) remains positive and statistically significant. This result also establishes a direct link between trade liberalisation and industry profits. The reduction in protection reduces excessive profits in concentrated industries. The elasticity value of 0.102 derived from the 1993 regression (4) tells us that a 10 per cent fall in the concentration-ERP interaction term will cause a decline in industry profits by 1.02 per cent.

Economic theory predicts that, in the long run, after adjustments to the trade policy reforms have taken place, concentration would have a significantly reduced impact on profitability as domestic prices for a small open economy would tend to be determined by foreign markets. Tentative evidence supporting this proposition is provided in our 1993 results. While the coefficients of the interaction term are similar in the 1993 and 1985 equations, its significance level is much lower in the 1993 equation. This suggests that the concentration-profits relation has weakened after the 1980s trade policy reforms. Our findings are also consistent with the results of previous studies for other developing economies that have liberalised (de Melo and Urata, 1986; Weiss, 1993). Furthermore, the F-test for overall fitness of the

regression is statistically weaker in the 1993 regression (4) compared to the 1985 regression (2), and this may also be indicative of the effects of the trade policy reforms on industry profits, as domestic prices tend to be determined by foreign markets.

The results for the other variables are mixed. The coefficient on the capital intensity (PC) variable has the expected (positive) sign, and is statistically significant in all the equations, except that for 1993 equation (3). This result supports the hypothesis that profitability tends to be higher in those industries where capital requirements are a major barrier preventing new entrants. The reduced impact of the capital variable in the 1993 post-reform equations is consistent with the proposition advanced in Chapter 5, that greater exposure to foreign trade should weaken the influence of explanatory variables, like capital requirements, in a small, open economy.⁷ The coefficient on the regional market (RM) variable is statistically insignificant, with the unexpected (negative) sign. There appears to be no evidence that regionally segmented industries have higher profit rates than national industries. The coefficient on the product differentiation (PD) variable is statistically insignificant, with the unexpected (negative) sign in all equations. The industry output growth (GRO) variable gave mixed results between the two years. The coefficient of industry growth is negative and statistically significant in 1985, indicating that rapid growth reduced profits. This could occur if rapid growth attracted entry, or triggered a breakdown in collusion. In the 1993 equation (4), the growth variable is positive and weakly significant. Therefore, no firm conclusions can be drawn about the effect of growth on profits.

7.4 Multinational Enterprise Presence

The 2SLS estimates of the determinants of multinational presence in manufacturing industries are reported in Table 7.5. The elasticities of the significant explanatory variables are reported in Table 7.6. All equations reported in Table 7.5 are in linear form. In all cases, the linear specification was preferable to alternative specifications (e.g., the log-linear) in terms of Ramsey RESET test for functional form misspecification. On the basis of the Farrar-Glauber test of multicollinearity, we

⁷ In section 7.8, we report tests for structural change in the coefficients of the profit equation. The tests show that the coefficient of the capital variable is statistically smaller in 1993 compared to 1985.

excluded human capital (HC) and economies of scale (EOS) from the model. The inclusion of the capital intensive (PC) variable in our model also proxies economies of scale. In a number of experimental runs, imports and price-cost margins gave unsatisfactory results in terms of conventional coefficient signs and tests of significance, and were dropped from the model. Finally, we removed regional market segmentation (RM), resource intensity (RI), and the consumer goods (CG) variables from the model on the basis that their t-ratios were extremely low, indicating they did not have any explanatory power. The results of the non-nested test also suggested that we delete these variables for the same reason.

We will examine the post-trade reform 1993 results (equation 2) first, and later compare them with the pre-trade reform 1985 results (equation 1). The coefficient of the capital intensity (PC) variable is positive and statistically significant at the 10% level. This result supports the hypothesis that MNCs are concentrated in capital intensive industries, reflecting the comparative advantage structure of the capital exporting country and, conversely, reflecting Indonesia's weak comparative advantage in capital-intensive industries. The capital intensity elasticity value of 0.227 tells us that, at the sample mean values of PC and MNC, a 10 per cent increase in the degree of capital intensity of industry causes an increase of 2.27 per cent in multinational presence. The coefficient of the technology intensity (TI) variable is positive, and statistically significant at the 10% level. This result is consistent with the intangible assets hypothesis, that MNCs have a competitive advantage over local firms in technology-intensive industries, and are consistent with those results of previous studies for other developing economies (e.g. Lall and Mohammed, 1983). The elasticity value of 0.032 tells us that a 10 per cent increase in the degree of technological intensity of the industry causes a 0.32 per cent increase in multinational presence.

Table 7.5: Determinants of Multinational Enterprise Presence: 2SLS Results

	2SLS Results	
	Pre-trade reform 1985 Equation	Post-trade reform 1993 equation
CR4	0.216 (1.19)	0.626 (3.35)a
EX	-0.547 (0.87)	0.409 (1.56)c
RERP	0.061 (2.00)b	0.040 (1.33)c
SOE	-0.490 (3.13)a	-0.609 (2.99)a
PC	0.00004 (2.50)a	0.00002 (1.53)c
TI	4.056 (1.25)	4.870 (1.38)c
GRO	0.001 (0.13)	-0.002 (0.89)
PD	-0.281 (0.20)	-0.960 (0.58)
REG	-0.162 (1.96)b	0.062 (0.28)
Constant	0.044 (0.27)	-0.204 (1.19)
Adjusted R ²	0.22	0.16
H-test(a)	6.559	7.238

Notes: Equations are in linear form.

t-ratios are given in parentheses. Significance levels are a=1%, b=5%, c=10%.

(a) Heteroskedasticity test. Chi-square test under 2SLS (critical value at 1% is 6.63).

Table 7.6: Elasticities

	Elasticities Evaluated at Sample Mean Values	
	1985	1993
CR4	0.116	0.337
EX	-0.053	0.114
RERP	0.123	0.035
PC	0.311	0.227
SOE	-0.038	-0.067
TI	0.026	0.032

Only elasticities of statistically significant explanatory variables are reported.

The coefficient of the industry concentration (CR4) variable is positive and statistically significant at 1%, suggesting that MNCs presence is high in oligopolistic markets. The elasticity value of 0.337 tells us that a 10 per cent increase in the CR4

ratio causes an increase of 3.37 per cent in multinational presence. The export orientation coefficient is positive and statistically significant at the 10% level. This result supports the hypothesis that MNCs are also concentrated in export-oriented industries in 1993. The elasticity value of 0.114 also tells us that a 10 per cent increase in the degree of export orientation causes an increase of 1.14 per cent in the multinational presence

Among the three policy variables, trade policy has a positive coefficient that is statistically significant at the 10% level. This result supports the hypothesis that MNCs are attracted by protection granted to import-substituting industries. The elasticity value of 0.035 tells us that a 10 per cent increase in the real effective rate of protection causes an increase of 0.35 per cent in multinational presence in 1993. However, this relationship between protection and MNC presence is weaker in the post-reform equation compare with the pre-reform 1985 equation (see below). As expected, the coefficient of the state ownership variable is negative, and statistically significant at a 1% level. State enterprises tend to crowd out private investment and deter multinational entry to the extent that investors fear that the government will bias commercial conditions to the benefit of their own companies. The final government policy variable, entry regulations in 1985, is included to test for the effect of the removal of most of the entry restrictions on FDI by 1993. The coefficient of the regulation dummy variable is positive, but is statistically insignificant. This result is expected, of course. By the early 1990s many industries were open to FDI with minimal entry conditions attached (Chapter 2). In our sample of 67 industries, only kretek cigarettes and malt beer had entry prohibitions, and the latter industry is dominated by multinational joint ventures anyway.

The product differentiation variable is negative, but is statistically insignificant. This result suggests that MNCs do not appear to be heavily concentrated in product differentiated industries. However, given the positive association between concentration and product differentiation in the concentration equation, it is possible that concentration may be capturing some of the influence of product differentiation on the foreign ownership variable. This result is consistent with an earlier study of the determinants of foreign ownership in Indonesian manufacturing (Aswicahyono and

Hill, 1995). Finally, the coefficient of the industry output growth variable is negative, but statistically insignificant. There is no evidence that MNCs enter the fastest growing industries over and above the other variables considered in the analysis. To some extent this result is not surprising since foreign firms can produce at home and export their production to foreign markets whenever there are no advantages in exploiting foreign markets by FDI.

It is of interest to compare the 1993 results with those of the pre-trade reform period, proxied by the 1985 equation (1). The changing pattern of FDI in Indonesian manufacturing is shown by the change in the sign of the export orientation coefficient between the two years. The sign of the export coefficient switches from negative in 1985 to positive and statistically significant in 1993. This result supports the hypothesis that the foreign investment and trade policy reforms have increased FDI in export-oriented industries. The positive impact of the removal of entry restrictions on FDI in manufacturing is shown by the change in the sign of the regulation dummy coefficient between the two years. The sign of the dummy coefficient changes from negative and statistically significant in 1985 to positive and statistically insignificant in 1993.

The results for the other explanatory variables in the 1985 equation are similar to those in the 1993 equation. The coefficient of the trade protection (RERP) variable is positive, but is more significant in 1985 than in 1993, indicating that protection had a stronger significant influence on FDI in 1985. The coefficient of the capital intensity (PC) variable is positive and is also more significant in 1985 than in 1993. These two findings are consistent with the observed shift in the pattern of FDI away from heavy concentration in highly protected, capital-intensive industries in the mid-1980s to export-oriented industries by the early 1990s (Chapter 3). The coefficient of the technology intensity (TI) variable is positive, but statistically insignificant at the 10% level. The concentration variable (CR4) is positive, but it is statistically insignificant in 1985. The lack of significance of the concentration variable is due to collinearity with the capital intensity variable in the 1985 equation.⁸

⁸ This is confirmed when we drop the capital intensity variable from the 1985 equation. When capital intensity is dropped, the CR4 variable becomes statistically significant at the 1 per cent level.

7.5 Export Orientation

The 2SLS estimates of the determinants of export intensity are reported in Table 7.7. We removed capital intensity (PC) and consumer goods (CG) variables from the model on the grounds that their t-ratios were extremely low, indicating that they have no explanatory power. With the exception of the MNCs and RERP variables, all the variables are transformed into natural logarithms (including the dependent variable, EX). Thus, the coefficients of these independent variables are interpreted as constant elasticities. For example, the coefficient of the human capital variable (HC, measured by average wage) in equation (2) is -1.509. This means that a 10% increase in average wage reduces export intensity by 15.1%. The MNCs variable has some zero observations and the RERPs variable has some non-positive observations (zero and negative RERPs values) and, thus, these two variables can not be transformed into natural logarithms. The estimates of the elasticities for the MNCs and RERP variables are evaluated at their sample mean values, and are reported in the square brackets below their coefficients in Table 7.7. In all cases, the log-linear specification of the export equation was preferable to alternative specifications (e.g., linear form) in terms of Ramsey RESET test for functional form misspecification. The adjusted R square of around 0.24 in the 1993 regression is not particularly high, indicating that there is a large unexplained residual. However, they compare favourably to cross-sectional studies for other developing and developed countries (Caves et al, 1980; Koo and Martin, 1984; Chou, 1986).

We will examine the post-trade reform 1993 results (equation 2) first, and later compare them with the pre-trade reform 1985 results (equation 1). The coefficient of the real effective rate of protection (RERP) is negative, and it is statistically significant at the 1% level of significance. The elasticity value of -0.429 tells us that a 10 per cent increase in the real effective rate of protection reduces export intensity by 4.29 per cent. This negative relation indicates that Indonesia's export successes are inversely related to government assistance.⁹

⁹ Recall, from Chapters 3 and 6, a major limitation of the estimated average RERPs is that the duty rebates given to export producers are not captured in the ERP estimates. The duty exemption and drawback facility for export-oriented firms had provided free access to imported intermediate inputs for these firms. However, as domestic market-oriented firms still had to purchase their intermediate

The coefficients of the factor intensity variables (HC, RI and WP) have the expected signs, and all are statistically significant at a 1% level of significance. The labour intensity (HC) variable has a negative sign, indicating that Indonesia's exports are higher in low wage, labour intensive industries. This result provides support for the price version of the factor proportions theory, that a labour abundant country like Indonesia has a comparative advantage in labour-intensive industries and will export the latter. The resource intensity (RI) variable has a negative sign indicating that export intensity ratios are lower in primary (agriculture and fisheries) resource-intensive manufactures like processed foods and beverages. This result supports the view, presented in Chapter 3, that some remaining restrictions in the agriculture sector and the general lack of development in processed foods has hindered this sector's export performance. The coefficient of the wood products dummy variable (WP) is positive, confirming that Indonesia has a comparative advantage in wood processing industries and wood products, such as furniture, building materials, and wood panels.

The results for the market structure variables (concentration, economies of scale, product differentiation, regional market segmentation and MNCs) are mixed. The coefficient of the foreign ownership variable is positive and statistically significant at a 5% level. The elasticity value of 0.956 tells us that a 10 per cent increase in foreign ownership presence causes exports to rise by 9.56 per cent. This result supports the hypothesis that MNCs invest in export-oriented projects when the policy environment is supportive. The significant and positive correlation between MNCs and export intensity in both the foreign-ownership and export intensity equations confirms the proposition advanced in Chapter 5 that MNCs and exports are jointly determined variables.

The coefficient of the economies of scale variable is positive, but is statistically insignificant. This result is also consistent with other studies for small economies. Caves et al (1980) could not find a significant relationship between economies of

inputs in the protected domestic markets, the ERP for these two categories of firms differed from one another.

scale and export performance in Canadian manufacturing industries, and Ratnayake (1990) could not find one for Australian manufacturing industries. The coefficient of the industrial concentration variable has a negative sign, but is statistically insignificant. Thus, industrial concentration appears to have no significant effect on export performance in Indonesian manufacturing.

Table 7.7: Determinants of Export Orientation: 2SLS Results

	Pre-trade reform 1985 Equation	Post-trade reform 1993 Equation
CR4	0.987 (1.12)	-0.650 (1.00)
MNC	1.990 (0.74) [0.472]	3.501 (1.91) ^b [0.956]
RERP	-0.594 (1.53) ^c [-1.199]	-0.488 (2.54) ^a [-0.429]
HC	-1.680 (1.45) ^c	-1.509 (2.65) ^a
RI	0.160 (0.72)	-0.449 (2.74) ^a
WP	2.754 (1.96) ^b	2.678 (2.67) ^a
EOS	0.379 (0.98)	0.272 (1.26)
PD	-0.044 (0.12)	-0.043 (0.17)
RM	0.339 (0.32)	0.751 (0.90)
Constant	3.028 (0.55)	2.072 (0.67)
Adjusted R ²	0.11	0.24
H-test (a)	4.708	1.291

Equations are in log-linear form. t-ratios are given in parentheses. Significance levels are a=1%, b=5%, c=10%.
(a) Heteroskedasticity test. Chi-square test under 2SLS (critical value at 1% is 6.63).

As expected, the coefficient of the product differentiation (PD) variable is negative, but is statistically insignificant. This result is consistent with the commonplace observation that Indonesia's exports are not highly product differentiated. Finally, the coefficient on the regional market segmentation (RM) variable is positive, but is statistically insignificant. This finding is contrary to the conventional hypothesis that, in a geographically dispersed country, high transportation costs reduce the volume of exports from regional markets. The performance of this variable may also be the

result of measurement problems associated with the definition of regionally segmented markets, as discussed in Chapter 6.

It is of interest to compare the 1993 results with those of the pre-trade reform period, proxied by the 1985 export intensity equation (1). There are two major differences in the performance of the two equations that can be directly linked to the structure of protection prevailing in 1985, and the subsequent trade policy reforms. First, the 1985 equation performed poorly relative to the 1993 equation. The F-test for overall fit is significantly lower in the 1985 regression compared to that of 1993. Further, only three variables are statistically significant in the 1985 equation: labour intensity (HC), real effective rate of protection (RERP) and wood products (WP), and their t-ratios are much lower in the 1985 equation. The poor performance of the 1985 equation supports the well established fact that the structure of protection prevailing in the mid-1980s adversely affected Indonesian manufacturing exports. Trade policy was biased against export-oriented industries, resulting in very low export levels (Fane and Phillips, 1991). In other words, there is not much export orientation to explain in the 1985 equation. Second, the coefficient of the MNCs variable is insignificant in the pre-reform equation, but significant in the post-reform equation. This result supports our earlier finding that changes in foreign investment and trade policies directed a substantial proportion of new FDI to export-oriented industries.

7.6 Import Penetration.

The 2SLS estimates of the determinants of import penetration are reported in Table 7.8. We will test two alternative dependent import penetration variables. They are the ratio of imports to industry production (IMDP), and the ratio of imports to domestic consumption (IMDC), where domestic consumption is equal to industry output minus exports plus imports. We removed the consumer goods (CG) variable from the model on the grounds of collinearity with product differentiation. We also removed the human capital variable (HC) on the grounds that its t-ratio was extremely low, indicating that the HC variable has no explanatory power.

With the exception of the MNCs and RERP variables, all the variables are transformed into natural logarithms (including the two alternative dependent

variables). Thus, the coefficients of these independent variables are interpreted as constant elasticities. The elasticities of the MNC and RERP variables, evaluated at the sample mean values, are reported in square brackets below their estimated coefficients in Table 7.8. In all cases, the log-linear specification of the import equation was preferable to alternative specifications (e.g., linear form) in terms of Ramsey RESET test for functional form misspecification. The adjusted R squares, of around 0.21 in the 1993 regressions, are not particularly high, indicating that there is a large unexplained residual. However, they compare favourably to cross-sectional studies for other developing and developed countries (Koo and Martin, 1984; Chou, 1986; Athukorala, 1988).

A problem encountered in investigating the relationship between industrial concentration and import penetration is that there exists a positive statistical bias in the relationship which has nothing to do with market behaviour. Consider the determinants of industrial concentration analysed in section 7.2. Suppose that the minimum efficient scale is the same in all industries and that total demand in Indonesia has the same money value (at competitive equilibrium prices) for every industry. Concentration would be higher in industries facing more import competition, simply because room is left for fewer domestic firms of efficient size. In other words, imports squeeze the residual size of the domestic market. Imports and concentration may thus be positively related through the influence of costs and technology, and no market behaviour need be involved. Following Caves et al (1980:71) we put the expected positive relation between imports and concentration to a more appropriate test by using the variable

$$CR4M=CR4/(1+IMDP)$$

which has the effect of deflating the four-firm concentration ratio on the assumption that imports function competitively the same way that a fringe of small domestic producers does. This test is rigorous because errors in the measurement of imports tend to produce a negative statistical relation between our measures of import penetration (IMDP and IMDC) and CR4M and obscure any positive behavioural one.

We will examine the post-trade reform 1993 results (equations 2 and 4) first, and later compare them with the pre-trade reform 1985 results (equations 1 and 3). The coefficients of the factor intensity variables (PC, RI, TI) are statistically significant with the expected signs. The result for capital intensity (PC) provides support for the factor proportions theory that a labour abundant country like Indonesia has a comparative disadvantage in capital-intensive industries and will generally import the latter. The technology intensity (TI) variable has the expected positive sign, and is statistically significant. This result provides support for the neo-technology version of the factor proportions theory, that a human capital and technology-scarce country like Indonesia will have a comparative disadvantage in technology-intensive industries and will import the latter. As expected, the resource intensity (RI) variable has a negative sign, indicating that Indonesia's imports are lower in primary (agriculture, fisheries and forestry) resource-intensive manufactures

Table 7.8: Determinants of Import Penetration: 2SLS Results

	IMDP		IMDC	
	Pre-trade reform 1985 equation	Post-trade reform 1993 equation	Pre-trade reform 1985 equation	Post-trade reform 1993 equation
CR4M	-0.506 (0.60)	-0.229 (0.37)	-0.444 (0.51)	-0.534 (0.79)
MNC	1.239 (0.61) [0.294]	2.505 (1.62) c [0.684]	1.008 (0.49) [0.239]	2.829 (1.68) c [0.772]
RERP	-0.427 (1.30)c [-0.862]	-0.169 (0.93) [-0.149]	-0.444 (1.34) c [-0.896]	-0.294 (1.49) c [-0.258]
EOS	0.291 (0.86)	-0.409 (2.02)b	0.314 (0.92)	-0.372 (1.69)b
PC	0.178 (0.25)	0.975 (2.48)a	0.142 (0.20)	0.705 (1.65) c
RI	-0.251 (1.23)	-0.288 (1.81)b	-0.255 (1.23)	-0.356 (2.05)b
TI	0.274 (0.93)	0.387 (1.67)c	0.248 (0.84)	0.279 (1.41)c
PD	-0.429 (1.30) c	-0.432 (1.76) c	-0.185 (0.54)	-0.364 (1.37)c
RM	-0.377 (1.69)b	-0.222 (1.23)	-0.402 (1.78)b	-0.279 (1.41)c
Constant	-7.090 (1.54)c	-3.999 (1.01)	-6.979 (1.50) c	-2.514 (0.58)
Adjusted R ²	0.07	0.20	0.06	0.21
H-test(a)	3.555	2.452	3.76	1.262

Notes: Equations are in log-linear form.

t-ratios are given in parentheses. Significance levels are a=1%, b=5%, c=10%.

(a) Heteroskedasticity test. Chi-square test under 2SLS (critical value at 1% is 6.63).

The market structure variables – MNC, economies of scale, product differentiation, and regional market segmentation – are statistically significant with the expected signs. The coefficient of the foreign ownership variable is positive. The positive sign confirms the proposition, advanced in Chapter 5, that MNCs are expected to have a positive relation with imports because of the prevalence of intra-firm trade and various forms of international sourcing in arm's length trade (Wilmore, 1993). The coefficient of the economies of scale variable is negative, indicating that imports are lower in industries with large economies of scale. Thus, there is some support for the hypothesis that lower average costs achieved through economies of scale deter

competing imports. The coefficient of the product differentiation (PD) variable is negative and statistically significant. This result supports the hypothesis that product differentiation impedes entry by imports, presumably because of the fixed costs of creating goodwill assets in the domestic marketplace. The result is also consistent with the analysis of multinational companies in Chapter 5, according to which a firm skilled in product differentiation and promotion of a product will choose to serve a foreign market by means of local production instead of exports. Industrial concentration (CR4M) consistently takes a negative sign, but it is not statistically significant, even at the 10 per cent level. The statistical bias discussed above is a sufficient explanation for the sign. Thus, we reject the hypothesis that imports are higher in concentrated industries, because of the profit-maximising behaviour of firms in these industries. As expected, both natural protection (RM) and policy-induced protection (RERP) reduce foreign competition in the domestic market.

It is of interest to compare the 1993 results with the results of the pre-trade reform period, proxied by the 1985 import equations (1) and (2). Like exports, the 1985 import equation performed poorly relative to the 1993 equation. The F-test for overall fit is significantly lower in the 1985 regression compared with the 1993 regression. Further, only three of the 10 variables are statistically significant in the 1985 equations (real effective rate of protection (RERP), regional markets (RM) and the constant term) compared to seven significant variables in the 1993 equations. These results are consistent with the highly restrictive foreign trade regime of Indonesia's manufacturing sector in the mid-1980s.

7.7 Trade Protection.

The 2SLS estimates of the determinants of real effective rates of protection are reported in Table 7.9. The elasticities of the significant explanatory variables, evaluated at their sample mean values, are reported in Table 7.10. All equations reported in Table 7.9 are in linear form. In all cases, the linear specification was preferable to alternative specifications (e.g., the log-linear) in terms of Ramsey RESET test for functional form misspecification. At the experimental stage, we removed growth in industry output (GRO), human capital (HC), technology intensity

(TI), resource intensity (RI), historical real effective rates of protection (RERP(t-1)), regional market segmentation (RM), and consumer goods industry (CG) from the model on the basis that these variables had little explanatory power (i.e. their t-ratios were extremely low).

A number of outliers are identified in each of the two equations. The outliers in the 1985 equation are paper (ISIC 34112), basic chemicals (ISIC 35110), resins (ISIC 35130), ceramics (ISIC 36110), and ship building (ISIC 38411). The outliers in the 1993 equation are soft drinks (ISIC 31340), plastics (ISIC 35600), tyres (35510), and manufacture and assembling of automobiles (ISIC 38430). We control for these outliers by including a dummy variable in the model. We define a dummy equal to one, if the industry is an outlier, zero otherwise. Later we will speculate on some of the 'other factors' that might explain the high levels of protection in these industries.

Table 7.9: Determinants of Levels of Protection: 2SLS Results

	2SLS results	
	Pre-trade reform 1985 equation	Post-trade reform 1993 Equation
CR4	3.832 (1.44)c	2.540 (1.41)c
PCM	-1.980 (0.67)	-7.012 (1.62)c
MNC	1.511 (1.12)	1.182 (0.72)
IMDP	-0.157 (0.26)	-0.302 (0.14)
SOE	-0.072 (0.04)	-0.379 (0.30)
PC	-0.0003 (2.41)a	-0.00004 (0.82)
IZ*	0.00001 (2.22)c	0.000001 (1.43)c
Dummy	2.237 (1.72)b	5.141 (9.15)a
Constant	0.289 (0.19)	0.881 (1.19)
Adjusted R ²	0.19	0.51
H-test(a)	0.009	0.146

Notes: Dependent variable is real effective rates of protection

All equations are in linear form

The coefficients of IZ were multiplied by 10,000 to improve presentation.

t-ratios are given in parentheses. Significance levels (one-tailed test) are $\alpha=1\%$, $\beta=5\%$, $\gamma=10\%$.
(a) Heteroscedasticity test. Chi-square test under 2SLS (critical value at 1% is 6.63).

Table 7.10: Elasticities

	Elasticities Evaluated at Sample Mean Values	
	1985	1993
CR4	1.023	1.555
PCM	-0.245	-2.270
PC	-0.296	-0.131
IZ	0.233	0.247

Only elasticities of the statistically significant explanatory variables are reported.

The physical capital intensity (PC) variable has a negative sign in both equations, but is statistically significant only in that of 1985. This result rejects the comparative disadvantage hypothesis that capital-intensive industries should attract more protection in the Indonesian manufacturing sector, either on national interest or interest group grounds. The result for 1985 supports Pangestu and Boediono's (1986) contention that the government felt under pressure to offer protection on equity grounds to labour-intensive industries. During this period many labour-intensive industries - a number of them major traditional industries such as textiles - were being squeezed by the inter-sectoral effects of the oil boom. Our insignificant result in 1993 suggests that equity considerations are less important in the determination of the pattern of protection in the post-reform period. Basri and Hill (1996) also found an inverse relation between capital intensity and protection in their recent study of the determinants of protection in Indonesian manufacturing in the early 1990s. They argued that this unexpected inverse relation might arise because a number of the labour intensive industries are export-oriented, and the ERP numbers are sensitive to the treatment of duty drawback and other schemes which neutralise the impact of the protection regime.

The coefficient of the PCM variable has the expected (negative) sign, but is statistically significant only in 1993. This result supports the hypothesis that more profitable industries do not receive high protection, because they are less likely to demand it since they are in a position to compete with imports. The coefficient of the industry size variable (IZ) has the expected positive sign and is significant in 1985 and 1993. This result supports the notion that larger industries have the resources to

be able to lobby more effectively for protection than smaller ones. It is also conceivable that industry size alone attracts government support on the grounds of both national interest and concern about equity. For example, some of the large industries are also major employers of labour (e.g., cigarettes).

The results for the remaining variables (CR4, MNC, SOE) are mixed. Industry concentration (CR4) has a positive sign, and is weakly significant at the 10% level in both years. This supports the hypothesis of the interest group model, that a concentrated industry will find it easier to organise lobbying activities. The coefficient of the MNC variable is positive in 1985 and 1993, but is statistically insignificant in both years. While the variable is not statistically significant, there is anecdotal evidence that MNCs did bargain for protection before the 1980s trade reforms (Hill, 1988). The insignificant relation in 1993 is not entirely unexpected. While it was common in Indonesia for MNCs to bargain for protection before the 1980s trade reforms, there is little anecdotal evidence to suggest that this has occurred in the 1990s (Basri and Hill; 1996). Evidence for Indonesia and other countries suggests that MNCs benefit from trade liberalisation because of their world-wide market networks and sourcing of components and raw materials and, thus, are less likely to lobby for protection. The sign of the SOEs coefficient is negative, but statistically insignificant in both years. The unexpected results for the SOEs variable probably reflect the fact that they receive assistance in less transparent forms than trade barriers. The import variable has a negative sign in both years, but is statistically insignificant.

Finally, it is worth speculating on some of the factors that might explain the high levels of protection in our industry outliers (i.e., our dummy variables). Strong political-business connections are likely to be a major determinant in some of these industries (and probably in other industries as well). In their study on protection in Indonesian manufacturing, Basri and Hill (1996) speculated that political-business connections in automobiles, plastics, and tyres, among others, might explain the very high levels of protection in these industries in the early 1990s. While it is difficult to identify these 'other factors', the exercise does highlight the fact that close political-

business connections are likely to be important in explaining protection in some Indonesian manufacturing industries.

7.8 Structural Change in the Structure-Performance Model

Table 7.11 reports the tests for structural shifts in the coefficients of our two main equations, concentration and profitability, between 1985 and 1993. We report the coefficients of the dummy variables only.¹ We examine the industrial concentration equation first. The coefficient on the capital cost dummy variable ($D*AKC$) is negative and statistically significant at the 5% level. The coefficient on the industry size dummy variable ($D*IZ$) is positive and statistically significant at the 1% level. This tells us that the values of the coefficients of these two variables have changed significantly between the two years. The negative sign on the capital cost dummy variable tells us that the positive effect of capital costs on the degree of concentration observed in section 7.2 is smaller in 1993 compared to 1985. The positive sign on the industry size dummy variable tells us that the negative effect of industry size on the degree of concentration observed in section 7.2 is smaller in 1993 compared to 1985.

In the profit equation, there is a statistically significant increase in the coefficient of the growth ($D*GRO$) variable, and a statistically significant decline in the capital cost ($D*AKC$) variable between the two years. The latter result tells us that the positive influence of the capital cost barrier to entry on industry profits is smaller in 1993 compared to 1985.

¹ Dummy variables are used to test for stability of regression coefficients as follows. Consider two equations:

$$y_{85} = \alpha_{85} + \beta_{85}X_{85} + \mu_{85} \quad \text{for 1985}$$

$$y_{93} = \alpha_{93} + \beta_{93}X_{93} + \mu_{93} \quad \text{for 1993}$$

We can write the equations for the two years as

$$y = \alpha_{85} + (\alpha_{93} - \alpha_{85})D_1 + \beta_{85}X + (\beta_{93} - \beta_{85})D_2 + \mu$$

Where the dummy variables are defined as;

$D_1 = 1$ for 1993, zero for 1985

$D_2 = X_{93}$ for observations in 1993, zero for all observations in 1985.

The null hypothesis of stability is: $\alpha_{85} = \alpha_{93}$ and $\beta_{85} = \beta_{93}$. If the coefficient of the dummy variable is statistically different from zero, then we reject the null hypothesis that the coefficient of the variable under consideration is stable (constant) between the two years. Thus, we can conclude that there has been structural change in the coefficient of the variable between the two years. See Maddala, (1992; Ch 8).

**Table 7.11: Structural Change Test for Concentration and Profitability
(Pooled 1985 and 1993 data)**

Dummy Variables	Concentration	Profitability
D*RERP	-0.017 (0.53)	
D*CR4MX*RERP		0.057 (0.38)
D*EOS	-0.00009* (0.06)	
D*AKC	-0.0003* (1.71)b	
D*PC		-0.000009 (1.60)c
D*IZ	0.000002* (2.69)a	
D*GRO		0.286 (2.51)a
D*RM	-0.003 (0.34)	0.000 (0.05)
D*PD	0.408 (0.33)	0.176 (0.13)
D*Constant	0.041 (0.87)	-0.024 (0.19)

Notes: the coefficients of EOS, AKC and IZ were multiplied by 10,000 to improve presentation.

7.9 Summary of Major Findings

The main focus of the Chapter is on the determinants of industrial concentration and its relationship with other aspects of market structure, international trade and performance. The major findings of the Chapter are summarised below.

Industrial Concentration: Our results suggest that market structure factors are the major determinants of industrial concentration in Indonesian manufacturing: economies of scale, absolute capital requirements, industry size, regional market fragmentation, and product differentiation all have the expected significant relation with concentration. We could not find a direct significant relation between trade policy and concentration, either in 1985 or 1993. However, trade policy may affect concentration indirectly through other variables such as economies of scale. Our results for the export and import variables suggest that foreign trade does not have a significant impact on the degree of industrial concentration. The result for export orientation is consistent with the observation in Chapter 4 that export-oriented and unconcentrated industries share common structural characteristics, namely low

barriers to entry, and it is the barriers to entry variables that are dominant in the concentration equation. Finally, foreign and state ownership of industry do not have significant effects on industrial concentration over and above the other variables considered in the analysis. This result may also be due to measurement problems associated with the ownership variables discussed in Chapter 6.

Profitability: Our analysis of the determinants of industry profits is consistent with the well established proposition that higher levels of concentration lead to higher profitability. The results also show that it is in the more protected industries that concentration has a greater impact on industry profits. The study also provides evidence that this positive association has weakened since the 1980s policy reforms, establishing a direct link between trade liberalisation and industry profits in concentrated industries. The reduction in protection reduces excessive profits in concentrated industries. By contrast the positive relationship between profits and barriers to entry postulated in the literature is not strongly supported by Indonesian manufacturing data. Only the capital intensity variable is significant with the expected sign, and only weakly significant in the 1993 post-reform equation (4). The other hypothesised barrier to entry, product differentiation, is not statistically significant. The growth variable gave us inconsistent results between the two years. These results are consistent with previous studies for other small, open economies (e.g., Caves et al, 1980; Kirkpatrick et al, 1984).

Foreign ownership:

Our results for the determinants of foreign ownership in manufacturing show that there is a similarity between the determinants of foreign ownership in developed and developing economies. Most of the conventional industrial factors (concentration, capital intensity and technology intensity) are statistically significant with the expected signs. There are, however, some unconventional results. These are the negative, but insignificant influence of product differentiation and the insignificance of the industry growth variable. The results also show that there has been a shift in the pattern of FDI in manufacturing towards export-oriented industries since the mid-1980s. This is partly attributed to trade and investment reforms during this period.

Export-orientation:

Our analysis of the determinants of export-orientation shows that the factor intensity (HC, WP) variables are the major structural determinants of export performance in Indonesian manufacturing. Our results show that exports are concentrated in products in which that Indonesia has a comparative advantage. These are the labour-intensive industries and the forestry-based products. The market structure factors do not appear to be important determinants of Indonesia's export orientation in the 1990s. Economies of scale, concentration, regional market segmentation, and product differentiation all have the expected signs, but are statistically insignificant. Finally, we observe an inverse relationship between export orientation and trade protection (RERPs).

Import penetration:

The analysis of the import penetration equation generally supports the findings of the analysis of the export intensity equation. The factor intensity variables (PC, RI, TI) are important determinants of import penetration in manufacturing industries since the 1980s reforms. Our results show that imports are concentrated in industries in which Indonesia has a comparative disadvantage, such as capital (PC) and technology (TI) intensive activities. Foreign ownership and market structure variables - economies of scale, product differentiation, and regional market segmentation - have a greater influence in the import penetration equation than they do in the export intensity equation. All these variables are statistically significant, with the expected signs. Concentration is not statistically significant in the import penetration equation. Finally, our results for the trade policy variable (RERPs) show that trade protection reduce foreign competition in the domestic market.

Trade protection: Our results support the findings of other studies for Indonesia that political-economy factors are important determinants of the pattern of protection in Indonesian manufacturing. This of course is consistent more broadly with the political economy of decision-making processes in Indonesia, and in particular the vulnerability to capture of micro-level policy-making processes. A number of variables generated results consistent with the political economy models, such as concentration, price-cost margins, industry size. Concentration and industry size

variables are positive and significant in both the pre-reform and post-reform periods. The profit variable has the expected negative sign and is significant in the 1993 equation. In contrast, economic factors (comparative disadvantage considerations) do not appear to be important determinants of the pattern of protection. Only the capital intensity (PC) variable was statistically significant in the pre-reform equation.

Chapter 8

Dynamics of Leading Firms' Market Shares

8.1 Introduction

In Chapter 4 we noted that a major limitation of seller concentration statistics is that they are static measures of competition. They simply record the characteristics of a size-distribution at some particular point in time. The industrial organisation literature has long recognised that high concentration ratios can be found along with considerable instability in leading firms' market shares. Industrial organisation theory tells us that if the identity of the dominant firms were to change over time, then even persistently high levels of concentration would not necessarily imply the absence of competitive forces (Baldwin and Gorecki, 1994; Davis and Geroski, 1997).

The purpose of this Chapter is twofold. First, we measure the magnitude of changes in leading firms' market shares and determine whether it is the case for Indonesian manufacturing that persistently high levels of concentration can be found along with considerable instability in leading firms' market shares. To do this, we construct a data set for a sample of industries from the annual manufacturing surveys. The data set records the changes in firms' rank and market shares in each industry between 1985 and 1993. Our results show considerable instability in leading firms' market shares and rank across industries. The second purpose is to identify the determinants of changes in leading firms' market shares and to estimate their influence on the observed changes for our cross-section of 67 manufacturing industries.

There are several important empirical findings in this Chapter that provide valuable insights into the competitive process, and how government policies impact on this process. First, government regulations on a selected number of industries - sugar processing, cooking oil, alcoholic beverages, fertiliser, cement, and steel - constrain

domestic rivalry. This provides a direct link between deregulation and competition. Removing regulatory constraints on firm behaviour will trigger rivalry among firms in these industries. Trade liberalisation, however, does not appear to have disturbed market shares except in export-oriented industries. Second, there is no evidence that MNCs have any impact on domestic rivalry, over and above the other variables considered in the analysis. This result provides some evidence to reject the proposition that large MNCs' business practices reduce market rivalry in the host developing country's markets. Finally, the results of most of the other industrial organisation factors tend to be consistent with studies for other countries. Market shares tend to be more stable in highly concentrated industries, all other things being equal. Rapid growth in industry destabilises market shares, while large absolute capital requirements constitute a barrier to entry and mobility, thereby insulating leading firms' market shares.

This chapter is organised as follows. Section 2 briefly reviews the theory of market share instability. Section 3 discusses the various turnover-based measures of competition, and section 4 reviews the major empirical studies on the topic. Section 5 presents evidence on market share instability in Indonesian manufacturing industries. Section 6 presents the hypotheses to be tested in this Chapter. Section 7 specifies the empirical model and discusses the sample. Section 8 presents and discusses the empirical findings, while section 9 summarises the main findings of the Chapter.

8.2 Theoretical Background

The industrial organisation literature has long recognised that high concentration ratios can be found along with considerable instability in market shares of leading firms. Industrial organisation theory tells us that, if the identity of the dominant firms were to change over time, then even persistently high levels of concentration would not necessarily imply the absence of competitive forces. In the absence of regulatory constraints on competition, changes in the relative positions or market shares of the leading firms would indicate healthy competitive conditions prevailing in that industry (Baldwin and Gorecki, 1994; Davis and Geroski, 1997).

According to Geroski and Toker (1996), turnover in firms' rankings provide at least

some useful information on the vibrancy of the competitive process, and turnover-based [i.e changes in rank or market shares] measures of competition may reflect the dynamics of the competitive process more accurately than conventional static measures of competition (like the concentration ratio).

Caves and Porter (1978) argue that the instability of leading firms' market shares provide a measureable indicator of a rival's behaviour in oligopolistic markets. For example, rivalry in advertising, product or process innovations and other marketing variables should change shares because competitive moves in these areas are replicable only with a lag, if at all, and so give an advantage to the successful advertiser or innovator. The time required to match non-price moves and the discontinuous nature of responses increase the chance of prolonged and oscillatory adjustments, or a very different new equilibrium.

While most researchers agree that changes in market shares are indicative of competition, there is a divergence of views about whether stable market shares indicate collusion. Caves and Porter (1978) argue that the stability of shares reflects the stability of the oligopolistic bargain among firms or the cartel, as well as the size and the nature of exogenous disturbances to that bargain. As Stigler (1964: 46) writes,

'Fixing market shares is probably the most efficient of all methods of combating secret price reductions. No firm can profit from price cutting if it is moving along the industry demand curve, once a maximum profit price has been chosen. With inspection of output and an appropriate formula for redistribution of gains and losses for departures from quotas, the incentive to secret price cut is eliminated.'

In the absence of any kind of disturbance, market shares would remain constant over the life time of the collusive arrangement. The distribution would be revised in the face of some types of disturbances. For example, capacity could be added to serve a growing market only in efficient-size lumps that could change shares. The distribution would by assumption not be altered by a breakdown of, or incomplete adherence to, the collusive arrangements, or by incomplete coverage in the agreement of the key

market variables when exogenous market disturbances are occurring.

The alternative view is that, while unstable market shares indicate competition among firms, stable market shares are consistent in principle with either collusion or competition (Schmalensee 1989: 999). For example, if a price war breaks out among firms, price cuts can be easily matched by rivals, and market shares may not be disturbed. Thus, under price competition it is possible for market shares to remain stable over time.¹

The theory of perfectly contestable markets makes it plain that the identity of leading firms is unlikely to be an important determinant of market performance. If a market is contestable, excess profits will be eliminated regardless of whether it is the incumbent who lowers price and remains in the market, or whether the work is done by an entrant who displaces that incumbent. According to Geroski and Toker (1996: 142), this view 'probably pushes what is basically a static view of markets too hard'.

8.3 Market Share Turnover-Based Measures of Competition

A rich menu of alternative market share instability statistics, including the one presented in this study (*viz.*, absolute market share instability index), have been put forward in the literature. It is convenient to begin with Hymer and Pashigan's (1962) criticism of the commonly used measure of market share instability at that time - the change in the rank of incumbents. Joskow (1960) used the rank measure to study mobility in the shoe manufacturing industry.² He arranged the top 150 firms in both 1947 and 1954 by order of size, and calculated the rank correlation coefficient. The higher the rank coefficient, the greater was the stability of firms' relative position in the industry.

¹ Of course, it is possible that unstable market shares are also associated with intense price competition. Firms that introduce new cost-reducing processes are able to expand their market shares by undercutting prices of their higher cost rivals. This competitive pressure will stimulate rivals to adopt similar cost-saving devices to regain or protect their market shares. This process would lead to turbulence in market shares.

² See also Boyle and Sorensen (1971), and Heggstad and Rhoades (1976) for studies using variants of the change in rank measure of firm market share instability. See Gort (1963) for an alternative measure of firm mobility based on the OLS estimate of the regression of market share in time *t* on market share in time *t*-1.

Hymer and Pashigan showed that the rank correlation coefficient is sensitive to the size distribution of firms included in the sample. The value of the rank correlation coefficient tends to fall, the greater the number of firms included in the sample, because smaller firms can change their rank more easily than larger ones. Thus, a low rank correlation coefficient for an industry may be the result of small firms changing their rank, and not large ones. They did note that this problem could be reduced by truncating the sample towards large firms. However, large market share gains are often required to lodge the top firm from its place, so that in a highly concentrated industry with a large standard deviation of market shares, stability would be expected when using the change in rank measure.

They proposed an alternative measure of market share instability: the absolute instability index (AII).

$$AII = \sum_{i=1}^n |\Delta ms_{i,t,t-1}| \quad i = 1, \dots, n \text{ leading firms in industry } j \text{ at time } t-1.$$

Where $\Delta ms_{i,t}$ is the change in market share of firm i in industry j , between time t and $t-1$. The absolute instability index measures the *magnitude* of change in market shares in an industry. It is the summation of the absolute value of the change in market shares of leading firms between time t and $t-1$. The value of the index ranges between zero and one. If the index is close to zero, then this indicates that market shares are relatively stable. If the index is close to one, then this indicates that market shares are unstable.

The index can obviously be affected by the number of firms included in the sample, but it is not very sensitive to it. Small firms do not significantly contribute to the value of the index since they account for a small share of the industry output. The index weights a given percentage point increase in the market share of a small firm equally with the same percentage point increase in the market share of a large firm. This measure is subject to a possible bias, in that it is easier for a given change in market shares to occur among large firms in highly concentrated markets than in less concentrated markets where large firms have lower market shares. This explains why

some studies have found a positive relationship between industrial concentration and AII (see Table 8.1 below).

Heggestad and Rhoades (1976) proposed an alternative measure to the absolute market share instability index: the relative market share instability index (RII). The index is defined as:

$$RII = \sum_{i=1}^n \left| \frac{\Delta ms_{i,t,t-1}}{ms_{i,t-1}} \right| \quad i = 1 \dots n \text{ leading firms in industry } j.$$

The relative instability index is the summation of the absolute value of the percentage change in the market shares of leading firms between two points of time. A limitation of this measure is that it gives greater weight to equal absolute changes in market share of smaller firms relative to larger firms.

Finally, the question remains, how many firms should be included in the calculation of the instability statistics? Many studies have used a variety of sample sizes ranging from the largest three firms in an industry (Heggestad and Rhoades, 1976) to the largest 15 (Gort, 1963). The main reason for the truncated sample size is that it is in a restricted size range that market share stability is most relevant for analysis of competitive structure (Gort, 1963). The problem with this argument is that there is no objective method for determining the appropriate number of leading firms in each industry. Furthermore, the number of leading firms in one industry may not be the same in another industry. The best practical solution is to use the same number of firms as defined by the concentration ratio. In our study, we use the four-firm concentration ratio, so it makes sense to include only the four largest firms in the calculation of the instability index.

8.4 Review of Empirical Studies

There are numerous empirical studies on leading firm market share turnover in the industrial organisation literature. Selected studies are discussed below.³ However,

³ Other studies include Havrilesky and Barth (1969), McGuckin (1972), Reekie (1974), Hirschey

there are no cross-sectional studies of this kind for other developing economies known to the author, so our study is the first to examine market share instability in a developing economy.⁴

One of the most recent studies is Geroski and Toker (1996). They estimated the determinants of sales growth of leading firms in U.K. manufacturing between 1979 and 1986 for a cross-section of 54 industries. Leading firms were defined as the five largest firms in each industry in 1979. In their model they included several firm-specific and industry-specific variables that may affect firms' sales growth (and by implication market shares). Firm-specific variables included firms' advertising expenditure in 1979 and the number of innovations produced between 1970 and 1979. Industry-specific variables included industry sales growth over the period 1979 to 1986, variability in industry growth rates over the period 1970 to 1979, industry exports in 1979, imports in 1979, variability in exports and imports over the period 1970 to 1979, industry advertising in 1979, the total number of industry innovations produced over the period 1970 to 1979, and industrial concentration in 1979 (measured by CR5). Most of the variables turned out to be statistically insignificant and were dropped from their model. They found a positive and significant relationship between firm growth and firm advertising expenditure, the number of firm innovations, industry growth and industrial concentration. The positive effect of advertising and innovations on firm growth suggests that those firms that spent more on advertising and produced more innovations grew faster than other firms.

Davies and Geroski (1997) estimated the determinants of changes in leading firms' market shares in U.K. manufacturing using the same data base as Geroski and Toker (1996). In their model, they included firms' relative advertising expenditure in 1979 (RELADV, ratio of a firm's advertising expenditure to competitors' advertising expenditures) and the relative number of innovations over the period 1970 to 1979 (RELINN, ratio of a firm's number of innovations to competitors' innovations). They

(1981), Meisel (1981), Lynk (1981), Sandler (1988), Eckard (1991), and Das et al (1993).

⁴ Lindsay (1979) described turnover of the largest 20 and 60 industrial enterprises in Philippine manufacturing over the period 1961 to 1970. He did not examine the determinants of leading firm turnover within individual industries, which is more relevant to the analysis of competition than turnover among the largest industrial enterprises.

found a significant and positive relationship between RELADV and changes in market shares, suggesting that advertising competition shifted market shares among rivals. A significant and positive relationship between changes in market shares and total industry advertising expenditure was also found, suggesting that industries characterized by high advertising competition had relatively more unstable market shares. The coefficient of RELINN had the expected (positive) sign, but was statistically insignificant.

Caves and Porter (1978) is one of the most cited empirical studies in this area. They estimated the influence of a selected number of industry-specific explanatory variables on two measures of market share turnover: the absolute (AII) and relative (RII) market share instability indexes for a cross-section of U.S.A. manufacturing industries over the period 1970 - 3.⁵ They hypothesised a non-linear relationship between concentration and market share instability. As seller concentration rises from moderate to high levels, the effectiveness of collusion and hence stability of shares should rise. It should also rise as concentration falls from moderate to low levels, so that firms' behaviour approach that under pure competition and there are no mutual arrangements to be violated. They approximated the non-linear relationship using a piecewise linear model. A piecewise linear model fits a separate linear regression on each sub-sample and, thus, allows the coefficients of variables to differ across sub-samples. In Caves and Porter's study three sub-samples of CR4 values were chosen: CR4 greater than 77.5% (high CR4), CR4 between 50% and 77.5% (moderate CR4) and CR4 less than 50% (low CR4).

⁵ A criticism of their study is that the three year period is not long enough to minimise short-run, random fluctuations in market shares.

Table 8.1

Some Empirical Studies of Market Share Instability^a

Independent Variables	Heggestad & Rhoades (1977)		Caves & Porter (1978)		Allen (1981)	Eckard (1987)	Geroski & Toker (1996)	Davis and Geroski (1997)
Dependent Variables	AII & RII		AII & RII		SDMS	DCR	Sales growth	MS _t -MS _{t-1}
CR	+	*	+	*	+	+	+	+
EX				-			+	
IM				+				
ASIND				+		+	+	+
AS squared						-		
AS*CR						+		
R&D				+				
Firmadv							+	+
Firminn							+	+
GRO		+		+	+	+	+	-
VGRO				+		+	-	
Entry				+				
Exit				+				
VI				-	-			
EOS				+				+
PC				-				
REG		-						
Firm size		-					-	-
Adjusted R ²	0.13		0.35		0.31	0.23	0.32	0.40
Sector	Banking		Industry		Gasoline	Industry	Industry	Industry
Period	1969-72		1970-73		1969-74	1963-82	1979-86	1979-86
Country	U.S.A.		U.S.A.		U.S.A.	U.S.A.	U.K.	U.K.

a. The values of the coefficients are not presented in Table 8.1, because differences in model specification (i.e., linear, log-linear, non-linear) mean that the coefficient values can not be compared with each other.

CR refers to the concentration ratio, EX to export intensity ratio, IM to import penetration rate, AS is the industry advertising-sales ratio, CR*AS is the concentration-advertising interaction term, R&D refers to industry research and development-sales ratio, Firminn refers to number of firm innovations, Firmadv refers to firm advertising expenditure, GRO refers to growth in industry output, VGRO refers to variance of growth rates, VI refers to vertical integration of production, EOS is economies of scale, REG is a regulation dummy variable, firm size is measured by firms sales, MS refers to market share.

* denote statistically significant at the 10% or better significance level.

AII refers to the absolute instability index, RII is the relative instability index, SDMS is the standard deviation of leading firms' market shares, DCR is the mean of the absolute deviation from the simple trend of CR4 from 1963 to 1984.

Heggestad and Rhoades (1977) and Caves and Porter (1978) only reported the coefficients of the CR4 variable in the AII equation.

All samples refer to industry observations, except for Geroski and Toker (1996) and Davies and Geroski (1997) who used firm level data.

Caves and Porter found that the coefficients of absolute shares (AII) remain positive in all sub-samples but decrease in size and significance from the low to medium and high sub-samples. The coefficients of relative share swing from positive and insignificant to increasingly negative and significant as concentration rises from low to medium and high concentrated sub-samples. They explained that the different signs

of the coefficients of relative and absolute shares arise because of their different statistical relationship to the size of share disturbances. The coefficients of absolute share contain a built-in upward bias, and those of relative share are biased downward because of the construction of these dependent variables. For example, larger market share changes are more likely to occur in concentrated industries than in less concentrated industries where the leading firms have lower market shares. Thus, a positive relationship between absolute market share change and concentration is expected. Conversely, larger relative changes in market shares are more likely to occur in less concentrated industries where leading firms' initial market shares are small relative to leading firms in more concentrated industries. Thus, a negative relationship between concentration and relative change in market shares is normally expected. Caves and Porter argued that their results do lend some support to the hypothesis that the true relation swings from positive to negative as concentration rises.

The authors also found some evidence to support the hypothesis that some forms of non-price competition destabilise shares: market share instability increases with product research and development effort. However, they could not find evidence that advertising competition destabilises market shares. The authors also found that greater import competition, new entry and rapid growth in demand destabilise shares in highly concentrated industries (defined by them as industries with a CR4 greater than 77.5 per cent).

Heggestad and Rhoades (1976) were concerned with testing the concentration-market share hypothesis in the US banking industry. They used AII and RII measures of market share turnover. They found an inverse relationship between concentration and relative shares (RII), and a positive relationship between concentration and absolute shares (AII). Of interest to our study, they also included a dummy variable to capture barriers to entry caused by state regulation of the number of regional branches per bank. The sign of the coefficient was negative and significant, providing evidence that these regulations minimised changes in market shares and rank among leading firms.

Allen (1981) examined market share instability in the regionally segmented U.S

gasoline industry. The dependent variable in his analysis was the standard deviation of each gasoline marketer's market share in each U.S state, computed over the period 1969 to 1974. The author found a positive relationship between concentration (CR4), industry output growth and his measure of market share instability. He argued that the positive relation with concentration arises because seller interdependence leads to the replacement of price competition by non-price competition. However, this positive coefficient may contain a built-in upward bias similar to that of the absolute market share instability index discussed by Caves and Porter (1978). A larger standard deviation of leading firms' market shares is more likely to occur in concentrated industries than in less concentrated industries, where the leading firms have lower market shares.

In sum, most studies find that, in manufacturing industries in developed economies market shares tend to be more stable the higher the concentration. However, the results are sensitive to the measure of market share instability and the specification of the model. Most studies confirm that rapid growth disturbs market shares, but only a few studies find evidence that advertising or product differentiation affect market share stability. The little evidence that exists on the relation between international trade and share stability suggests that market shares tend to be more unstable the greater is import competition. Apart from Heggstad and Rhoades, no studies have investigated the influence of regulation or changes in trade policy on market share instability.

8.5 Market Share Instability in Indonesian Manufacturing Industries

This section describes the changes in leading firms' rank and market shares in 102 ISIC manufacturing industries during the period of trade liberalisation and industry deregulation, 1985 and 1993. The descriptive analysis enables one to gauge the degree of turbulence in market shares that have occurred in these industries, and provides a backdrop for the statistical analysis into the underlying factors explaining the observed market share instability in section 8.8.

For this purpose, we constructed a data set for a sample of 102 ISIC industries from

the 'backcasted' annual manufacturing surveys. These are the same 102 industries included in the analysis of trends in concentration in Chapter 4. The data set records the changes in firms' rank and market shares in each industry between 1985 and 1993. We define leading firms as the four largest firms in 1985. This definition is consistent with our earlier analysis of the trends in the four-firm concentration ratio.

We present two descriptive statistics of market turbulence. The first describes the changes in the identity of leading firms during the period 1985 to 1993. We refer to this measure as firm turnover. It describes the number of survivors, exitors and entrants into the top four firms in an industry. The second measure is the absolute instability index (AII) described in the preceding section. We divide the AII by the number of leading firms included in the index (i.e., the largest four firms in 1985) to obtain the *average* absolute market share instability index. This measures the *average* absolute change in the leading four firms market shares and is defined as:

$$AII = \sum_{i=1}^4 \left| \frac{ms_{i,1993} - ms_{i,1985}}{4} \right| \text{ where } n = 4, \text{ the leading four firms in industry } j \text{ in}$$

1985. This index tells us the average percentage point change in a leading firm's market share between 1985 and 1993.

Table 8.2 presents firm turnover statistics and the market share instability index (AII) by CR4 class intervals between 1985 and 1993. 'Survivors' indicate the number of leading firms in 1985 that remained in the top four firms in 1993. 'Exitors' indicate the number of firms that were among the top four firms in 1985, but exited out of the industry in 1993. 'Entrants' indicate the number of new entrants into the top four in 1993. The table shows that entry and exit into the top four firms was relatively frequent during this period; the typical industry had around two entrants or exitors. Of the 408 leaders in the sample of 102 industries in 1985, 173 exited from the top four nine years later (and, thus, 173 firms entered the top four between 1985 and 1993). This finding suggests considerable turbulence in firm turnover across industries during this period.

Table 8.2

Leading Four-Firm Turnover and Market Share Instability, 1985-1993

CR4 Class Interval	Average Number of			AII	STDEV of AII
	Survivors	Exiters	Entrants		
75 to 100	3.2	0.8	0.8	0.098	0.052
50 to 74	2.3	1.7	1.7	0.095	0.032
25 to 49	2.0	2.0	2.0	0.066	0.022
0 to 24	1.5	2.5	2.5	0.037	0.024
Average for Manufacturing	2.3	1.7	1.7	0.078	0.042
Correlation coefficient between CR4 and AII				0.54*	
<i>Sub-samples:</i>					
CR4: 75 to 100				0.10	
CR4: 50 to 74				0.16	
CR4: 25 to 49				0.61*	
CR4: 0 to 24				0.63*	

Notes: 102 industries. All industries recorded four or more firms in 1985, except for wheat flour milling, which recorded three incumbents. Including wheat flour milling does not significantly bias the results for the high concentration class.

STDEV denotes the sample standard deviation of the AII index. It measures the degree of dispersion in the index within the sample.

*Statistically significant at 95% confidence level

Leading firm turnover in Indonesian manufacturing is relatively high compared to developed economies. Davies and Geroski (1997), for example, investigated firm turnover in a sample of 54 U.K. manufacturing industries over the period 1979 to 1986. They found that entry and exit into the top five was relatively infrequent. Of the 270 leaders in the 54 industries in 1979, 213 survived in the top five seven years later. The higher degree of turnover among leading firms is expected in a rapidly industrialising and growing economy, as Indonesia was over this period.⁶ In a fast growing manufacturing sector, entry is easier and, thus, firm turnover and market shares are less stable.

The degree of leading firm turnover varies considerably with the level of industrial concentration. Table 8.2 shows that entry and exit into the top four firms is less frequent in highly concentrated industries (industries with a CR4 ratio greater than 75 per cent) compared with low concentrated industries. For example, the average

⁶ There are no similar published studies for other developing economies known to the author. Thus, we are unable to make a comparison with manufacturing industries in other developing economies.

number of 'survivors' in highly concentrated industries was around three, compared with 1.5 firms in low concentrated industries. This finding suggests that leading firm rank is more stable in concentrated industries, and this is consistent with the findings of other studies for developed countries.

Table 8.2 also presents the average market share instability index (AII), measured over the period 1985 to 1993. Examining the index, a considerable amount of turbulence in market shares is observed across manufacturing industries. The average index for our sample of 102 industries is 0.078. This tells us that, on average, leading firms' market shares (in absolute values) changed by 7.8 percentage points between 1985 and 1993. The index is positively correlated with the degree of industrial concentration. For example, the average change in leading firms' market shares was 9.8 percentage points in highly concentrated industries, compared with 3.7 percentage points in industries with concentration levels below 25 per cent. This positive correlation arises because it is easier for a given change in market shares to occur among large firms in highly concentrated markets than in less concentrated markets where large firms have lower market shares. The dispersion of the index, measured by the standard deviation, is substantially greater in the highest CR4 class interval compared with the other three CR4 classes. This indicates that there is greater inter-industry variation in market share instability in highly concentrated industries. In other words, high concentration ratios exist along with considerable instability in leading firms' market shares for some manufacturing industries.

An examination of the determinants of market share instability, requiring the construction of an econometric model, is undertaken in the section 8.8 of this Chapter. But for illustrative purposes it is useful to examine the pattern of firm turnover in persistently concentrated industries. This is done in Table 8.3 for the industries for which the CR4 exceeded 75 per cent in 1985 and 1993. The results show the following;

- (1) A number of the persistently concentrated industries experienced considerable firm turnover and market share instability during the period 1985 to 1993. For example, four of the 20 persistently concentrated industries had two new

leading firms by 1993. These industries were cigarettes, carpet and rugs, paper products and structural clay products. Firm turnover in these industries were well above the manufacturing average of 1.7 entrants (Table 8.2).

- (2) While many concentrated industries recorded low rates of firm turnover (i.e. little change in the identity of the four leading firms) many of these industries still experienced considerable instability in market shares, as measured by AII relative to the manufacturing average. For example, large changes in leading firms' market shares occurred in animal slaughtering, ice cream, processed fruits and vegetables, and motor bikes, despite little change in the identity of the top four firms in these industries. This tells us that intense rivalry among firms can exist along with high concentration ratios and low rates of rank changes, as noted earlier by Hymer and Pashigan (1962).
- (3) A number of the industries with 'stable incumbency' (i.e., low AII and no change in the identity of the four leading firms) during this period were heavily regulated. Many of these industries had regulations restricting entry and exit of firms, distribution controls, and protection from import competition. Examples of these industries include, wheat flour milling, alcoholic beverages, fertiliser and cement.
- (4) Stable firm market shares are to some extent associated with state ownership, but much less so with foreign ownership. In the case of state ownership, government policies have insulated state enterprises from competitive pressures. In the case of foreign ownership, there does not appear to be any strong association with leading firm turnover. Foreign presence can be found in industries with considerable turbulence in market shares (e.g., paper products, and cigarettes), and can also be found in industries with stable incumbency (e.g., beer, tyres, and sheet glass).

Table 8.3

Persistently Concentrated Industries and Market Share Instability, 1985-1993

ISIC No.	Industry	CR4		Turnover of Top Four Firms				Ownership Share (% of production)			RERP(a)	Regulation (b)
		1985	1993	Survivor	Exit	Entrant	All	Foreign	State	1987, 1993		
31111	Animal Slaughtering	78	90	3	1	1	0.12	0	66	49,174		
31122	Ice cream	95	95	4	0	0	0.10	0	0	600+, 85		
31130	Proc. veg and fruit	84	90	4	0	0	0.15	0	0	-30,-26		
31164	Wheat flour	100	100	3	0	0	0.06	0	0	600+, -33	entry	
31310	Alcoholic liquors	86	100	4	0	0	0.10	0	0	90,62	entry	
31320	Wine	87	96	3	1	1	0.03	0	0	90,62	entry	
31330	Malt beer	97	98	4	0	0	0.07	99	0	90,62	entry	
31420	Clove cigarettes	78	82	3	1	1	0.09	0	0	600+, 108	price, entry	
31430	White cigarettes	82	94	3	1	1	0.06	54	0	600+, 108	price	
3142/3	Cigarettes ^a	71	70	2	1	1	0.09	11	0	600+, 108		
32140	Carpet and rugs	89	78	2	2	2	0.15	7	0	12,-12		
34190	Paper products	91	86	2	2	2	0.10	34	17	28,31		
35120	Fertiliser	87	80	3	1	1	0.07	10	85	56,-24	distribution	
35232	Cosmetics	77	78	3	1	1	0.06	57	0	88,116		
35510	Tyres	78	76	4	0	0	0.06	44	0	600+, 600+		
36220	Sheet glass	100	91	4	0	0	0.05	90	0	111,-2		
36310	Cement	77	83	4	0	0	0.05	6	31	138,-18	price, distribution	
36490	Structural clay prod	91	90	2	2	2	0.15	0	12	68, 42		
38430	Motor vehicles	100	100	4	0	0	0.09	50	0	428, 600+	Local content	
38440	Motor bikes	96	97	4	0	0	0.12	16	0	600+, -7		
39020	Musical instruments	99	99	3	1	0	0.06	98	0	108,63		

Notes: a. 'Cigarettes (ISIC 3142/3)' include both clove (ISIC 31420) and white (ISIC 31430) cigarette firms. 'Entry' indicates the presence of entry restrictions; 'distribution' indicates the presence of distribution controls or monopoly practices; 'price' denotes price setting or controls;

a. RERPs are taken from Fane and Condon (1996). b. Source: Xie and de Bruyn Kops (1995) and the author's fieldwork in 1995.

CR4 ratios, rank turnover statistics, and ownership shares are calculated from BPS, Annual Manufacturing Surveys, 1985-93.

8.6 Determinants of Market Share Instability in Indonesian Manufacturing

This section identifies the determinants of changes in leading firms' market shares. Section 8.8 estimate their influence on the observed changes for our cross-section of 67 manufacturing industries. Drawing on previous empirical studies for other countries and the Indonesian policy regime, leading firm market share turnover in Indonesian manufacturing is specified as a function of concentration, economies of scale, demand conditions of the industry (growth in demand, variability in demand growth), barriers to entry and mobility (product differentiation, capital requirements), foreign ownership, international trade (export intensity and import competition), and government intervention through trade policy, public sector investment and regulatory constraints on domestic competition.

Concentration (CR4)⁷

We hypothesise a quadratic relationship (inverted U-shape relation) between concentration and market share instability. This quadratic relationship is supported by economic theory. Caves and Porter (1978) implicitly assumed a quadratic relationship when they hypothesised their non-linear relationship between market share instability and concentration: as seller concentration rises from moderate to high levels, the effectiveness of collusion and hence stability of shares should rise. It should also rise as concentration falls from moderate to low levels, so that firms' behaviour approaches that under pure competition and there are no mutual arrangements to be violated. To test for the quadratic relationship between concentration and leading firm market share instability we include the four-firm concentration ratio (CR4) and the square of the four-firm concentration ratio (CR4²). We expect the coefficient of the CR4 ratio to be positive, and the coefficient of the square of the CR4 ratio to be negative.

Economies of scale (EOS)

Economies of scale should affect market shares. The direction of the relationship,

⁷ Conglomerates may also influence the nature of rivalry in a market for reasons discussed in Chapter Four (e.g. horizontal integration, financial staying power, multi-market contact). However, our data base does not allow us to identify which firms are conglomerates.

however, is ambiguous. Economies of scale may destabilise market shares. Where economies of scale are large, firms increasing capacity to respond to demand growth must add it in discrete lumps that necessarily destabilise market shares, raising a seller's share as its new capacity comes on stream and lowering those of its rivals (Caves and Porter, 1978). This suggests a positive relationship between economies of scale and market share instability. However, in practice we might expect that these discrete 'lumps' are quite small, in which case economies of scale are unlikely to be disruptive. A negative relationship is possible to the extent that economies of scale acts as an entry barrier into the top four placed firms and the industry as a whole (Davies and Geroski 1997).

Demand conditions (GRO and VGRO)

Two aspects of demand are considered as important influences on market share turnover. These are industry growth and demand instability. It is hypothesized that market shares should be less stable in industries that are growing more rapidly (GRO) as the entry of new competitors is easier. Thus, we expect a positive relationship between rapid industry growth and market share turnover.

Variations in overall demand (VGRO) should affect market shares. However, the direction of the relationship is ambiguous. Instability in demand might transmit instability into leading firms' market shares: demand fluctuations cause variations in market shares because firms can not predict such changes with perfect foresight. This proposition suggests a positive relationship between instability in demand and market share turnover. However, a negative relationship is also possible if firms have an incentive to minimise risk arising from demand fluctuations. Normally, instability in profit rates is associated with instability in demand conditions. Therefore, it may be in the interest of firms to adopt strategies or arrangements to minimise instability in demand (McBride, 1983).

Barriers to entry and mobility (PD and AKC)

According to Geroski (1994: 155), the success of leading firms will also depend on the extent to which there are entry barriers, both into the top four firms and the industry as a whole. Barriers into the top four firms are referred to as mobility

barriers. Geroski noted that barriers to mobility have the same basic features and arise from the same kinds of sources as do entry barriers into the industry. Thus, we include the same two barriers to entry variables used in the concentration and profit equations in Chapter 7: capital requirements of establishing a plant of minimum efficient scale (AKC) and product differentiation (PD).

We expect a negative relationship between capital requirements and market share instability. Large capital requirements may deter entry to the extent that they are sunk costs. Large sunk cost of production reduces the contestability of the industry for local entrants. On a similar reasoning, large capital requirements may inhibit small firms from graduating to become large firms (i.e., mobility barriers), which in turn protects existing leading firms' market shares.

The effect of product differentiation on market share instability is ambiguous. On the one hand, product differentiation may reduce market share instability. Product differentiation insulates each seller's market by a downward sloping demand curve, and this constitutes an entry barrier to new competition and upward mobility by smaller firms (Scherer and Ross, 1990). Such firms therefore face less elastic demand and, thus, greater market power. This suggests that smaller displacements of shares follow a disturbance such as a reduction of one seller's costs. This in turn implies a negative relationship between product differentiation and leading firm market share instability. On the other hand, non-price competition like product differentiation increases market rivalry among firms and facilitates the entry of new firms (Nelson, 1974; Scherer and Ross, 1990). The result is greater market share instability. Further, competitive moves in this area are replicable only with a lag, if at all, and so give advantage to the successful advertiser. This in turn implies a positive relationship between product differentiation and leading firm market share instability.

International influences (EX, IM, MNC)

The intensity of rivalry in a domestic industry is influenced by the degree of openness to international competition. We include two variables to capture international competition: import penetration (IM) and export intensity (EX).

It is hypothesised that high import competition reduces interdependent behaviour among domestic firms, which in turn triggers rivalrous behaviour among firms because they have to compete with imports, in addition to products from local producers (Caves 1980; 132). Caves and Porter (1978; 298) also argue that foreign competition provides a transmission belt for disturbances occurring in the world market that feed into the local market, thus destabilising market shares. Thus, we expect a positive relationship between import penetration (IM) and market share instability.

The effect of exports on market rivalry is ambiguous. On the one hand, high exports signal the presence of a world market with correspondingly greater rivalry than recorded by the domestic concentration ratio. Greater rivalry implies greater market share instability. Further, the world market is a source of disturbances, and exports (like imports) can introduce exogenous disturbances and deter an oligopoly consensus tight enough to stabilise market shares. These propositions suggest that there will be a positive relationship between exports and changes in market shares. On the other hand, concentrated industries may export a proportion of their output to stabilise market shares in the domestic market. Caves and Porter (1978) referred to this as a 'dumping oligopoly'. If the home market is assumed to be protected by trade policy or high transportation costs, exports would signal the opportunity for profitable price discrimination and an outlet for competitive behaviour that does not destabilise the domestic market (Caves et al 1980; 132). Caves and Porter argue that members of a dumping oligopoly have a substantial incentive to vent disturbances to the domestic market by varying their foreign sales. If so, the presence of export opportunities should permit the stabilisation of shares in the domestic market. This proposition suggests that there is an inverse relationship between exports and market share instability.

The other possible international influence on market share instability is the presence of multinational enterprises in the domestic market. However, the effect of MNCs on market share instability is ambiguous. On the one hand, MNCs might increase market share instability by increasing competition in the domestic market. Foreign firms are able to break down local oligopolies and widen the scope for competition by

increasing the number of firms in the industry. This is possible because foreign firms have greater access to resources on international capital markets, and intangible assets to overcome domestic entry barriers. This proposition suggests a positive relationship between MNCs and market share instability. On the other hand, MNCs might reduce rivalry and, thus, market share instability in the long run. It is possible that when a MNC enters an industry there is a temporary competitive phase as the MNC competes for market share. However, once the MNC has won sufficient market share and established itself as a leading firm, rivalrous behaviour may decline and the oligopoly stabilises (eg market shares become stable over time). Furthermore, MNCs may introduce restrictive business practices (tie-in sales, exclusive dealerships and territories) that limit rivalry among firms.⁸ The dominant MNC may also see tangible benefits in colluding with local firms and other MNCs in the same industry (Lall 1978, Newfarmer, 1980). These propositions suggest a negative relationship between MNCs and market share instability.

Government intervention

We include here our three policy variables, trade protection (RERP), constraints on domestic competition (REG), and state ownership of industry (SOE).

(a) Changes in trade policy (ERP)

Our sample period of 1985 to 1993 covers the major trade policy reforms. It is often argued in the literature that trade reforms reduce the interdependent behaviour among firms and generate greater competitive pressures that trigger market rivalry.⁹ This should be reflected in greater market share instability. To capture the dynamic effect of changes in trade protection on market share instability, we use changes in the levels of real effective rates of protection (Δ RERPs) between 1985 and 1993. However, a small number of industries have been given increases in RERPs over this period (Chapter 2). It is equally plausible that an increase in protection may stimulate market share changes, as increased protection may attract new entrants. Therefore, we use the absolute value of changes in RERPs. If changes in RERPs trigger greater market share

⁸ See Long (1981) for a survey of MNCs' restrictive business practices in developing economies.

⁹ Since the late 1980s many Indonesian firms expected reductions in protection to continue. Thus, it is also possible that expected changes in protection may trigger greater competition among domestic firms as they prepare for more import competition.

instability, then we would expect a positive relation between the absolute value of Δ ERPs and market share instability.

(b) Constraints on domestic competition (REG)

In Chapter 2 we noted that constraints on domestic competition in Indonesia take many forms, including entry and exit controls, exclusive dealing, and price controls. In our sample we have six industries that have been intensely regulated over the period 1985 to 1993. These industries are: sugar processing (ISIC 31181), alcoholic beverages (ISIC 31310/30), cooking-oil (ISIC 31150), fertiliser (ISIC 35120), cement (ISIC 36310), and basic iron and steel (ISIC 37100). It is hypothesised that restrictions (REG) in these industries inhibit competition and rivalry among firms, and this will be reflected in a negative relationship between regulation and changes in leading firms' market shares. We capture the effect of regulation in these industries by introducing a dummy variable equal to one if the industry is one of those listed above, otherwise it is zero.

(c) State owned enterprises (SOEs)

The final form of government intervention is through state-ownership of industry. In Indonesia, industries that are dominated by state owned enterprises (SOEs) are often insulated from domestic and foreign competition. Further, a large state enterprise sector crowds out private sector investment in the industry and deters private sector investment to the extent that private investors fear that the government will bias commercial conditions to the benefits of their own companies. Thus, we expect a negative relation between SOEs' dominance of an industry and market share instability.

8.7 Equation Specification

The functional relationship suggested by the discussion above is Equation (1)

$$AII_{8593} = f(CR4_{85}^+, CR4_{85}^2, EOS_{85}^?, GRO_{8593}^+, VGRO_{885}^?, MNC_{85}^-, SOE_{85}^-, AKC_{85}^?, PD_{85}^?, EX_{85}^+, \Delta ERP_{8793}^+, REG_{8593}^-)$$

Where AII is the average absolute instability index between 1985 and 1993.

CR4 is the four-firm concentration ratio in 1985.

EOS is economies of scale in 1985.

GRO is growth in industry output between 1985 and 1993.

VGRO is the instability in industry growth rates between 1978 and 1985.

MNC is the share of industry output produced by multinational enterprises, averaged over the period 1985 to 1993.

SOE is the share of industry output produced by state-owned enterprises, averaged over the period 1985 to 1993.

AKC is absolute capital requirements in 1985.

PD is product differentiation measured by the advertising-sales ratio of U.S.A. counterpart industries.

IM is import penetration ratio, averaged over 1985 to 1993.

EX is export intensity ratio, averaged over 1985 to 1993.

ΔERP_{95-87} is the absolute value of the change in ERPs between 1987 and 1993.

REG is the regulation dummy variable.

With the exception of demand instability (VGRO) variable, all the independent variables are defined in Chapter 5. The demand instability variable is defined as the variance of the annual growth rates in industry output over the period 1978 to 1985. We use the period 1978 to 1985 to calculate VGro to avoid colinearity with our demand growth variable, which is calculated over the period 1985 to 1993. Because there has been considerable variation in the export intensity and import penetration ratios over the period 1985 to 1993, we use the averages of these ratios over the

period 1985 to 1993 instead of the 1985 ratios. Similarly, since there has been some variation in MNCs' and SOEs' share of industry output over this period, we also use the averages of these ratios over the period 1985 to 1993, instead of the 1985 ratios.

Equation (1) constitutes the maintained hypothesis of our specification search. This general model is tested down (using OLS) by dropping statistically insignificant variables. The testing procedure continues until a parsimonious representation is obtained which retains the *a priori* theoretical model. To be acceptable, the final equation must satisfy various diagnostic tests relating to the OLS estimation procedure.

The model was estimated for the same cross-section of 67 industries used to estimate the SCP model in Chapter 7. Market share changes are measured between 1985 and 1993. The nine year period (1985-93) should be long enough to minimise short term fluctuations in market shares, and also long enough for firms to enter and expand capacity in most industries

8.8 Estimation results

Table 8.4 reports the OLS estimates of the determinants of the market share instability index (AII).¹⁰ The elasticities of the statistically significant explanatory variables are reported in Table 8.5. Regression (b) in Table 8.4 is our preferred specification of the model. Equation (b) passes the F-test for overall significance at the 1% level. Statistically, equation (b) performed very well, exhibiting no problems of functional form misspecification (RESET), and heteroskedasticity (HSC). Based on the Ramsey RESET test, the preferred functional form of the model is a semi-log linear specification; i.e., where only the dependent variable is used in log form. We also use the logs of two explanatory variables, economies of scale (EOS) and capital costs (AKC). This improves the equation in terms of the Ramsey RESET test. Two

¹⁰ The model was re-estimated using the relative change in leading firms' market shares (RII) as the dependent variable. The two dependent variables yield about the same statistical conclusions. However, in any given specification the explained proportion of the variance of the absolute measure is twice as high as that of the relative measure, and most independent variables are more significant for the absolute measure. Therefore, the results we present in this chapter are the better of our two sets.

variables (product differentiation and variability in growth rates) were dropped from the equation because their t-ratios were statistically insignificant. The results of the non-tested test also suggest that these variables should be deleted from the model.¹¹

Equation (a) presents the model without the inclusion of the quadratic term in CR4. This allows us to make a comparison with the other studies reported in Table 8.1. The positive and significant coefficient of CR4 is consistent with the studies referred to in section 8.4. However, the equation does not pass the Ramsey RESET test at a 10 per cent level, suggesting that this functional form is not the correct one. Equation (b) extends the model to include the quadratic term in CR4. The equation does pass the Ramsey RESET test at a 5 per cent level, confirming that this equation is the correct functional form. The coefficient of the linear term in CR4 remains positive and the coefficient of the squared term in CR4 is negative, and both estimates are significant at the 1% level. The highly significant coefficients of CR4 and the quadratic term in CR4 provides strong support for the hypothesis that the relationship between changes in leading firms' market shares and concentration is quadratic: as seller concentration rises from moderate to high levels, market share instability declines. It also declines as concentration falls from moderate to low levels, so that firms' behaviour approaches that under pure competition and there are no mutual arrangements to be violated. The quadratic function in concentration has a maximum at $CR4 = 0.885$ ¹²; market share instability increases with concentration to reach a maximum at $CR4=0.885$ and declines thereafter. The negative relation between market share instability and concentration beyond $CR4=0.885$ is consistent with the conclusion of the other studies that market shares tend to be more stable in highly concentrated industries.

¹¹ In the earlier stages of the experimental econometric work, we included the regional market segmentation (RM) variable to control for possible statistical bias in our measure of AII. Like the CR4 ratio, the market share instability index is calculated at the national level, and is not adjusted for regional market fragmentation. Thus, there is a possible statistical bias in the calculation of the index for industries with regional sub-markets. However, the RM variable was statistically insignificant in the regression and was dropped from the model. Refer back to Chapter 3 for a discussion on this issue.

¹² The maximum of the quadratic function is found by setting the first derivative of the market share function with respect to CR4 equal to zero and solving for CR4:

$$\frac{\partial \log(AII)}{\partial CR4} = 4.71 - 5.32CR4 = 0. \text{ Thus, } CR4 = \frac{4.71}{5.32} = 0.885$$

Table 8.4

Determinants of Market Share Instability

Dependent Variable: Average Change in leading Firms' Market Shares		
Independent Variables	Equation (a)	Equation (b)
CR4 ₈₅	1.959 (7.38) ^a	4.712 (5.50) ^a
CR4 ² ₈₅		-2.66 (3.30) ^a
LnEOS ₈₅	0.104 (2.22) ^b	0.061 (1.36) ^c
LnAKC ₈₅	-0.164 (2.10) ^b	-0.066 (1.43) ^c
GRO ₈₅₋₉₃	0.005 (1.64) ^c	0.004 (1.58) ^c
MNC	-0.323 (1.27)	-0.223 (0.95)
SOE	0.366 (0.86)	0.472 (1.21)
EX	0.594 (2.10) ^b	0.485 (1.89) ^b
IM	-0.018 (0.30)	-0.045 (0.85)
Δ RERP ₉₃₋₈₇	-0.0003 (0.90)	-0.0003 (0.98)
REG	-0.922 (2.70) ^a	-0.915 (2.89) ^b
Constant	-3.88 (6.30) ^a	-4.312 (7.40) ^a
R ²	0.55	0.62
F-Stat	8.97 ^a	10.68 ^a
Het(a)	2.88	0.07
RESET(b)	9.25	4.07

Notes: Dependent variable is Ln(All)

T-ratios are given in parentheses.

Significance levels are a=1%, b=5%, c=10%.

(a) Heteroskedasticity test. Chi-square test under OLS (critical value at 5% is 3.84)

(b) Ramsey's regression specification test. F-test under OLS (critical value at 5% is 4.00)

Table 8.5

**Elasticity of Market Share Instability With Respect
To Independent Variables**

Independent Variable	Elasticities evaluated at sample mean values (derived from regression (b))
CR4 ¹³	1.05
LogEOS	0.061
LogAKC	-0.066
Gro	0.046
ES	0.090

Only elasticities of the statistically significant explanatory variables are reported.

The concentration elasticity is reported in Table 8.5. The elasticity value of 1.05 tells us that, calculated at the sample mean values of CR4 (0.539) and AII, a 10% increase in concentration causes changes in leading firms' market shares to increase by 10.5%. The mean value of CR4 (0.539) is below the maximum of the quadratic function in concentration (CR4=0.885), so that any percentage increase in concentration below CR4=0.885 will always lead to a percentage increase in market share turnover. To the right of the maximum, a percentage increase in concentration will always lead to a percentage reduction in market share turnover. For example, at CR4=0.90 the elasticity is -0.082 so that a 10% increase in concentration will cause market share turnover to decline by 0.82%.

The coefficients of the conventional industrial organization variables (industry growth, economies of scale and capital costs) have the expected signs, and all are statistically significant. The coefficient of the growth in demand (GRO) variable is positive, suggesting that rapid growth attracts entrants and, thus, destabilises market shares. The elasticity value of 0.046 tells us that, evaluated at the sample mean values of Gro and AII, a 10% increase in industry growth causes a 0.46% rise in market share instability. The coefficient of the economies of scale (EOS) variable is statistically significant at the 10% level. This result suggests that, where economies of scale are large, firms wishing to increase capacity to respond to demand growth must add it in discrete lumps that destabilise market shares, raising a seller's share as new capacity comes on stream and lowering those of its rivals. The elasticity value of 0.061 tells us

¹³ The elasticity of AII with respect to CR4 is calculated as follows:

$$\frac{dAII}{dCR} \cdot \frac{CR}{AII} = (4.71 - 5.3 \cdot CR) \cdot (CR) = 1.05, \text{ where } CR = 0.539$$

that a 10% increase in economies of scale causes a rise of 0.61% in market share instability. The coefficient of the capital cost (AKC) variable is negative, suggesting that the large capital costs of establishing a plant of MES scale constitute a barrier to entry and mobility and, thus, protect leading firms' market shares.

Only one of the three variables representing government intervention has the expected sign and is statistically significant. The regulation dummy variable (REG) has the expected negative sign and is significant at the 1% level, suggesting that government constraints on domestic competition in the six industries (sugar processing, malt beer, cooking oil, fertiliser, cement, basic steel and iron industries) have reduced market rivalry. This result also establishes a direct link between industry deregulation and market rivalry. The removal of constraints on market behaviour should lead to greater market rivalry and competition in these industries (and possibly in other industries outside our sample). The sign of the state ownership variable is unexpectedly positive, but is statistically insignificant. The hypothesised negative effect of state-ownership is probably captured by the regulation variable, since four of the five regulated industries have significant state enterprise participation. The absolute value of the change in the real effective rate of protection variable has an unexpected negative sign but is not statistically significant. This finding suggests that trade liberalisation has not significantly disturbed market shares. This result is consistent with our earlier empirical findings for concentration in Chapters 4 and 7.¹⁴ The coefficient of import penetration is negative but is not statistically significant. This result is also consistent with our finding for changes in real effective rates of protection (Δ RERPs).

However, clearer inferences can be made about the impact of trade liberalisation on market share turnover in export-oriented industries. The positive and significant coefficient of export intensity (EX) variable provides support for the proposition that the expansion in export opportunities over this period has destabilised market shares in export-oriented industries. In Chapter 4 we also observed a continuous reduction in concentration of export-oriented industries between 1985 and 1993, and this declining

¹⁴ In alternative specifications of the model we dropped the ERP and import variables. When we dropped the import variable from the model, the ERP variable did not improve significantly. Similarly, when we dropped the ERP variable from the equation the import variable did not improve significantly.

trend is also reflected in leading firm market share instability. The positive relationship also supports the proposition outlined in section 8.6 that high export intensity indicates greater exposure to international competition, and thus greater market rivalry than recorded by the industry's domestic concentration ratio. The elasticity value of 0.089 tells us that a 10% increase in export intensity causes market share instability to rise by 0.89%. Finally, the coefficient of the multinational (MNC) variable is negative, but is statistically insignificant. Thus, there is no evidence in our sample of 67 industries that foreign enterprises affect market share instability over and above the other variables considered in the analysis.

8.9 Summary of Major Findings

Industrial organisation theory tells us that, in the absence of regulatory constraints on competition, changes in the relative positions or market shares of the leading firms would indicate healthy competitive conditions prevailing in that industry. Market turbulence (i.e. changes in market shares) provide some information on the competitive process, and turnover-based measures of competition reflect the dynamics of the competitive process more accurately than static measures of competition (i.e., CR4 ratio). The results of this chapter provide several insights into the dynamic competitive process and the influence of government intervention on market rivalry in Indonesian manufacturing. The major findings of the Chapter are twofold:

First, several persistently concentrated industries had considerable turbulence in firm turnover and market share instability, suggesting that intense rivalry among firms exist in these industries. These industries include cigarettes, motor bikes, structural clay products, carpets and rugs, and vegetable and fruit processing.

Second, consistent with the studies referred to in Table 8.1, we find that leading firms' market shares are more stable in highly concentrated industries, when allowance is made for other relevant influences. However, our study differs from other studies in that we have approximated the concentration-market share stability relationship using a quadratic function, which is more consistent with economic

theory as outlined earlier in the Chapter. Also consistent with the studies for other countries, we find that rapid growth in demand destabilises leading firms' market shares, while product differentiation has no significant effect on market share instability. In addition to these results, we find that large capital costs of establishing a MES plant size constitute a barrier to entry and mobility, thereby insulating leading firms' market shares from new entrants and smaller firms. Finally, we do not find any evidence that MNCs affect market rivalry over and beyond the other variables considered in the analysis.

Third, we find a significant direct link between industry deregulation and competition: the removal of these restrictions may trigger greater market rivalry between firms in these industries. Finally, trade liberalisation does not appear to have disturbed market shares except in export-oriented industries. There is a significant positive relationship between export intensity and market share instability.

Case Studies

Chapter 9: Structural Change and Competition in
Cigarette Industry

Chapter 10: Advertising Competition in the Cigarette
Industry

Chapter 11: Regulation and Competition in Cement
Industry

Chapter 9

Structural Change and Competition in the Cigarette Industry

9.1 Introduction

This Chapter provides an overview of the development of the Indonesian cigarette industry over the last three decades. The descriptive analysis enables one to gauge the linkages between competition, government policy and industrial structure over time, and provides a backdrop for the statistical analysis into the effects of advertising competition on firms' market shares in the next Chapter.

The descriptive analysis shows that there has been a considerable growth and structural change in the cigarette industry over the last 30 years. Per capita consumption of cigarettes has grown at an average rate of 4.3 per cent per annum. The dualistic structure of the industry - a small number of modern MNCs existing side by side with hundreds of labour-intensive, small-scale domestic firms - observed by Castles (1967) in the 1950s and 1960s had greatly diminished by the late 1980s. By the early 1980s, several domestic firms had replaced the dominant position of MNCs in the cigarette industry. The level of seller concentration had increased continuously throughout the 1970s and 1980s. The four-firm concentration ratio increased from 43 per cent in 1976 to 75 per cent by 1994. Coinciding with the increase in concentration has been the decline in the number of producers, from around 900 firms in the early 1960s to just over 160 firms in 1994. However, the high levels of concentration in the 1980s and 1990s hide considerable turbulence in leading firms' market shares and rank. Rankings among the top ten firms continuously changed during the last three decades, suggesting intense competitive pressures are operating in the cigarette industry. This rapid change in the structure of the industry is due to a combination of factors, such as the mechanisation of production by domestic firms since the late 1970s, rising consumer incomes and changing consumer tastes from 'western'

cigarettes to locally produced, clove flavoured cigarettes (known as kretek in Indonesia), and intense competition among firms. Government intervention through investment, excise tax, and minimum retail price regulations has at different times affected the fortunes of firms, the structure of the industry and the nature of competition.

This Chapter is divided into three main parts. The first part deals with the growth and development of the cigarette industry, changing industrial structure and changes in leading firms' fortunes over the last three decades. The second part discusses the role of government policy in protecting the small-scale cigarette sector by trying to constrain competition from the larger firms. The final part provides a description of the different forms of competition (especially advertising) among the large firms and the competitive fringe where price competition more often prevails.

9.2 Kretek and White Cigarettes

Cigarettes are produced in Indonesia in what, from the perspective of the technology, is often considered as two separate industries: clove cigarettes (sigaret kretek) and 'western' white cigarettes (sigaret putih).¹ 'White' cigarettes are made purely from tobacco by cigarette-making machines. Kretek are either hand-rolled (referred to as sigaret kretek tangan-SKT) or machine-made (referred to as sigaret kretek mesin-SKM), and contain tobacco, cloves and a secret mixture of spices. Each firm has its own secret blend of cloves and 'sauce', and the recipe is usually known only by the owner or a close relative(s). The hand-rolled kretek may also be rolled in 'corn paper' - a dried and ironed sheath of the maize plant - and is known as klobot. Mechanisation in the kretek industry was introduced only on a large scale in the late 1970s, and by 1994 about 70 per cent of total kretek production was from cigarette-making machines.

The basic technology in making and packing hand-rolled kretek has remained almost unchanged in the last 60 years. The process of manufacture is simple and may be described briefly as follows. The tobacco is shredded and blended; the cloves are

¹ The Central Bureau of Statistics, for example, classifies kretek and white cigarettes as two separate industries in its industrial classification (industries ISIC 31420 and 31430 respectively).

soaked in water, chopped in tiny pieces, and then blended in a proportion which averages about 70 per cent tobacco and 30 per cent cloves. The mixture is then sprayed with 'sauce' consisting of flavour essences, and apportioned among the main body of workers, called rollers (or *penggiling*). The rollers are usually women. The rollers sit on the factory floor with a simple wooden rolling machine. Although much bigger, it uses the same principle as the small "roll-your-own" cigarette-rollers once popular in European and North American countries. Once the cigarette is rolled using the wooden instrument, the cutter (known as *tukang mbatil*) trims the shreds of tobacco projecting from the ends of the cigarette. The cutter is also a woman, usually a friend or relative of the roller. Each roller has one *tukang mbatil*. The cigarettes are then dried and assembled into packs of six, 12 or 16 sticks by women packers.

Despite the contrast in the products (i.e., machine-made kretek, hand-rolled kretek and machine-made white cigarettes), they do compete with each other. They sell closely substitutable products in the same markets, usually in the same cigarette stalls, and there is a wide range in the quality and price of the three types of cigarette.

9.3 The Development of the Cigarette Industry

Kretek is one of the oldest industries in Indonesia. The industry began to develop at the end of the last century. It flourished in the early part of the 20th century in heavily populated regions of Central and East Java, especially in Kudus in northern Central Java and along the Brantas valley in south and central East Java. According to Castles (1967: 26-8), the availability of cheap supplies of labour, proximity to major tobacco growing areas in Central and East Java and a relatively developed 'smoking habit' were probably the major factors which influenced the growth of the industry in these regions of Java.

The industry began as a cottage industry. This was followed by the *abon* (or putting-out) system, which developed on a large scale prior to the emergence of the factory sector as the dominant mode of production in the 1920s and 1930s. Under the *abon* system, the entrepreneur obtained the tobacco and cloves and mixed them, but the task of rolling was let out to workers called *abons* who called at the entrepreneur's

establishment to collect the mixture of tobacco and cloves and returned with the hand-rolled cigarettes a week later. Each *abon* had his own workers (called *kornets*) in his home or village. The large entrepreneurs had hundreds of *abons* (Castles, 1967: 34). By 1929 the industry employed 65,000 workers and was one of the largest employers of labour in manufacturing in Indonesia (Castles, 1967: 36). During the ten years before the Japanese occupation this *abon* system was replaced by the factory system. The production process, however, remained labour-intensive and all kretek was hand-rolled using the simple wooden tool described above.

From the mid-1920s kretek producers faced strong competition from machine-made 'white' cigarettes. In 1925, British American Tobacco (BAT) acquired the Egyptian Tobacco Company which was established by two Dutchmen in 1924. Until then, all white cigarettes were imported, to the extent of about 4 billion sticks annually (Castles, 1967: 35). Three years later BAT built a second factory in Surabaya and by 1931 production of white cigarettes had reached 6 billion sticks, compared with 1.1 billion imported sticks. The consumption of white cigarettes had thus reached 7 billion, almost exactly comparable to kretek. Though domestic production had almost replaced imports, the white cigarette industry was wholly foreign owned.

The success of the new foreign-owned factories threatened the existence of the kretek industry. The survival of the kretek industry during this period was partly the result of protection provided by the colonial government in the form of a differential excise on cigarettes, a minimum retail price for white cigarettes, and limitations on increased investment in machine-made cigarettes. In 1936, the government imposed an excise of 30 per cent on white cigarettes and 20 per cent on kretek (Harahap, 1952: 210; Castles, 1967: 36). The purpose of these measures was to prevent competition within the white cigarette industry from leading to a dominant position by BAT, and to conserve a share of the market for hand-made kretek. As we will show later, this fear of 'excessive' competition and the desire to protect small firms' market shares continued throughout the post independence period.

Table 9.1 **Cigarette Production, 1921-94**
(billion sticks)

Year	Kretek	White Cigarettes
1921	1.1	na
1929	7.1	6.0
1939	15.1	na
1949	16.1	na
1957	18.3	na
1963	20.7	na
1969	14.3	11.0
1974	21.1	21.7
1980	49.2	33.4
1985	82.4	24.3
1990	138.3	15.6
1991	128.6	18.7
1994	156.0	21.2

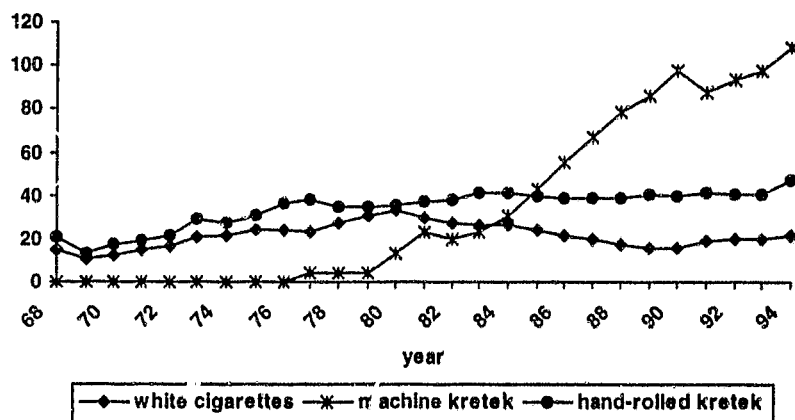
Source: For Kretek and white cigarettes: Castles (1967) for the period 1921 to 1957; Indonesian cigarette producers association (GAPPRI) for 1957 to 1994.

na= data not available.

Table 9.1 shows the production levels of kretek from 1921 to 1994. Figure 9.1 provides a visual interpretation of the growth in kretek and white cigarettes production since 1969. Kretek production grew from 1.1 billion sticks in 1921 to 7.1 billion in 1929, and then doubled to reach 15 billion in 1939. Production stagnated as a result of the Japanese occupation and the disruption to the Indonesian economy caused by Holland's attempted re-occupation of Indonesia from 1945 to 1949. Production recovered after 1950 and by 1960 had reached 20 billion. In the 1960s production of kretek stagnated and fell to 14 billion in 1969, the lowest recorded level of production since independence. Quite dramatic increases in the price of cloves over the period 1968 to 1969 appear to have adversely affected production levels.² The fortunes of the white cigarette producers were even more desperate in the early 1960s. All the foreign-owned white cigarette factories were nationalised between 1958 and 1964 by the Soekarno government, thus putting the major cigarette producers at the time under state ownership and control. Subsequent poor management of the companies led to a decline in sales. The companies were later returned to their original foreign owners after 1966.

² The price of cloves rose sixfold in 1968-9 (from Rp 250 to Rp 1,500 per kilogram) and by another 300 per cent between 1973 to 1975 (Manning, 1979: 202).

Figure 9.1 **Trends in Cigarette Production**
(billion sticks)



Annual Growth Rate: (%)	Hand-Rolled Kretek	Machine-Made Kretek	White Cigarettes
1968-79	9.7	-----	9.5
1980-90	0.9	24.4	-7.2
1990-91	4.5	-11.3	18.2
1991-94	4.4	6.9	3.9

Source: GAPPRJ

Under the New Order production of kretek has grown at a faster rate than ever seen since independence, and much faster than white cigarettes. By 1975 production had already topped 30 billion and by 1980 it exceeded 50 billion, compared with white cigarette production which had reached only 33 billion sticks in 1980. According to Manning (1979: 198) part of the success of the kretek industry during the 1970s was due to continued protection. The policy of differential excise taxes and minimum retail prices for white cigarettes had been retained throughout the period of independence (see section 9.7).³ In addition, machine-made cigarette production had been limited by application of strict licensing. Several appeals by white cigarette (and also kretek) factories to use new machinery had been turned down. Castles (1967: 107) reports two cases - one involving a kretek company and one involving BAT - in which applications for use of cigarette-making machinery were rejected in the 1960s. Manning (1979: 199) noted that in the mid-1970s BAT again failed in an attempt to introduce new machinery.

³ Between 1967 and 1979 the excise had been set at 35 per cent for kretek and 50 per cent for white cigarettes.

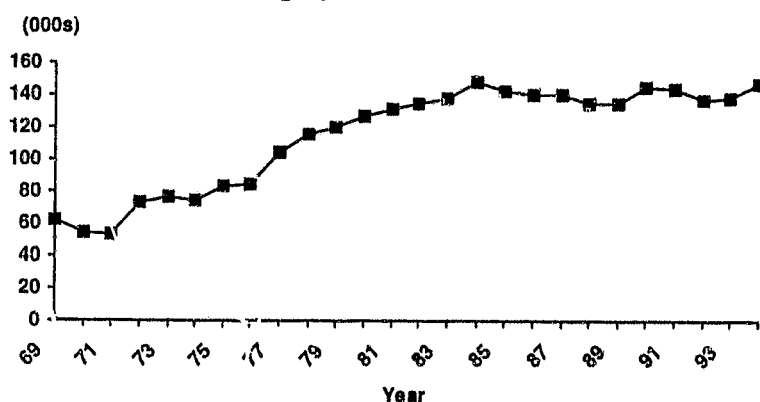
introduce new machinery.

Over the next 14 years kretek production more than tripled to top 156 billion sticks by 1994. Conversely, white cigarettes declined from 33 billion in 1980 to 15.6 billion in 1990, but recovered to around 21 billion in 1994 (or 12 per cent of total cigarette production). Part of the success of the kretek industry in the 1980s must be attributed to the introduction of mechanisation on a large scale from the late 1970s. Bentoel, one of the leading kretek firms in the 1970s, was the first to obtain permission from the Department of Industry to mechanise part of its production in 1972. This was followed by Djarum in 1976 and Gudang Garam in 1978. Initially, these two firms were allowed to mechanise only around 10 per cent of their production in 1978 (Manning, 1979: 199). Gudang Garam, for example, was only permitted to use eight of its 28 new filter machines (Tempo, 21 April, 1979: 51). In 1979 these restrictions were replaced with a required production ratio between machine and hand-made kretek of 1:2. That is, machine-made kretek was not to exceed 50 per cent of the firms' production of hand-rolled kretek. The purpose of these restrictions was to protect smaller firms' market shares and existing employment levels. As a consequence of the change, however, growth of machine-made kretek has grown rapidly since 1980. Figure 9.1 clearly show that the growth in kretek production in the 1980s was wholly attributed to machine-made kretek. Non-compliance with the production ratio was widespread, and in 1983 the Department of Industry revised the ratio to 2:3. Tarmidi (1996:101) notes that the 2:3 ratio has not been complied with, and the government has been reluctant to enforce the regulation.

In addition, rising disposable incomes, improved quality and image of the kretek brands and greater advertising and promotional activities have enabled the larger kretek firms to expand their markets at phenomenal rates. Production levels of hand-rolled kretek have stagnated since 1983 but have not declined, indicating a stable demand for hand-rolled kretek. This stable demand is partly the result of differential excise taxes between hand-rolled kretek and machine-made kretek (see section 9.7). Corresponding to the stability in production of hand-rolled kretek, employment levels have also remained stable at around 140,000 employees throughout the 1980s (Figure 9.2). The expansion in total kretek production and stable employment numbers

together imply sharply rising labour productivity in the 1980s.

Figure 9.2 **Employment in the Kretek Sector**



Source: GAPPRI

The decline in the demand for white cigarettes during the 1980s is more difficult to explain. Government policy is partly an explanation of the decline, but not the major reason. Restrictions on mechanisation certainly constrained growth in the 1970s, but these were eased in the 1980s. Higher minimum retail prices for white cigarettes were retained during this period. A differential excise tax rate existed between machine-made kretek and white cigarettes, but it was not large (about 5 per cent in 1979) and had narrowed considerably during the 1980s. The best explanation appears to be the reformulation of the image of kretek in the 1980s. The introduction of the filter kretek in the early 1980s, improved packaging, and intensive advertising and promotional activities induced a shift in consumer tastes from white cigarettes and hand-rolled kretek to machine-made kretek (Permana, 1989: 172). Culture and local tastes may also help to explain why many consumers switched from white cigarettes to kretek.

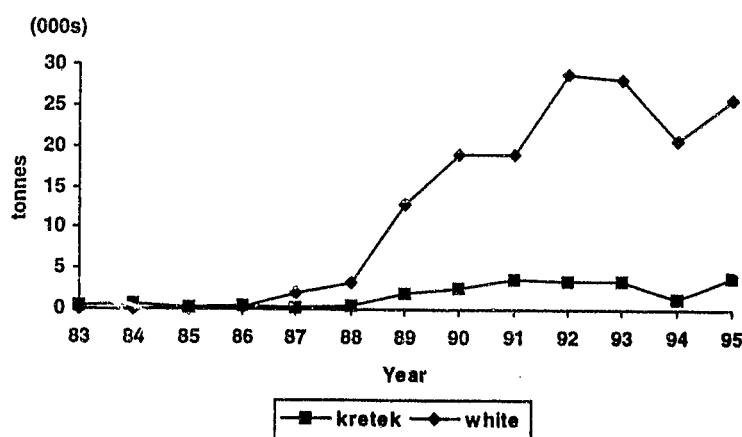
Production of machine-made kretek declined by 11.3 per cent in 1991. This large slump in sales was due to two policy changes in that year. First, to raise more revenue the government increased excise taxes for large kretek firms. Second, to protect small firms' market shares from competition from larger firms the government introduced differential minimum retail prices between small and large firms. The differential minimum retail prices were based on a firm's production volume. In other words, the

larger the firm's production volume, the higher its legislated minimum retail price per cigarette stick. The effect of this policy was to increase large firms' relative retail prices and, thus, reduce demand for their brands. These policy changes had a positive impact on sales of hand-rolled kretek and white cigarettes, production of which increased by 4.5 percent and 18.2 percent respectively in 1991.

Exports of cigarettes, in particular white cigarettes, have grown substantially over the last decade (Figure 9.3). White cigarette exports increased from a negligible 3 tonnes in 1983 to top 283,000 tonnes in 1993 or an average growth rate of 68.7 per cent per annum. Exports of white cigarettes grew partly in response to declining domestic demand for the product in the 1980s, but also because the MNCs (e.g., BAT) are well placed to penetrate export markets as they have specialised knowledge of and access to export markets through their subsidiaries located around the world. Kretek cigarettes have also grown rapidly in the last decade, from 346 tonnes in 1983 to reach 3,848 tonnes by 1995, or an average growth rate of 23.6 per cent per annum. A substantial proportion of these exports go to Malaysia where there is a sizeable Indonesian expatriate community, although in recent years they have also been exported to Indochina, South America and North America. The three largest producers - Gudang Garam, Djarum and Sampoerna - account for most of these kretek exports.

Figure 9.3

Cigarette Exports, 1983-95

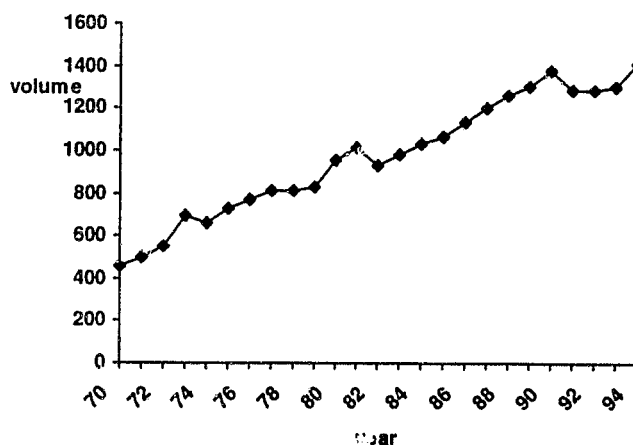


Source, Export Statistics, BPS

9.4 Demand For Cigarettes

Figure 9.4 depicts per capita consumption of cigarettes (both kretek and white cigarettes) during 1970 - 1994. Per capita consumption is measured as the annual consumption of cigarettes per person over 15 years old. It is apparent that cigarette consumption per person has increased substantially over the last 25 years. The annual average growth of consumption for the period is 4.3 per cent. The sharp drop in consumption in the early part of the 1990s was due to the substantial increase in excise taxes and the introduction of minimum retail prices in 1991.

Figure 9.4 Per Capita Consumption of Cigarettes
(number of cigarettes)



Annual Growth Rate	%
1970-94	4.3
Sub-periods:	
1970-80	6.8
1980-90	3.8
1990-91	-6.6
1991-94	2.8

Source: GAPPRI

In this section we estimate the price and income elasticities of the demand for cigarettes in Indonesia. Many researchers have investigated the determinants of cigarette consumption for other countries. In general, these studies find that demand is both price and income inelastic. Further, some of these studies find that advertising

and various anti-smoking campaigns and government health warnings affect the demand for cigarettes.⁴ We follow these studies and specify the demand function for cigarettes as:

$$Q_t^D = f(\dot{P}_t, \dot{Y}_t, \dot{A}_t) \quad (1)$$

where Q_t^D is the quantity demanded of cigarettes in period t ($t=1 \dots N$), P is the price of cigarettes, Y is disposable income, A is advertising expenditures. P is expected to be inversely related to cigarette demand, and income and advertising to be positively related to demand. A dummy variable, $D1980$, which is equal to one for the years 1980 and 1981 and zero otherwise, is included to capture the positive impact of the introduction of mechanised filter kretek in 1980 and 1981 on cigarette demand. Price (P) is usually treated as an endogenous variable in a simultaneous demand-supply equation for the reason that price and quantity are simultaneously determined variables. However, the price for cigarettes in Indonesia is partly determined exogenously by the tax regulators (see section 9.7). Further, since 1991 the government has fixed minimum retail prices. Thus, P can be treated as an exogenous variable in the demand function. Health considerations are not yet strong in Indonesia, and are ignored in our model.

In estimating the demand function, it is necessary to allow for possible time lags involved in the hypothesised relationships between demand, price and income. For this, we make use of the error correction method (ECM), which is considered a highly appropriate dynamic specification when one works with relatively short time series. Under the ECM method, the long-run (steady state) relationship being investigated is embodied with a dynamic specification including lagged dependent and independent variables (Hendry, 1995). The ECM procedure has the added advantage of separating long-run relationships from the short-run impact in the estimated equation.⁵

The ECM redresses the spurious regression problem associated with modeling with time series data. If the time series is non-stationary in level form, then the regression

⁴ Baltagi and Levin, 1986; Boyd and Seldon, 1990; Tegene, 1991; Tansel, 1993; Valdes, 1993; and Hondroyannis and Papapetrou, 1997.

⁵ With the exception of Hondroyannis and Papapetrou (1997), all the other studies have not drawn upon recent advances in time-series analysis (i.e. the ECM) that allow us to investigate the short-run impacts and the long-run equilibrium relationships between economic variables.

is estimating a spurious relationship, and thus, tells us nothing about the behavioural relationships between the variables (Banerjee et al, 1993: 138-9). Guarding against the possibility of uncovering spurious relations is important when we work with variables (consumption and price) which seem to have a strong trend component (Athukorala, 1994, 1995). The ECM procedure minimises the possibility of estimating a spurious relation while retaining long run information when modeling with time series data (Hendry, 1995).

The estimation procedure starts with an over-parameterised autoregressive distributed lag (ADL) specification of an appropriate order:

$$Q_t^d = \alpha + \sum_{i=1}^m b_{1,i} Q_{t-i}^d + \sum_{i=0}^m b_{2,i} X_{t-i} + u_t \quad (2)$$

where α is a constant, Q_t^d is a $(n \times 1)$ vector of endogenous variables, X is a $(k \times 1)$ vector of exogenous variables, and b_1 and b_2 are $(n \times n)$ and $(n \times k)$ matrices of parameters.

Equation (2) is then reparameterised in terms of differences and lagged levels so as to separate the short-run and long-run multipliers of the system.

$$\Delta Q_t^d = \alpha + \sum_{i=1}^{m-1} b_{1,i}^* \Delta Q_{t-i}^d + \sum_{i=0}^{m-1} b_{2,i}^* \Delta X_{t-i} + c_1 Q_t^d + c_2 X_{t-m} + u_t \quad (3)$$

$$\text{where } c_1 = -(I - \sum_{i=1}^m b_{1,i}), \quad c_2 = (\sum_{i=0}^m b_{2,i})$$

and where the long-run multipliers of the system are given by $\frac{c_2}{c_1}$.

Equation (3) constitutes the maintained hypothesis of our specification search. This general model is tested down (using OLS), by dropping statistically insignificant lag terms, and imposing data-acceptable restrictions on the regression parameters. The testing procedure continues until a parsimonious error correction representation is obtained which retains the *a priori* theoretical model as its long run solution. To be acceptable, the final equation must satisfy various diagnostic tests relating to the OLS error process.

The sample period is 1970 to 1994. The price of cigarettes is measured by the relative cigarette price index (ratio of the cigarette price index to the consumer price index: the base year is 1983). The cigarette price index includes both kretek and white cigarette prices.⁶ The source is the various issues of BPS Indikator Ekonomi (Economic Indicators). Income is measured by the per capita real disposable income (World Bank, World Tables, 1970-94). We do not have advertising data for the period 1970 to 1991. However, television advertising was banned for a decade until 1989. Thus, we include a dummy variable (Dadv) to capture the effect of television advertising on demand since 1989 (dummy variable = one for the years 1989 to 1994, otherwise zero). All variables (except the two dummy variables) are used in log form so that the coefficients can be directly interpreted as constant elasticities.

The final parsimonious estimates of cigarette demand are reported in Table 9.2 together with the diagnostic statistics. The long-run income and price elasticities derived from the estimated coefficients of the lagged level variables are also reported in Table 9.2. The equation passes the F-test for overall significance at the one percent level. Statistically, the equation performed very well, exhibiting no problems of functional form misspecification (RESET), heteroskedasticity (HSC), or serial correlation (LM). The adjusted R square is 0.92, higher than most other studies on cigarette demand.

⁶ Data limitations prevent us from constructing separate price indices for kretek and white cigarettes and estimating the demand equation separately for kretek and white cigarettes.

Table 9.2 Determinants of Cigarette Consumption: Regression Results

$$\Delta Q^d = 2.249 - 0.599 \Delta P + 0.701 \Delta Y - 0.245 P_{t-1} + 0.471 Y_{t-1} - 0.570 Q^d_{t-1}$$

(2.7)* (8.2)* (2.6)* (2.0)** (6.8)* (6.7)*

$$+ 0.075 D1980 - 0.103 Dadv$$

(4.8)* (5.5)*

Long-run price elasticity^a = -0.43 (t-ratio = 2.5)*

Long-run income elasticity^a = 0.83 (t-ratio = 15.1)*

$R^2 = 0.92$ $F(7, 16) = 36.7$ $LM(1, 15) = 0.26$ $RESET(1, 15) = 0.10$

$JBN(2) = 0.63$ $HSC(1, 22) = 1.17$

* t-ratios of regression coefficients are given in brackets with the level of statistical significance (one-tailed test) denoted as * 1 per cent, ** 5 per cent

a: The long-run price and income elasticities are derived from the long-run (steady-state) solution to the model.

Test statistics

LM Lagrange multiplier for serial correlation; *RESET* Ramsey RESET test for functional form misspecification; *JBN* Jarques-Bera test for normality of residuals; *HSC* test for heteroskedasticity (based on squared residuals). Except *JBN*, which is based on the χ^2 distribution, all other tests are based on the F-distribution. The degrees of freedom for the respective tests are given in brackets.

As expected, cigarette price impacts negatively and real disposable income positively on cigarette demand. The long-run price and income elasticities are -0.43 and 0.83 respectively. Both estimated elasticities are less than one, suggesting that cigarette demand is price and income inelastic: A 10 per cent increase in the relative cigarette price will reduce cigarette demand by 4.3 per cent in the long-run. A 10 per cent increase in real disposable income will increase the demand for cigarettes by 8.3 per cent in the long-run. The short-run price elasticity of demand of -0.599 is higher than the long-run price elasticity of -0.43. This suggests that the demand effects of a change in price are greater in the short-run compared with the long-run. Conversely, the demand effects of a change in income are smaller in the short-run (short-run income elasticity of 0.701) compared with the long-run.

The dummy variable (*Dadv*) intended to capture the effect of television advertising since 1989 is negative and statistically significant at the 1 per cent level. This suggests that television advertising had no positive effect on demand. However, the dummy

variable is most likely capturing other policy changes that had a stronger negative effect on per capita cigarette consumption, such as the sharp increase in excise taxes and the establishment of minimum retail prices in 1991. As expected, the coefficient of the dummy variable D1980 is positive and statistically significant at the one per cent level. This indicates that the introduction of filter kretek caused a jump in the demand for cigarettes in the early 1980s.

Our results are consistent with studies for other countries. Hondroyiannis et al (1997), for example, found a long-run price elasticity of -0.66 per cent and an income elasticity of 0.54 for Greece.

9.5 Structural Change in the Cigarette Industry

The Indonesian cigarette market can be characterised as a product differentiated oligopoly with a competitive fringe. In 1994 the four-firm concentration ratio was 75 per cent (total kretek and white segments) and the number of firms was in excess of 155. In the two sub-markets of kretek and white cigarettes the CR4 ratios were 85 per cent and 93 per cent respectively. These ratios are comparable with those of other countries' cigarette markets (Chapter 4, Table 4.11). However, this oligopolistic market structure evolved only in the last 20 or so years due to a combination of factors, such as the mechanisation of production on a large scale from the late 1970s, changes in demand conditions, and intensive competition among firms.

Castles (1967: 20-22) described the Indonesian cigarette industry in the 1960s as having a 'dualistic' structure. A small number of large, foreign-owned white cigarette producers existed side by side with hundreds of small-scale domestic kretek producers.⁷ White cigarette producers used modern filter machines to produce cigarettes, while kretek producers used simple labour-intensive techniques to produce kretek. Even in the largest kretek firms, rolling of cigarettes continued to employ simple wooden rolling tools, trimming was done with scissors and packing and packaging by hand. From the colonial period three foreign-owned firms dominated the white cigarette industry: British American Tobacco (BAT), Belgian-owned

⁷ Castles (1967:21) reported that 941 kretek firms existed in 1961.

Faroka, and the Dutch-owned *Industria*. Castles (1967: 20-1) reported that these three accounted for over 65 per cent of white cigarette production in the 1950s, and probably an even higher share before the war. In the 1950s a number of domestic owned firms were established but these were mostly small scale and never produced a major share of total white cigarette output. In contrast to the white cigarette industry, ownership and control in the kretek industry was widely dispersed. Castles (*ibid*: 21) observed,

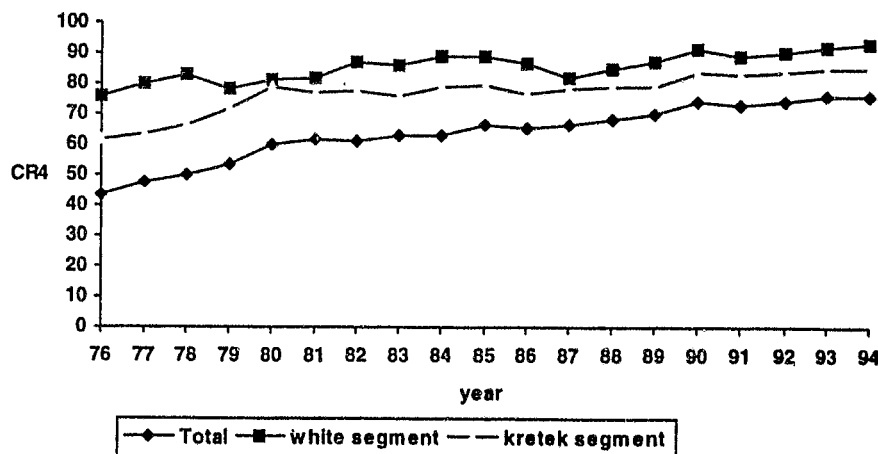
' though some of the more popular brands have been able to secure fairly stable market for themselves, conditions in the kretek industry [in 1961] approximate pure competition more closely than is usual for secondary industries, and the price tends to remain close to the cost of production.'

Since the late 1960s the kretek industry has become increasingly dominated by three firms: Bendoel in Malang, Djarum in Kudus and Gudang Garam in Kediri. These three firms' combined share of kretek production in 1970 was 36 per cent, rising to 56 per cent in 1976. The rising trend in concentration in the kretek industry during this period had little to do with changes in technology since the basic technology in making and packing cigarettes remained almost unchanged since the 1930s. Manning (1979, 202-5) suggested that productivity differences between firms, easier access to capital (for larger firms) and increased efforts in marketing and advertising contributed to the rising trend in concentration in the 1970s. In addition, the dramatic increase in clove prices over the period 1968 to 1974 appears to have adversely affected many small-scale producers, who were unable to obtain sufficient working capital to maintain their stocks of cloves, thus, resulting in their closure (Manning, 1979: 202).

Figure 9.5 shows the trends in the four-firm concentration ratio since 1976 in the cigarette industry and the two sub-sectors of kretek and white cigarettes. It is apparent that there has been a continuous increase in concentration in the total cigarette industry (both white and kretek) since 1976. The CR4 ratio increased from 43 per cent in 1976 to 75 per cent in 1990, and has remained stable since then. In the kretek

industry the bulk of the increase in concentration occurred before 1981. The CR4 increased from 61 per cent in 1976 to 80 per cent in 1980, and gradually increased over the next 14 years to reach 85 per cent in 1994. Concentration also rose in the white cigarette sector from 76 per cent in 1975 to around 93 per cent by 1994.

Figure 9.5 Trends in Seller Concentration
(four-firm concentration ratio)



Source: GAPPRI

Increasing seller concentration in the cigarette industry since the late 1970s can be attributed to rising scale economies resulting from the larger kretek firms mechanising production. Increased efforts in distribution and advertising by the major kretek firms, and the decline in the sales of the major white cigarette producers, also help to explain rising concentration in the 1980s. Corresponding to the rise in concentration is the decline in the number of firms over the period 1968 to 1994. Figure 9.6 (a) shows that the number of kretek firms declined from 653 in 1968 to 144 in 1994. Figure 9.5 (b) shows that the number of white cigarette producers declined from 22 firms in the 1976 to 11 in 1994.

Figure 9.6 (a) Number of Kretek Firms, 1968-94

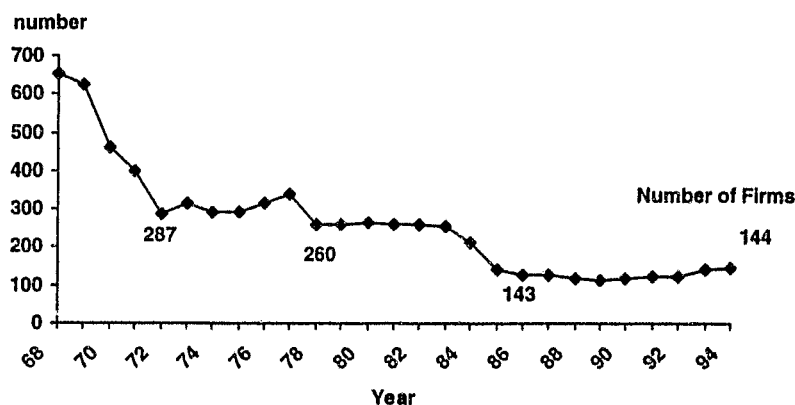
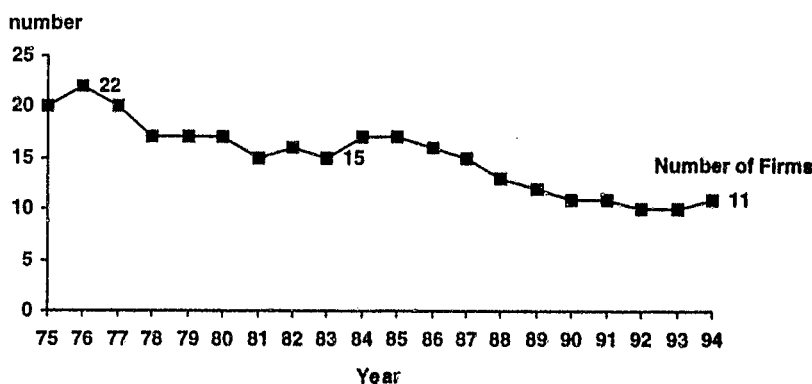


Figure 9.6 (b) Number of White Cigarette Firms, 1975-94



Source: GAPPRI.

9.6 Changes in Leading Firms' Market Shares

The rising concentration in the cigarette industry hides considerable instability in leading firms' market shares. In Chapter 8 we contended that, in the absence of constraints on competition (which we will discuss shortly), fluctuations in leading firms' market shares and rankings are good indicators of competitive rivalry in an industry. Turnover of leading firms' rankings provides some information on the vibrancy of the competitive process, and turnover-based measures of competition reflect the dynamics of the competitive process more accurately than static measures of competition such as seller concentration. Table 9.3 traces changes in leading firms' market shares since 1979.

Table 9.3 **Changes in Leading Firms' Market Shares**

Rank in 1979	1979	Market Share (%)		Change in Market Share (percentage point change)	
		1989	1994	1979-89	1979-94
1. BAT (W)	15	3	5	-12	-10
2. Djarum (K)	13	28	18	15	5
3. Gudang Garam (K)	12	28	43	16	31
4. STTC (W)	10	4	1	-6	-9
5. Bentoel (K)	8	11	7	3	-1
6. Noyorono (K)	4	3	2	-1	-2
7. Faroka (W)	4	1	1	-3	-3
13. Sampoerna (K)	1	3	7	2	6
Malboro (W) ^a	0	2	5	2	5

Source: GAPRI, and Survey Research Indonesia. K=kretek, W = white cigarettes

a. Malboro was introduced in 1983.

A significant amount of turbulence in market shares is observed over the period 1979 to 1994 in Table 9.3. Both Gudang Garam's and Djarum's market shares expanded rapidly over this period. Gudang Garam's share increased from 12 per cent in 1979 to 43 per cent in 1994, a change of 31 percentage points. Djarum's share expanded from 13 per cent in 1979 to 28 per cent in 1989, but declined to 18 per cent in 1994. The other leading kretek producer, Bentoel, experienced a long term decline in market share from around 8 per cent in 1975 to 6 per cent in 1994. Sampoerna achieved a significant increase in share since the late 1980s, and by 1994 had surpassed Bentoel as the third largest cigarette producer in Indonesia. The three largest white cigarette producers in 1979 also experienced long term declines in their market shares, consistent with the switch in demand from white cigarettes to kretek in the 1980s. BAT, for example, saw its market share decline from 15 per cent in 1979 to around 3 per cent in 1989, but recovered to just under 5 per cent in 1994. The Sumatra Tobacco Trading Company (STTC) experienced a similar fate to BAT, and its market share was just 1 per cent by 1994. Faroka saw its market share decline from around 4 per cent in 1979 to less than 1 per cent in 1987 when Rothmans of Pall Mall, Australia, acquired it.

Turbulence is also observed in the changes in the rank order of the leading four firms. Two of the top four firms (Gudang Garam and Djarum) in 1979 remained in the top four in 1994. Two firms (BAT and STTC) exited out of the top four firms after 1979,

and two firms (Bentoel and Sampoerna) entered the top four firms before 1994. This continuous change in market shares and rankings among firms suggests that intense competitive pressures were operating in the cigarette industry over the period 1979 to 1994.

There are several reasons why Gudang Garam and Djarum grew at a much faster rate than other producers during the 1980s. First, Gudang Garam and Djarum were two of the first three firms to mechanise production. They had a lead time of more than four to six years over their nearest kretek competitors and this 'first mover' advantage certainly contributed towards higher growth rates and consolidation of market shares by the end of the 1980s. Several medium-sized firms delayed mechanising production for reasons that appear to be related to management inertia, rather than government opposition to mechanisation. Management at Noyorono, for example, were not entirely convinced that machine-made kretek would significantly affect their sales of hand-rolled kretek. They adopted a 'wait and see' strategy before undertaking such a large capital investment. The success of Gudang Garam and Djarum, and the fact that two of its closest rivals, Sampoerna and Sukun, began to mechanise production in 1983, moved Noyorono to mechanise production in 1984 (firm interview).

A second factor was Gudang Garam and Djarum's success in expanding distribution networks across Indonesia and being the first to establish national brands for their products. Prior to the 1970s, the kretek industry was regionally fragmented, and regional brand loyalty was very strong (and still is for many brands). Bentoel, the leading kretek producer in the mid-1970s, sold its brands mainly to smokers around Malang in East Java and Central Java. Djarum's brands were popular in Central Java, while Gudang Garam's brands were popular in East Java. In the 1970s and early 1980s, Djarum and Gudang Garam invested heavily in establishing distribution networks across Indonesia. The two firms also spent heavily on advertising and promoting their brands in all provinces.⁸ By the mid-1980s their major brands could be purchased across the archipelago. Djarum's market share fell in 1991 and remains well below its 1989 level. We will show later that this downsizing is a deliberate strategy of Djarum so that it can fall into a lower excise rate and, thus, raise its profit

⁸ Interview with a Gudang Garam marketing official.

margin.

Sampoerna has emerged as one of the 'big shakers and movers' of the 1990s. This firm adopted an entirely different marketing strategy from the other leading firms. While Gudang Garam, Djarum and Bentoel targeted the lower profit margin, mass market (middle to lower income consumers), Sampoerna targeted the more 'profitable', but smaller niche markets. Sampoerna is the only firm to have established a 'premium' kretek brand (known as *Dji Sam Soe* or 234 in Chinese), and the first to have introduced a mild tar, low nicotine kretek brand called *A MILD*. Both these brands generate large profit margins for Sampoerna, and have also resulted in significant increases in market share in the last few years.⁹

British American Tobacco and the other MNCs' market shares declined in the 1980s for at least two reasons. First, as discussed earlier, there was a substantial shift in demand from white cigarettes to kretek since the early 1980s. A second reason is that entry restrictions in the kretek industry prevented BAT and other MNCs from shifting production to the kretek sector to offset the fall in the demand for white cigarettes.

9.7 Regulatory Constraints on Firm Growth and Rivalry

Before analysing the nature of competition among the major cigarette firms in more detail we will first discuss the regulatory constraints on firm rivalry. Table 9.4 lists several government policies affecting the cigarette industry. Restrictions on entry and mechanisation, differential excise taxes between small and large firms, and minimum retail prices have been used to protect the small-scale kretek sector (and employment levels) from competition from MNCs and the larger kretek firms. The effect of the restriction on mechanisation was addressed earlier and does not need to be repeated here.

⁹ Jardine Fleming Securities (1995) estimated *Dji Sam Soe*'s gross profit margin to be 56 per cent, more than twice the industry average.

Table 9.4	Regulations in the Cigarette Industry
Entry restrictions	BKPM restricts MNC entry into the kretek sector
Mechanisation	Restricted in the 1970s. Production ratio of 2:1 between hand-rolled and machine-made kretek replaced mechanisation restrictions in 1979. Ratio revised to 3:2 in 1983.
Excise taxes domestic	Differential excise taxes between small and large firms, and imported cigarettes.
Import tariff	Tariff and surcharges of 30 per cent each on imported white cigarettes
Minimum retail Prices	Differential minimum retail prices between small and large firms introduced in April 1991
Clove monopoly	A buying and selling clove monopoly established in December 1990
Advertising	Television advertising banned between 1980 and 1989.
Health	Health warning on cigarette packs introduced in October 1991. Restrictions on smoking in some public places.

The clove monopoly was disbanded in June 1998 under the IMF structural reform programme.

9.7.1 Entry Restrictions

Entry restrictions in the kretek industry were primarily designed to protect domestic-owned firms from competition from large MNCs. For most of the 1980s and the 1990s the kretek cigarette industry was officially closed to both domestic and foreign investment. In July 1992, entry was allowed in kretek with certain conditions: new investments were to begin with the production of hand-rolled kretek, after which the company would be permitted to produce machine kretek in the ratio of 2:3 with hand-rolled kretek (BKPM Negative Investment List, 1992). In an attempt to offset the decline in its market share, BAT entered the kretek market in 1982 with its introduction of a mildly flavoured clove cigarette called "Carita". Initial market acceptance was positive, but eight months after its introduction the government advised BAT to withdraw it from the market (BAT, 1982). This decision mainly served to protect large kretek firms' market shares as BAT was in direct competition with these firms, and not with the cheap, low quality products of the small-scale sector.

While the regulatory authorities strictly enforced the regulation against the large MNCs, they were less strict on domestic firms. A number of smaller domestic white

cigarette producers were allowed to switch production to kretek in the 1980s.¹⁰ Further, entry into the white cigarette segment was not restricted, and a number of kretek producers entered the market in the 1980s and 1990s.¹¹

9.7.2 Differential Excise Taxes and Minimum Retail Prices

Differential excise taxes and minimum retail prices based on a firm's annual production volume are two other measures used by the government to try to conserve a share of the market for small kretek producers.

The excise tax on cigarettes is levied by reference to the retail or "banderole" price. The Director General of Customs and Excises determines the banderole price for each producer. The excise tax payable by each producer is then calculated by the excise tax rate times the banderole price (Permana, 1987: 99). The differential excise treatment of machine-made and hand-rolled cigarettes was first introduced by the Dutch colonial government in the 1930s, when it imposed an excise tax of 30% on white cigarettes and 20% on kretek. The major purpose (besides raising tax revenue) of the differential excise tax regime was to protect kretek firms from competition from the larger white cigarette producers. The Indonesian government widened the excise tax differential from 10 percentage points in 1950 to 30 percentage points in 1959, but later reduced it to 15 percentage points in 1970. While the amount of protection declined between 1959 and 1970 the excise tax differential still provided protection for the kretek industry (Tarmidi, 1996: 101).

The introduction of machine-made kretek on a large scale at the end of the 1970s threatened the survival of small kretek firms and existing employment levels. Consequently, the government introduced differential excise tax rates based on the total production volume (both hand-rolled and machine-made kretek) of firms. The larger the firm, the higher is the excise tax rate on both machine-made and hand-

¹⁰ These firms were: P.T Artha Tobacco Company (shifted to kretek in 1980), P.T Dewan Daru (1981) and P.T Perosi (1983).

¹¹ In 1983, Bentoel established a subsidiary named P.T Tresno Industria and licensed Malboro from Phillip Morris. By 1995 Malboro was the largest selling white cigarette brand in the main urban centres of Indonesia with a market share of around 6 per cent of the total cigarette market (SRI, 1995). Gudang Garam established a subsidiary named P.T Halim Wonowijoyo and launched its own white cigarette brand. In the early 1990s Djarum introduced Alain Delon, and Sampoerna licensed Salem from Philip Morris in 1991.

rolled kretek. For example, in 1995 a kretek firm with total production greater than 60 billion sticks incurred excise tax rates of 38 per cent and 18 per cent on machine-made and hand-rolled kretek respectively. This compares with excise tax rates of 28 per cent and 8 per cent for small-sized firms (production between 2 and 5 billion sticks). While an excise tax differential between machine-made kretek and locally produced white cigarettes existed in the 1970s (about 2.5% to 5% in 1979), it narrowed considerably in the 1980s, and by 1990 excise tax treatment between white cigarette and large kretek producers was more or less the same. However, imported cigarettes are subject to an excise tax of 70 per cent. They are also subject to tariff and surcharges of 30 per cent each, providing significant protection for local producers, including white cigarette producers.

The differential excise tax regime affected the behaviour of large kretek firms in two ways. First, the increase in the highest production threshold from 8.5 billion sticks in 1990 to 30 billion sticks in 1991 induced Djarum to reduce its production to below the 30 billion threshold so that it could incur a lower excise tax rate (see Table 9.5).

Table 9.5

Changes in Djarum's Production in Response to Changes in Excise Tax Rates

Year	Djarum			Gudang Garam		
	Excise Tax Rate On:			Excise Tax Rate On:		
	Production (million sticks)	SKT	SKM	Production (million sticks)	SKT	SKM
1988	35 140	25.0	35.0	40 980	25.0	35.0
1989	39 550	17.5	37.5	39 500	17.5	37.5
1990	37 114	17.5	37.5	56 780	17.5	37.5
1991	29 306	15.0	35.0	58 352	17.5	37.5
1992	28 938	15.0	35.0	64 068	17.5	37.5

SKT = hand-rolled kretek, SKM = machine-made kretek
Production data from GAPPRI.

By incurring a lower excise tax rate on its products, Djarum could increase its profit margin (Jardine Fleming Securities, 1991). Gudang Garam did not have the same option because its production was well over 56 billion sticks in 1990, and a reduction to below 30 billion sticks was not feasible.

Second, the major kretek firms sub-contracted out production of new brands to smaller firms, which incur lower excise tax rates. A Ministry of Finance regulation

prohibits firms from sub-contracting out production of existing brands to smaller firms.¹² The smaller firms are often subsidiaries of the kretek firm, but are treated as separate legal entities for the purpose of taxation. For example, Djarum established P.T Filastra (brand name Crystal) in 1992 and P.T Mustang (brand name Mustang) in 1993. In 1994, Mustang and Filastra produced around one billion and three billion sticks respectively, and incurred excise tax rates of 24% and 28% on machine-made cigarettes. Thus, while total Djarum/Filastra/Mustang production exceeded 30 billion sticks in 1994, their separate legal entities meant that each firm incurred excise tax rates below the 30 billion threshold rate of 37.5% and 17.5% for machine-made and hand-rolled kretek respectively. Other large kretek firms that have sub-contracted out new brands to smaller firms for similar tax reasons are: Gudang Garam sub-contracted production to its subsidiary P.T Karya Niaga Bersama (brand name Grendel); Noyorono sub-contracted out new brands to its subsidiary P.T Nikki Super Tobacco Company (brand name Nikki Super).

To protect small-scale kretek firms the Minister of Finance in April 1991 fixed minimum prices for kretek and white cigarettes, with the excise tax included. Like the excise tax regime, minimum prices were determined according to the total production volume of the firm. The larger the firm, the higher is the minimum retail price. For example, in 1995 a kretek firm with total production exceeding 60 billion sticks per annum must charge at least Rp 75 per machine-made stick and Rp 65 per hand-rolled stick. This compares to Rp 50 per machine-made stick and Rp 40 per hand-rolled stick for a medium-sized firm producing between 2 and 5 billion sticks per year. The immediate effect of this policy was to increase medium and large-scale firms' retail prices of kretek, resulting in a slump in their sales in 1991 (see Figure 9.3 above). The severity of the slump in sales encouraged the government to revise downward the minimum prices in December 1991.

9.7.3 Clove Monopoly

In December 1990 the government granted a private-state trading enterprise joint venture (known as the Clove Trading Agency, or BPPC) a monopoly right to purchase

¹² Ironically, the prohibition on large firms sub-contracting out production of existing brands is anti-small firm.

cloves from the producer cooperatives and sell them to the kretek firms. The result of the monopoly was an increase in the price of cloves to kretek producers from an average of Rp7,000 per kg in 1990 to Rp12,500 per kg in 1991. This translated into an increase of around 20 per cent in the cost of production of the large kretek producers (Jardine Fleming Securities, 1990).¹³

The establishment of the BPPC received considerable public criticism for its rent-seeking activities. While the events surrounding the formation of the monopoly are not central to our study, they are of interest in themselves. It is therefore worthwhile to describe them in some detail.

At the end of the 1980s, P.T Bina Reksa Perdana - a consortium of clove traders and a private company owned by Hutomo Mandala Putra (the youngest son of the former President) - was accumulating stocks of cloves in a speculative bid to 'corner the market'. By 1990 the consortium had accumulated around 65,000 metric tonnes of cloves, equivalent to about two thirds of annual cloves consumption in Indonesia. In 1990 the company lobbied the government to form a national clove buffer agency to support the government's floor price of Rp6,500 per kg.¹⁴ In December, the government announced the establishment of BPPC, which was a 80:20 joint venture between P.T Kembang Cengkeh Nasional (owned by Hutomo Mandala Putra) and P.T Kerta Niaga (a state-owned trading enterprise). The trading monopoly would purchase all the cloves from the farmers through the local village cooperative (Koperasi Unit Desa or KUD), and then sell them to the kretek firms. It immediately offered farmers Rp7,000 per kg, more than double the then current farmers price, and sold the cloves to kretek producers for Rp12,000 per kg.

However, through 1991, as the demand from kretek companies waned and clove production responded to the clove prices, the board's clove stocks rose dramatically, to about 170,000 metric tonnes by mid-1991, equivalent to about two years supply.¹⁵

¹³ In 1989, cloves made up 27 per cent and 33 per cent of the total cost of production of machine-made and hand-rolled kretek respectively (Gappri, 1989).

¹⁴ In 1980, the government introduced a floor price of Rp 6,500 per kilogram. Cooperatives were required to purchase cloves to maintain the floor price. As expected, this floor price stimulated an increase in production of cloves, which in turn led to an oversupply, and prices frequently fell below Rp 6,500. For example, in early 1989 the price of cloves fell to Rp 3,500 per kg in Surabaya.

¹⁵ Cigarette companies reduced their purchases of cloves by running down their existing stocks of

The result for BPPC was rising debt costs associated with the stockpile, which in turn threatened the long-term viability of the board. To fund the large stockpile of cloves, BPPC used its close connections with government to secure loans amounting to US\$350 million from Bank Indonesia (the central bank), and two state-owned banks, Bank Bumi Daya and Bank Rakyat Indonesia.

In an effort to increase the demand for cloves from the large kretek firms, the owners of BPPC again lobbied the government to make a number of adjustments to the excise tax regulations. In December 1991, a Joint Decree of the Minister of Trade and the Minister of Finance stipulated that from 1 January the purchase of cigarette excise bands was to be linked to the purchase of specified quantities of cloves from BPPC. In other words, firms must provide invoices from BPPC before obtaining the excise tax bands. The specified quantity of cloves for which kretek producers must provide invoices from BPPC were as follows:

Table 9.6 Regulated Clove Purchases from BPPC

Firm Annual Output (billion of Sticks)	Grams Per Stick	
	Mechanised Kretek	Hand-Produced Kretek
>30	0.63	0.81
>4.5 - 30	0.46	0.63
>0.75 - 4.5	0.35	0.52
>0.05 - 0.75	0.17	0.23

Decree of the Minister of Trade and the Minister of Finance, 1991

Larger firms are required to purchase from BPPC a greater amount of cloves per stick produced compared to smaller firms. For example, firms with annual production above 30 billion sticks (i.e. Gudang Garam and Djarum in 1991) are required to purchase 0.63 and 0.81 grammes of cloves per stick of machine-made and hand-rolled kretek respectively. The normal usage of cloves for large firms is between 0.5 and 0.7 grammes per stick of machine-made and hand-rolled kretek. The requirement to show proof of clove purchases resulted in either write-offs of existing clove stocks or at least higher inventory levels than normal for the large firms.

cloves, and reducing the content of cloves per cigarette stick. It is normal practice for cigarette producers to hold stocks equivalent to one year's consumption.

In an effort to reduce the stockpile Mr Hutomo declared that clove production would have to be cut, and in February 1992 publicly suggested that farmers burn 40-50 per cent of their crop and cut down 30 per cent of their trees. The ensuing public outcry, including criticism by the House Speaker and also the Secretary-General of Golkar, resulted in Presidential intervention. In April 1992, following a meeting between the President and eight Ministers, it was announced that BPPC's buying price would be cut from Rp7,000 per kg to Rp4,000 per kg, well below the world price of around Rp 6,000 per kg at the time (Indikator Ekonomi, 1994). The board continued to sell cloves to kretek companies at Rp13,000 per kg.

The higher clove prices threatened the survival of small firms. Demand for the smaller firms' products tend to be more price sensitive and it is more difficult for smaller firms to absorb input price increases as profit margins are already small. A number of small firms reportedly closed down during this period as a result of higher clove prices.¹⁶

9.7.4 Advertising Restrictions

In Chapter 4 we noted that television advertising was banned in the 1980s. In addition to television, the largest Indonesian language daily, *Kompas*, introduced a voluntary ban on tobacco advertising in its newspaper in the early 1980s. Consequently, tobacco companies were confined to advertising their products in print media (most newspapers and magazines), radio and outdoor advertising. The ban on television advertising was removed in 1989. Except for the condition that tobacco advertisements are not permitted to show the cigarette, no other restrictions are imposed on tobacco television advertising.

9.7.5 Health Regulations

Health considerations related smoking are not yet strong in Indonesia, reflecting the low level of awareness in the country. There is no vocal anti-smoking movement within the government or in the wider community. Smoking is permitted in most

¹⁶ The biggest losers from the cloves monopoly are the clove farmers themselves. Sondakh (1995:160) reported that farmers received only around Rp 2,700 per kg after BPPC deducted compulsory savings and other fees from the farmer's price. This price is just over half of the market price prevailing before the establishment of the monopoly.

public places, although in recent years the national airline carrier Garuda has prohibited smoking on both domestic and international flights. In May 1991 a Decree of the Minister of Health required all cigarette producers to print a health warning on cigarette packets. Initially, only Gudang Garam complied with the October 1 deadline. Most medium and large-scale firms have complied with the Decree in the last few years under pressure from the Department of Health.

9.8 The Nature of Competition in the Cigarette Industry

The structure of the cigarette market (i.e., a highly segmented, product differentiated oligopoly) shapes the nature of competition among firms. A feature of the industry worldwide is the preference of companies not to compete on price, but through other marketing efforts such as advertising.¹⁷ Relative price changes in the cigarette industry are infrequent and this rigidity tends to indicate a lack of price competition (Telser, 1962, Shepherd, 1984). There are price differentials between brands, and these are intended to signal differences in quality. Interviews with marketing executives from several large cigarette companies and industry analysts during my fieldwork in Indonesia confirm that companies do not compete on price. Price strata of brands are reported in the Appendix to this Chapter.

Image differentiation is the main instrument of competition among the large Indonesian cigarette firms. Firms try to establish favourable images for their brands by means of advertising and appealing ways of packaging. All the major firms advertise heavily on television, print media and radio. They also spend heavily on sales promotional activities. According to a leading Indonesian advertising magazine, *Cakra*, the Indonesian cigarette industry spent an estimated US\$1 billion on advertising in the last few years alone (*Cakra*; October issue, 1995). Unfortunately, cigarette producers in Indonesia do not publish their own advertising expenditures for the simple reason that such data are considered as sensitive competitive information. Further, there are no other published sources of advertising expenditure before 1992. Thus, it is not possible to analyse the effect of advertising competition on market shares before 1992. Since 1992 a Jakarta-based market research company, Survey

¹⁷ Telser, 1962; Alemson, 1970; Metwally, 1975; Roberts and Samuelson, 1988.

Research Indonesia (SRI), has been collecting advertising expenditures and market shares of all advertised brands on a monthly basis. SRI estimates advertising expenditure for each brand by valuing the recorded time length of each television and radio commercial, and the size of all print advertisements. Market shares for each brand are estimated by surveying 1200 stores in the nine main urban centres of Indonesia: Jakarta, Bandung, Semarang, Solo, Yogyakarta, Surabaya, Medan, Palembang, and Padang. SRI has provided us with each firm's monthly advertising expenditure and market share data from August 1992 to October 1995.

Table 9.7 shows the advertising and market shares of the leading producers averaged over the period 1992-95. A firm's advertising share is defined as its percentage share of total industry advertising expenditure. These seven firms account for over 90 per cent of total industry cigarette sales and advertising expenditure during this period. Monthly market share and advertising share of each firm is shown in the Appendix to this Chapter. Table 9.7 shows that the three largest firms accounted for the largest share of total industry advertising during this period, although not by a large margin. Gudang Garam's advertising share of 14.5 per cent is a little more than Bentoels' 12.7 per cent, BAT's 11.5 per cent, and Malboro's 10.2 percent of total industry advertising expenditure. However, the smaller firms (Bentoel, BAT, Malboro, and Rothmans) have much larger advertising shares relative to their market shares compared with the larger firms. For example, BAT's advertising share is 2.17 times larger than its market share, Bentoels' advertising share is 2.44 times larger than its market share, and Rothmans' advertising share is 8.3 times greater than its market share. This compares with advertising share-market share ratios of 0.31, 1.07 and 1.26 for the three largest firms respectively. This implies that smaller firms have higher advertising-sales ratios. In other words, smaller firms must spend a much larger proportion of their sales revenue on advertising to compete with larger firms.

This necessity arises for two major reasons. First, there are substantial fixed costs in advertising (especially for television) that all firms must pay, irrespective of firm size. These fixed costs make up a larger proportion of sales revenue of small firms compared with larger firms. Second, the successful firms (i.e., those with large market shares) may rely less on current advertising because they are able to reap the benefits

of positive image which have been created with advertising in past periods. That is, advertising creates positive goodwill. This in turn results in lower advertising-sales ratios for large firms relative to smaller firms.

These two factors also explain why advertising acts as a barrier to upward mobility within the Indonesian cigarette industry: (1) advertising is generally too expensive for small firms to purchase, and (2) advertising goodwill asset is an asymmetry that presents a barrier to upward mobility of less favoured existing firms.¹⁸ An examination of the relationship between relative advertising expenditure and market shares of the leading firms, requiring the construction of a dynamic econometric model, is undertaken in the next chapter.

Table 9.7

**Market Shares and Advertising Shares of Leading Firms
(averaged over the period 1992 to 1995)**

Competitors	Market Share	Advertising Share	Ratio of Advertising Share to Market Share
Gudang Garam (K)	46.3	14.5	0.31
Djarum (K)	16.5	17.7	1.07
Sampoerna (K)	14.1	17.8	1.26
Malboro (W)	6.3	10.2	1.62
BAT (W)	5.3	11.5	2.17
Bentoel (K)	5.2	12.7	2.44
Rothmans (W)	1.0	8.3	8.30
Total	94.7	92.7	

Source: Survey Research Indonesia

9.9 Competition in the Competitive Fringe

As mentioned earlier, the Indonesian cigarette industry is characterised as a product differentiated oligopoly with a competitive fringe. Firms belonging to the competitive fringe produce relatively cheap, low quality kretek. In contrast to large firms, price is the main instrument of competition among small-scale firms. Table 9.8 lists the prices of several brands produced by small-scale firms. Prices of these brands were collected during my fieldwork in Indonesia in 1995. Prices for their brands (mainly hand-rolled kretek) are clustered around Rp300 per pack of 10 cigarettes in 1995, compared to

¹⁸ Advertising is more of a barrier to upward mobility than a barrier to entry in the Indonesian cigarette industry as firms can enter the industry through the competitive fringe where barriers to entry are much lower.

around Rp800 for the larger brands. Demand for their brands tends to be price sensitive, and gross profit margins are low, in the range of 5 per cent to 15 per cent. The relatively high price elasticity of demand, and the low profit margins, mean that small firms are vulnerable to fluctuations in the prices of inputs, particularly cloves.

Firms undertake little or no promotional activities. Very few firms advertise in the local newspapers or on radio, and only during special events, such as the Moslem New Year and Independence Day. The only marketing technique used by these firms is direct selling to food stalls, hawkers and small retail outlets through their distributors. Firms sell their brands in established regional markets. For example, Djoharmanik's main selling areas are North Sumatra, Lampung and Pulau Bangka. Pantai Padang's main selling area is the Kudus-Jepara-Demak region, while Pamor's main selling region is Manado in North Sulawesi. Many of the firms' regional markets developed due to historical reasons. Djoharmanik, for example, spread to North Sumatra through Javanese migrant workers on the rubber plantations in the 1950s. Brand loyalty also tends to be strong in these regional markets, and firms often find it difficult to penetrate other markets.

Table 9.8 **Characteristics of Small-Scale Kretek Producers**

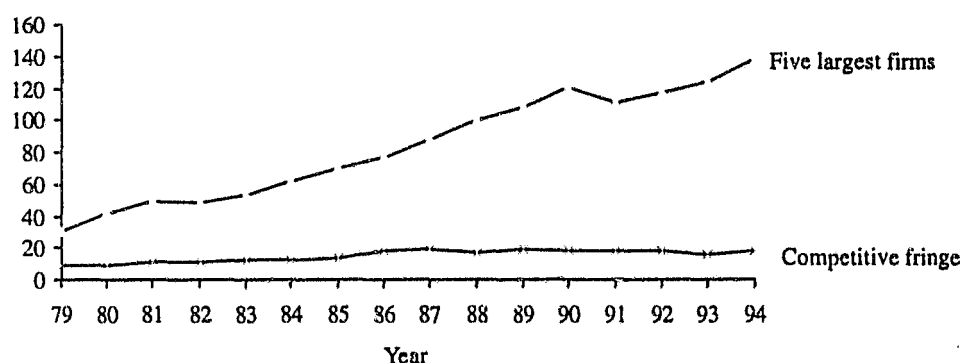
Name (Year began operations)	Major Brands	Price per pack	Major Selling Areas	No of Employees 1995
Sidodadi (1950)	Djoharmanik Ideal	Rp300/10 stks Rp450/12 stks	North Sumatra, Lampung and Pulau Bangka	250
Gentong Gotri (1927)	Gentong Gotri, Sigma Texas, Gala, Staff Int'l	Rp400/12 stks	West Java, Lampung, and South Sumatra	600
Banyu Intan	Pompa, Oepex	Rp300/10 stks	Cirebon in West Java	159
Mulyorahadjo (1974)	Pamor Pamor Filter Pahala Filter	Rp350/10 stks Rp500/12 stks Rp600/12 stks	Kudus, Jepara, Demak	574
Nyusul Express (1978)	Pantai Padang	Rp600/12 stks	North Sulawesi	250
Sri Asih (1961)	Supiah	Rp300/10 stks	East Java	100

Source: Firm interviews

The competitive fringe has been gradually declining over time owing to a combination of factors, such as changes in the technological and demand conditions of the industry, rising clove prices, and intensive advertising competition by the larger firms. This decline has occurred despite protection given to small-scale kretek producers through entry restrictions, differential excise taxes and minimum retail prices. We observed in section 9.5 that the number of small firms declined from around 653 in 1968 to 139 in 1994 (Figure 9.6). Figure 9.7 shows the growth in production of the five largest kretek firms and the competitive fringe.¹⁹

Figure 9.7

**Output Growth of the Five Largest Kretek Producers and Competitive Fringe
(billion of sticks)**



Annual Growth Rate of Production (%)	Large firms	Competitive Fringe
1979-85	11.8	6.7
1985-90	11.2	4.1
1990-91	-7.7	-0.4
1991-94	7.0	-1.3

Source: GAPPRI

Examining Figure 9.7 it is apparent that most of the growth in the industry has been concentrated among the five largest firms. The rate of output growth in the competitive fringe has continuously declined since 1979. Average annual growth was

¹⁹ Competitive fringe output is calculated as the difference between total industry output less the output of the largest five firms plus their subsidiaries (Gudang Garam+Grendel, Djarum+Mustang+Filastra, Sampoerna + Panamas, Bentoel, and Noyorono+Nikki).

6.7 per cent between 1979 and 1985, 4.1 per cent between 1985 and 1990, and minus 1.3 per cent between 1991 and 1994.²⁰ While the differential excise tax policy might have helped to protect the small-scale kretek sector in the 1980s, it appears to have had little effect in the 1990s, despite the added protection from the introduction of minimum retail prices in 1991. Higher clove price as a result of the clove monopoly was one factor that contributed to negative growth in the small-scale kretek sector in the first half of the 1990s. However, there are other factors that are contributing towards a long-term decline of the small-scale kretek sector.

As explained earlier, since the late 1970s several medium and large-scale firms began to upgrade the quality of their products by introducing mechanised filter kretek, using better quality tobacco and cloves and more appealing cigarette packaging. Coupled with rising incomes of consumers and intensive advertising and promotion, these innovations induced a shift in consumption away from cheap, low quality hand-rolled kretek produced by the competitive fringe to machine-made kretek produced by the large producers (Permana, 1989).

Yet, despite the gradual decline in the competitive fringe, a few small and medium-sized firms are in the process of 'graduating' to a larger size. One example is Wismilak, a kretek producer located in East Java. Wismilak has grown from a small firm supplying the East Java region in the late 1980s to become a medium-sized firm now supplying most regions in Java; by 1995 it was about half the size of Noyorono. The success of this firm has been due to the owner's ability to identify and produce for niche markets, adapting quality and price to market demand. In recent years Wismilak has advertised its Diplomat brand on national television and has invested heavily in expanding distribution networks across Java. This example indicates that it is still possible for small, innovative firms to overcome upward mobility barriers in the cigarette industry and to 'graduate' to a larger size.

²⁰ In Figure 9.1 we reported positive growth in the hand-rolled kretek segment over the period 1990 to 1994. This growth was mainly driven by Sampoerna's rapid growth in its premium hand-rolled brand, *Dji Sam Soe*, over this period, and not the competitive fringe.

9.10 Summary

This Chapter has described the development of the cigarette industry over the last three decades, the nature of competition among large firms and the competitive fringe, and the role of government policy in protecting the small-scale kretek sector. The most notable features of the analysis are:

- (1) The rapid rise in the dominance of several kretek firms, all domestically-owned, and the decline in the dominance of foreign-owned white cigarettes producers since the late 1970s. This change is mainly due to mechanisation in the kretek sector at the end of the 1970s, and a shift in consumer tastes away from white cigarettes and hand-rolled kretek to machine-made kretek. Government entry restrictions in the kretek sector prevented MNCs from shifting production to kretek, and this also helps to explain the decline in the market shares of the large MNCs during the 1980s.
- (2) There has been a rapid decline in the number of small kretek firms and white cigarette producers over the last three decades. Corresponding to this decline in the number of firms is an increase in the four-firm seller concentration ratio from 43 per cent in 1976 to 75 per cent in 1994. The major causes of this increase in concentration are mechanisation by the three largest kretek firms at the end of the 1970s, and increased efforts in distribution and promotion. However, we observed that the change in concentration does not reflect a common increase in the shares of the four leading firms but, rather, is driven mainly by the change in the market shares of the two leading firms, Gudang Garam and Djarum.
- (3) The success of government protection of the small-scale sector is mixed. While the differential excise taxes may have protected the small-scale kretek sector in the 1980s it appears to have had little effect in the 1990s, despite the added protection of minimum retail prices. Regulatory limitations on large firm's sub-contracting out production of existing brands to small firms hindered growth opportunities for small firms. Rising per capita incomes, and changing consumer tastes towards better quality and image filter kreteks produced by the larger firms, explain the decline of the competitive fringe in the 1990s.
- (4) Finally, the main instrument of competition among large firms is image differentiation by means of advertising. Large firms do not appear to compete with price, and this is consistent with studies of the cigarette industry for other countries. In contrast, small firms' main instrument of competition is price. Small firms sell cheap, low quality kretek.

Appendix 2

Figure 1a

Price Strata of Kretek Brands, 1995

Price Range
(Rp Per Pack)

	HMS	Gudang Garam	Djarum	Bentoel	Noyorono	Others
Rp2000						
		234 (SKT)				
		234				
Rp1000						
Rp800	A Mild	International Surya	Super	International		
600			Crystal		Nikki Super	
			Coklat			
					Minak Djinggo	
Rp400		The Competitive Fringe				Jambu Bol Sunkun Gentong Gotri
Rp 300						Djoharmanik Banyu Intan Pamor Supiah

HMS=Sampoerna

Brands priced below Rp400 are produced by several small-scale firms surveyed during my fieldwork in Indonesia in 1995.

Figure 1b

Price Strata of White Cigarette Brands, 1995

Price Range
(Rp Per Pack)

	BAT	Tresno (Bentoel)	Rothmans	STTC	Others
Rp2000		Malboro			
	B&H 555			Winston	Alain
Delon Rp1000	Lucky Strike		Dunhill		Salem
Rp800	Ardath				
600	Commodore				

Salem is licensed to Sampōerna; Alain Delon is licensed to Djarum; Malboro is licensed to P.T Tresno, a subsidiary of Bentoel.

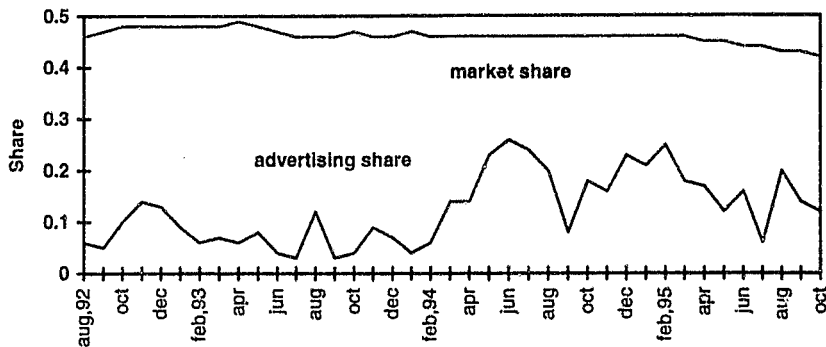
Winston is licensed to Sumatra Tobacco Trading Coy.

Appendix 2

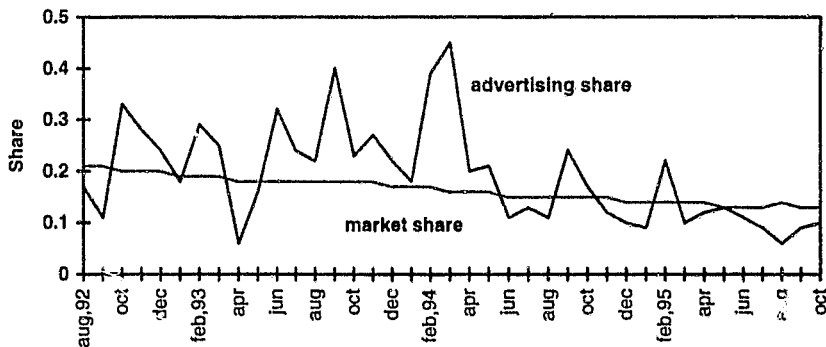
Figure 2

Firms' Monthly Market Shares and Advertising Shares, 1992-95 (advertising share indicates each firm's share of total industry advertising expenditure)

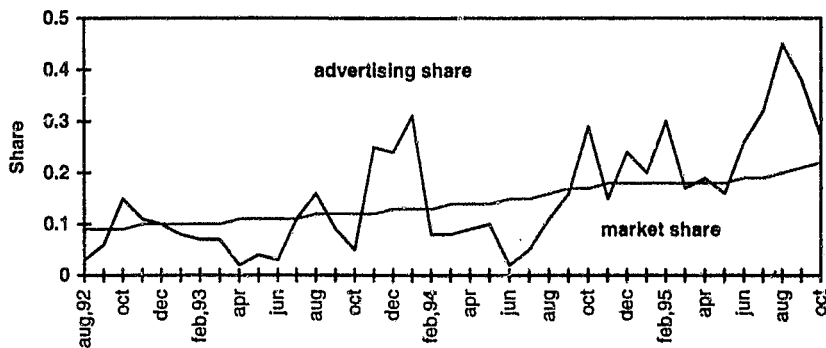
Gudang Garam



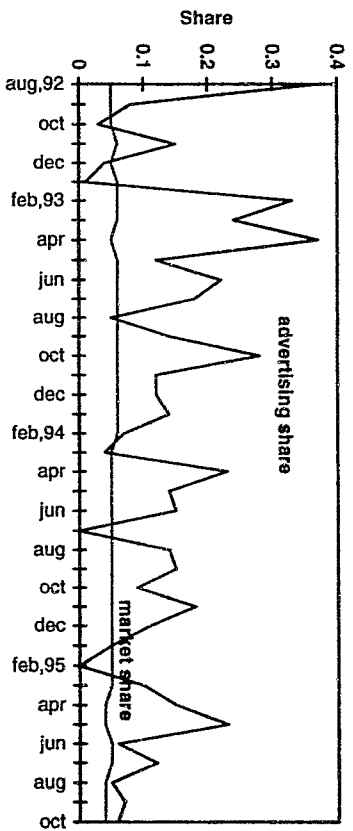
Djarum



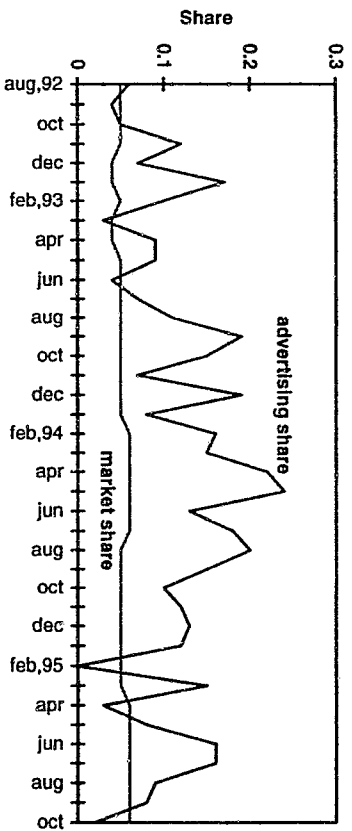
Sampoerna



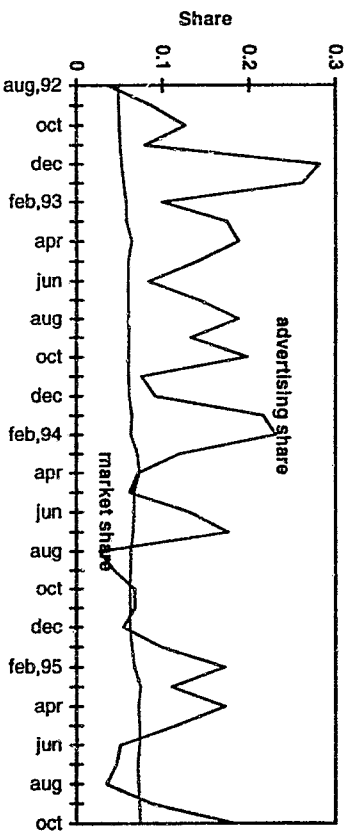
Bentol



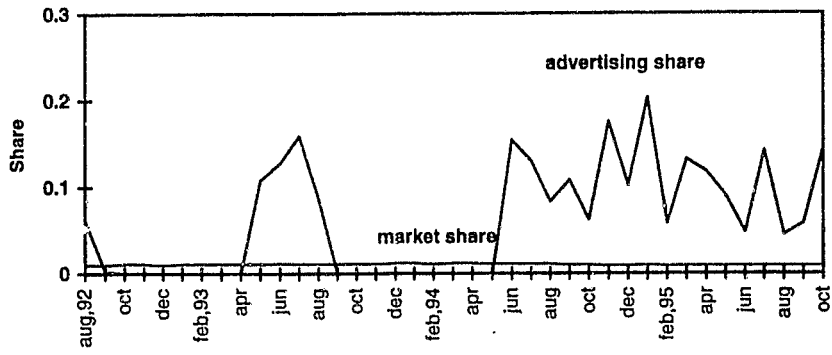
British American Tobacco (BAT)



Malboro



Dunhill



Chapter 10

Advertising Competition in the Cigarette Industry

10.1 Introduction

In Chapter 9 we noted that image differentiation is the main instrument of competition among large firms in the cigarette industry. This Chapter estimates the effect of advertising expenditure on seven leading firms' market shares, using monthly advertising and market share data from August 1992 to October 1995. These seven firms account for over 90 per cent of total market sales, and 90 per cent of total industry advertising expenditure. Our study stands out from previous research on advertising for other countries on at least three grounds. First, we employ recent advances in time-series analysis that allow us to separate the long-run relationship between advertising and market share from the short-run impact in the estimated equation. Second, we use monthly advertising and market share data, which are considered more appropriate than annual data in these kinds of studies (Landes and Rosenfield, 1994). Finally, unlike most other studies, our data set has time series sufficiently long to support a regression analysis for a single firm. This allows us to investigate whether the success of advertising differs among firms.

Our results show that advertising competition reallocates sales between firms. Increases in own advertising expands market share in four of the seven firms. Increases in rivals' advertising reduce market share in three of the seven firms. An important finding of our study is that an equal increase in advertising by all firms will change the distribution of market shares in favour of the more successful, larger firms in the long-run. This arises because larger firms have an image advantage over the smaller firms. This image advantage is an asymmetry that constitutes a barrier to upward mobility of smaller, less-favoured existing firms.

The remainder of this Chapter is divided into five sections. Section 2 briefly reviews the theoretical background to the study. Section 3 reviews the existing empirical literature on the topic. Section 4 presents our empirical model. Section 5 reports the estimation results and provides a discussion. Finally, section 6 summarises the main findings of the Chapter.

10.2 Theoretical Framework

The Indonesian cigarette industry represents a suitable industry to examine empirically advertising competition between firms. The cigarette industry has been characterised by many studies for other countries as the most representative case of oligopolistic competition, in which companies prefer not to compete on prices, but through other marketing efforts such as advertising.¹ Advertising competition is expected to shift market shares between firms for at least two reasons. First, rivalry in advertising has a greater potential for destabilising shares because competitive moves in these areas are replicable only with a lag, and so give an advantage to the first mover (Scherer and Ross, 1990; Davies and Geroski, 1997).² Unlike rival retaliation to aggressive price cuts, it takes weeks or even months to set a retaliatory nationwide advertising campaign in motion. During the interim, the first mover may enjoy gains in market share and profits. A second reason is that success in advertising depends at least as much upon the way the appeal is presented as on the amount of money spent. As Scherer and Ross (*ibid*: 595) observe:

'any fool can match a price cut, but counteracting a clever advertising gambit is far from easy. In this unpredictable clash of creative power, sellers often over-estimate their own ability to make market share gains and underestimate their rival's ability to retaliate successfully, exhibiting little concern for mutual interdependence.'

In the Indonesian cigarette market, price differentials tend to persist over time, and as mentioned earlier tobacco marketing executives in Indonesia confirmed that

¹ See, for example, Telser, 1962; Schmalensee, 1972; Montameni, 1987; Roberts and Samuelson, 1988; Scherer and Ross, 1990

² Refer back to Chapter 8 for a discussion of non-price determinants of changes in market shares.

companies do not compete on price. Further, the establishment of minimum retail prices in 1991 implies that price competition is now non-existent. Many previous studies on the determinants of market shares in the cigarette industry have found price to be statistically insignificant (Metwally, 1975), or have omitted price from the models on the ground that firms do not compete with price (Telser, 1962, Roberts and Samuelson, 1988). Therefore, from the marketing viewpoint, advertising may be considered as the most important variable that creates differential advantage for brands in this industry.

In the industrial organisation literature, advertising is hypothesised to have a dynamic effect on market shares. Periodic advertising expenditure builds up positive image or goodwill and increase sales for some period of time into the future. In other words, current advertising contributes to a long-lived asset - called goodwill - that affects future sales (Martin, 1993: 138). Goodwill depreciates over time, but can be replenished by advertising. The positive image or advertising goodwill hypothesis has two important implications for competition. First, it implies that firms that are successful in creating an image advantage for their brands will gain market share at the expense of less successful firms. Further, successful firms (i.e. those with large market shares) may then rely less on current advertising because they are able to reap the benefits of positive image which has been created with advertising in past periods. This in turn results in lower advertising-sales ratios for large firms relative to smaller ones. Second, the image advantage or goodwill asset is an asymmetry that presents a barrier to entry of new firms and a barrier to upward mobility of less-favoured existing firms.

The advertising-goodwill hypothesis has been under attack in recent years by several economists (Thomas, 1989, Seldon and Boyd, 1990, Landes and Rosenfield, 1994). Seldon and Boyd (1990), for example, showed that the effects of advertising on cigarette demand are short-lived, and 'appear to be fully depreciated within a year' (ibid: 378). They concluded that 'any concern that an accumulated advertising effect may constitute a barrier to entry may be ill founded.'

10.3 Empirical Literature Review

In the empirical literature the most commonly used specification for research on advertising competition in an oligopoly is the depreciable-advertising model or reduced form Koyck model (Roberts and Samuelson, 1988; Landes and Rosenfield, 1994). In this model researchers specify a firm's market share as a function of its own stock of goodwill and that of its rivals. For example, Roberts and Samuelson (1988) specified a model in which advertising by cigarette manufacturers in the U.S.A. market contributes to a firm-specific stock of goodwill:

$$G_{it} = \lambda G_{i,t-1} + A_{it}, \quad 0 < \lambda < 1 \quad (1)$$

where G is the stock of goodwill that has accumulated over time.

A is advertising expenditure,

λ is the retention rate of goodwill. The value of $1 - \lambda$ describes the rate at which goodwill depreciates over time.

A firm's market share (MS) is expected to be positively related to its own stock of goodwill (G) and negatively related to a rival's goodwill (GR).

$$MS_{it} = \alpha_i + \alpha_0 G_{i,t}^+ + b_r GR_{i,t}^- + \mu_{i,t} \quad (2)$$

The coefficients of G and GR capture the effect of a change in own and rival-firm goodwill stocks, respectively, on firm i 's output share in the market. To develop estimable market-share equations researchers must assume some dynamic structure for the accumulation of advertising goodwill. Studies usually rely on the Koyck transformation of the effect of advertising on future market share.³ The Koyck transformation assumes a geometric decay in the effect of advertising on future

³ Many of the recent studies on the effect of advertising on sales have relied on the Koyck model include Baltagi and Levin, 1986; Thomas, 1989; Seldon and Boyd, 1990; Tegene, 1991; Landes and Rosenfield, 1994. See Clarke (1976) for a review of the earlier empirical studies using the Koyck distributed lag model.

market share: $G_{it} = \sum_{i=0}^{\infty} \lambda^i A_{t-i}$, where $0 < \lambda < 1$ is the Koyck weight, and i is the time period.⁴

Lagging G by one period and simplifying results in current goodwill stocks being replaced with current advertising expenditure and lagged market shares,⁵ the market share response equation (2) becomes:

$$MS_{it} = \alpha_i + \alpha_0 A_{i,t} + b_0 AR_{i,t} + \lambda MS_{i,t-1} + \mu_{i,t} \quad (3)$$

Where A is own advertising expenditure, and AR is rival firms' advertising expenditure. The coefficient α_0 captures the short-term effect of advertising on market share. The coefficient (λ) of the lagged market share variable is the retention rate of goodwill. It measures the proportion of past sales that continue into the current time as a result of previous advertising expenditures. The higher the value of the retention rate, the longer is advertising's useful life. The coefficient $\frac{\alpha_0}{1-\lambda}$ measures the long-term effect of advertising on market share. Similarly, the coefficient $\frac{b_0}{1-\lambda}$ measures the long-term effect of rivals' advertising on the firm's market share.

Empirical results of selected market share studies using equation (3), or variants of equation (3), are reported in Table 10.1.

⁴ The Koyck transformation is often used by researchers because of it results in a reduced form which can be conveniently manipulated and tested.

⁵ Assume a sales response function $S_{it} = \alpha + \alpha_1 G_{it}$ where $G_{it} = \lambda G_{i,t-1} + A_{i,t}$. Applying the Koyck transformation to the sales response function we get:

$$S_t = \alpha + \beta(A_t + \lambda A_{t-1} + \lambda^2 A_t + \dots) + \mu_t$$

$$\text{or } S_t = \alpha + \beta \sum_{i=0}^{\infty} \lambda^i A(t-i) + \mu_t \quad (1)$$

Lagging equation (1) by one period and simplifying, we obtain the Koyck model:

$$s_t = \alpha(1-\lambda) + \lambda s_{t-1} + \beta A_t + v_t$$

$$\text{or } s_t = \gamma + \gamma_1 s_{t-1} + \gamma_2 A_t + v_t$$

Thus, current sales are a function of current advertising expenditure and lagged sales of firm i .

Table 10.1 **Selected Studies on the Cigarette Industry**
(dependent variable is firm market share)

Independent Variables	Telser (1962)			Metwally (1975)	Roberts et al (1988)	
	Camel	LS	Chesterfield		high-tar	low-tar
Constant	0.048	0.082	0.083	0.157		
MS _{t-1}	0.736*	0.596*	0.657*	0.441*	0.892*	0.831*
A _t	0.091*	0.123*	0.030	0.041*	0.005	-0.001
AR _t					-0.001	0.006
Rivals relative price _t				2.212		
Own brands _t					0.003	0.008*
Rival brands _t					0.001	-0.002*
Firm dummies on intercept:						
Philip Morris					0.038*	0.052*
R.J Reynolds					0.031*	0.062*
American brands					0.007	0.016
Brown and Williamson					0.016*	0.015*
Lorillard					0.006*	0.022*
R ²	0.69	0.87	0.44	0.934	na	na
Country			U.S.A.	Australia		U.S.A.
No. observations			10	11		72
Period		1929 - 39		1960 - 70		1970-82
Method	estimated for each brand			pooled firm data	pooled firm data	

*Statistically significant at the 5% or better level. LS = lucky strike.

All variables are in log form so that the coefficients can be interpreted as constant elasticities.

Telser's (1962) seminal study investigated the effect of advertising competition on three leading brands' market shares in the U.S.A. cigarette industry over the period 1929 to 1939. Telser measured competitive advertising as the ratio of a firm's advertising expenditure to total competitors' advertising outlays. Telser found that relative advertising had a positive and significant effect on the market shares of Lucky Strike and Camel, but not on that of Chesterfield. Telser argued that the insignificant effect of advertising on Chesterfield's share suggested that Chesterfield's advertising was less effective compared to the other two firms. Metwally (1975) investigated the effect of advertising competition on leading firms' market shares in the Australian cigarette industry over the period 1960 to 1970. He also included rival relative price (ratio of rival's price to own price) as an independent variable. Like Telser's study, Metawally measured competitive advertising as the ratio of a firms advertising to total competitors advertising outlays. He found that relative advertising had a positive and statistically significant effect on a firm's market share. The coefficient of the relative

price was not statistically significant, providing some evidence that firms do not compete on prices. Roberts and Samuelson (1988) used annual firm data to estimate the effect of own advertising and rivals' advertising on market shares in the U.S.A. cigarette industry. They expanded the equation to include the number of own brands and rival brands. The equation was separately estimated for the high-tar and low-tar segments. In their model the intercept term was allowed to differ across firms to capture firm-specific, time-invariant factors (such as quality differences) that affect market shares. However, they restricted the retention rate, and the coefficients on own advertising and rivals' advertising, to be equal for all firms, thus implying that the effect of advertising (both own and rivals) on market share is identical for all firms. The estimated effects of own advertising and rivals' advertising on market shares were not statistically significant in their study. Their results reject the hypothesis that advertising competition shifts market shares between firms. The coefficients (or retention rate of goodwill) on the lagged market shares were statistically significant and very high (0.83 and 0.89), indicating that advertising is long-lived. Thus, even though current advertising did not have a statistically significant effect on shares, the simple Koyck lag model implied that advertising is long-lived.

These empirical studies are subject to several major criticisms. First, the model specification assumes that the lag structure follows a geometric decay (i.e. Koyck transformation) in the market share effect of advertising. If the lag structure is different, then the model is misspecified. A number of studies have experimented with different lag structures. Ward (1976) considered a polynomial lag structure and Mann (1975), Weiss, Houston and Windal (1978) used a Pascal lag structure. However, these two studies fell into the same trap of restricting the lag structure to follow a pre-determined form. Recent work in econometrics adopts a flexible approach of allowing the data to determine the lag structure, rather than imposing a lag structure on the data (Hendry 1995). In other words, investigators search for a lag structure which is data-acceptable.

Second, as a result of the Koyck transformation the parameter of lagged market share is interpreted as the retention rate of advertising. This interpretation has been criticised in both the economics and marketing literatures on the grounds that the

parameter might be capturing the notion of 'retained consumers' or 'habit persistence' as a result of the total marketing programme (e.g product quality), and not just advertising (Lambin, 1979; Thomas, 1988).

A third major criticism is that these studies may be estimating spurious relationships. If the time series is non-stationary in level form, then the regression is estimating a spurious relationship and, thus, tells us nothing about the behavioural relationships between the variables (Banerjee et al, 1993: 138-9). Guarding against the possibility of uncovering spurious relations is important when we work with variables (market shares and advertising in our case) which seem to have a strong trend component (Athukorala, 1995). Recent advances in econometrics have designed estimation techniques (i.e the error correction modeling procedure) that minimise the possibility of estimating spurious relation while retaining long run information when modeling with time series data (Hendry, 1995).

A fourth criticism is that the studies ignore the dynamic effects of rivals' advertising on a firms' market share. In these studies, rivals' goodwill stocks are proxied by their current advertising, implying that there are no lagged effects of rivals' advertising on a firm's market share. Finally, the studies use annual data and, thus, are subject to what Clarke (1976: 355) termed the 'interval data bias'. Clarke showed that the length of the estimated duration interval of advertising on sales or market shares was itself closely correlated with the periodicity of the data used in the study. On the basis of studies using monthly, bimonthly, or quarterly data - studies less likely to be affected by data interval bias than those based on annual data - Clarke concluded that "the duration of cumulative advertising effect on sales is between 3 and 15 months; thus this effect is a short-term (about a year or less) phenomenon." If the effects of advertising on market share depreciate fully within one year then the use of annual data in models of advertising are inappropriate.

10.4 The Empirical Model for the Indonesian Cigarette Market.

The empirical approach adopted by our study is to allow the data to determine the lag structure of the effect of advertising competition on market shares, rather than to

impose a pre-determined one (i.e. Koyck model). To do this, we make use of the error correction method (ECM). The ECM procedure was described in Chapter 9. We will briefly describe it again. The ECM method is considered a highly appropriate dynamic specification when one works with relatively short time series. Under the ECM method, the long run (steady state) relationship being investigated is embodied with a dynamic specification including lagged dependent and independent variables in order to minimise the possibility of estimating spurious relationships. The ECM procedure has the added advantage of separating long-run relationships from the short-run impact in the estimated equation.

The estimation procedure starts with an over-parameterised autoregressive distributed lag (ADL) specification of an appropriate order:

$$MS_t = \alpha + \sum_{i=1}^m b_{1,i} MS_{t-i} + \sum_{i=0}^m b_{2,i} A_{t-i} + \sum_{i=0}^m b_{3,i} AR_{t-i} + u_t \quad (4)$$

where α is a constant, MS is a $(n \times 1)$ vector of market share variables, A is a $(k \times 1)$ vector of own advertising expenditure, AR is a $(k \times 1)$ vector of rivals' advertising expenditures, and b_1 , b_2 , and b_3 are $(n \times n)$, $(n \times k)$ and $(n \times k)$ matrices of parameters.

Equation (4) is then reparameterised in terms of differences⁶ and lagged levels so as to separate the short-run and long-run multipliers of the system.

$$\Delta MS_t = \alpha + \sum_{i=1}^{m-1} b_{1,i}^* \Delta MS_{t-i} + \sum_{i=0}^{m-1} b_{2,i}^* \Delta A_{t-i} + \sum_{i=0}^{m-1} b_{3,i}^* \Delta AR_{t-i} + c_1 MS_{t-m} + c_2 A_{t-m} + c_3 AR_{t-m} + u_t \quad (5)$$

where $c_1 = -(I - \sum_{i=1}^m b_{1,i})$, $c_2 = (\sum_{i=0}^m b_{2,i})$, $c_3 = (\sum_{i=0}^m b_{3,i})$

and where the long-run multipliers of the system are given by $\frac{c_2}{c_1}$ (long run effect of own advertising on market share) and $\frac{c_3}{c_1}$ (long run effect of rivals' advertising on the

⁶ Taking the difference of a variable between two periods removes any trend component in the time series and, thus, minimises the problem of spurious correlation.

firm's market share). The short-run effects of own and rival advertising are measured by the coefficients of the differenced advertising variables .

Equation (5) constitutes the maintained hypothesis of our specification search. This general model is tested down (using OLS), by dropping statistically insignificant lag terms, and imposing data-acceptable restrictions on the regression parameters. The testing procedure continues until a parsimonious error correction representation is obtained which retains the a priori theoretical model as its long run solution. To be acceptable, the final equation must satisfy various diagnostic tests relating to the OLS error process. Equation (5) is estimated for each firm. This allows us to examine whether the long-run advertising elasticities are equal across firms.

10.5 Estimation Results

Monthly market share and advertising expenditure data of the seven leading firms are provided by the Jakarta-based market research company, Survey Research Indonesia (SRI). SRI collects advertising expenditures and market shares of all advertised brands on a monthly basis. It estimates advertising expenditure for each brand by valuing the recorded time length of each television and radio commercial, and the size of all print advertisements. Market shares for each brand are estimated by surveying 1200 stores in the nine main urban centres of Indonesia: Jakarta, Bandung, Semarang, Solo, Yogyakarta, Surabaya, Medan, Palembang, and Padang. The sample period is August 1992 to October 1995, generating a total of 39 observations for each firm. These seven firms account for over 90 per cent of total industry cigarette sales and advertising expenditure during this period.

Own advertising expenditure (A) is the firm's monthly advertising expenditure. To calculate rivals' advertising expenditure (AR), we make the valid assumption that all kretek and white cigarette producers are competing with each other for market share. Thus, rival advertising is the total advertising expenditure of the other six competing firms.

All variables are used in log form so that the coefficients can be directly interpreted as constant elasticities.⁷ The final parsimonious estimates of changes in market shares are reported in Table 10.2 together with the diagnostic statistics. The long-run advertising elasticities derived from the estimated coefficients of the lagged level variables are also reported in Table 10.2. A summary of the long-run elasticities is reported in Table 10.3. The long-run elasticities tell us the percentage change in market share due to a change in own advertising and rival's advertising outlays once all the short-run dynamics have worked themselves out.

All the equations pass the F-test for overall significance at the one per cent level. Statistically, the equations performed very well, exhibiting no problems of functional form misspecification (RESET), heteroskedasticity (HSC), or serial correlation (LM). We included a time trend (T) in each firms' market share equation to capture any other systematic factors (product quality, brand strategies) that affect changes in market shares beyond advertising competition, but not included in our model. The time trend variable is statistically significant in all equations except for Rothmans. The statistically insignificant time trend is dropped from the Rothmans equation.⁸

⁷ In all cases the log-linear specification was preferable to the linear specification in terms of Ramsey RESET test for functional form misspecification.

⁸ Rothman's did not spend on advertising for several monthly observations during the period 1992 to 1995 (see Figure 9B in the appendix of Chapter 9). To allow a log form of the advertising expenditure variable, we replace the zero expenditure values with Rp1 value (equivalent to 0.25 US cents in 1995).

Table 10.2

Effect of Advertising on Firms' Market Shares: Regression Results

(1) Gudang Garam

$$\Delta MS_t = 0.74 + 0.006 A_{t-1} - 0.003 AR_{t-1} - 0.19 MS_{t-1} - 0.001 T$$

(2.1)** (2.2)** (0.7) (2.2)** (4.1)*

Long-run own advertising (A) elasticity = 0.031 (t-ratio = 2.1)**

Long-run rivals' advertising (AR) elasticity = -0.017 (t-ratio = 0.8)

$R^2 = 0.32$ $F(4, 33) = 5.44$ $LM-F(1, 32) = 0.02$ $RESET(1, 32) = 0.03$

$JBN(2) = 0.71$ $HSC(1, 36) = 1.82$

(2) Djarum

$$\Delta MS_t = 0.85 + 0.01 \Delta A_t - 0.003 A_{t-1} + 0.003 AR_{t-1} - 0.29 MS_{t-1} - 0.003 T$$

(2.0)** (1.9)** (0.5) (0.5) (2.2)** (2.1)**

Long-run own advertising (A) elasticity = -0.011 (t-ratio = 0.4)

Long-run rivals' advertising (AR) elasticity = 0.011 (t-ratio = 0.4)

$R^2 = 0.23$ $F(1, 36) = 3.27$ $LM-F(1, 30) = 0.044$ $RESET(1, 30) = 0.04$

$JBN(2) = 1.25$ $HSC(1, 36) = 0.11$

(3) Sampoerna

$$\Delta MS_t = 0.47 + 0.015 \Delta AR_t + 0.021 AR_{t-1} + 0.005 A_{t-1} - 0.39 MS_{t-1} + 0.008 T$$

(2.4)* (1.6)* (2.3)** (1.1) (3.3)* (3.3)*

Long-run own advertising elasticity (A) = 0.013 (t-ratio = 1.2)

Long-run rivals' advertising (AR) elasticity = 0.055 (t-ratio = 2.7)*

$R^2 = 0.17$ $F(5, 32) = 2.55$ $LM-F(1, 31) = 3.94$ $RESET(1, 31) = 0.14$

$JBN(2) = 0.75$ $HSC(1, 36) = 1.49$

(4) Bentoel

$$\Delta_2 MS_t = 0.46 + 0.007 \Delta A_t + 0.012 \Delta A_{t-1} + 0.023 \Delta A_{t-2} + 0.036 A_{t-3} - 0.012 AR_{t-1} - 0.40 MS_{t-2} - 0.004 T$$

(2.0)** (2.2)** (2.6)* (4.0)* (5.1)* (1.1) (5.3)* (5.1)*

Δ_2 denotes second difference ($MS_t - MS_{t-2}$)

Long-run own advertising (A) elasticity = 0.09 (t-ratio = 3.8)*

Long-run rivals' advertising (AR) elasticity = -0.03 (t-ratio = 1.1)

$R^2 = 0.64$ $F(7, 28) = 10.0$ $LM-F(1, 27) = 0.007$ $RESET(1, 27) = 0.22$

$JBN(2) = 0.28$ $HSC(1, 34) = 0.60$

(5) British American Tobacco (BAT)

$$\Delta MS_t = 0.97 + 0.006 \Delta A_t - 0.023 \Delta AR_t + 0.020 A_{t-1} - 0.043 AR_{t-1} - 0.39 MS_{t-1}$$

(3.6)* (1.1) (1.4)*** (2.7)* (2.7)* (3.8)*

$$+ 0.004 T$$

(3.9)*

Long-run own advertising (A) elasticity = 0.05 (t-ratio = 2.6)*

Long-run rivals' advertising (AR) elasticity = -0.11 (t-ratio = 2.3)*

$R^2 = 0.32$ $F(6, 31) = 3.9$ $LM-F(1, 30) = 3.90$ $RESET(1, 30) = 3.7$

$JBN(2) = 0.96$ $HSC(1, 36) = 0.0002$

(6) Marlboro

$$\Delta MS_t = 2.55 + 0.023 \Delta A_t + 0.041 \Delta A_{t-1} - 0.007 \Delta AR_t - 0.054 \Delta AR_{t-1}$$

(5.1)* (2.1)** (3.0)* (0.5) (3.5)*

$$- 0.088 \Delta AR_{t-2} + 0.056 A_{t-2} - 0.133 AR_{t-3} - 0.81 MS_{t-1} + 0.012 T$$

(4.4)* (3.0)* (5.2)* (5.7)* (5.4)*

Long-run own advertising (A) elasticity = 0.069 (t-ratio = 3.2)*

Long-run rivals' advertising (AR) elasticity = -0.166 (t-ratio = 7.1)*

$R^2 = 0.52$ $F(9, 26) = 5.2$ $LM-F(1, 25) = 0.04$ $RESET(1, 25) = 1.55$

$JBN(2) = 1.71$ $HSC(1, 34) = 5.13$

(7) Rothmans of Pall Mall (Dunhill)

$$\Delta_2 MS_t = 0.89 - 0.016 \Delta_2 AR_t - 0.056 AR_{t-2} - 0.002 A_{t-2} - 0.34 MS_{t-2}$$

(2.5)* (0.9) (2.4)* (1.2) (3.4)*

Long-run own advertising (A) elasticity = 0.007 (t-ratio = 1.2)

Long-run rivals' advertising (AR) elasticity = -0.167 (t-ratio = 2.3)*

$R^2 = 0.32$ $F(4, 32) = 5.3$ $LM-F(1, 31) = 0.13$ $RESET(1, 31) = 1.01$

$JBN(2) = 0.59$ $HSC(1, 35) = 0.23$

* t-ratios of regression coefficients are given in brackets with the level of statistical significance (one-tailed test) denoted as * 1 per cent, ** 5 per cent, *** 10 per cent.

Test statistics

LM Lagrange multiplier for serial correlation; *RESET* Ramsey RESET test for functional form misspecification; *JBN* Jarques-Bera test for normality of residuals; *HSC* test for heteroskedasticity (based on squared residuals). All tests are based on the F-distribution, except JBN, which is based on the χ^2 distribution. The degrees of freedom for the respective tests are given in brackets.

Table 10.3

Summary of Results: Long-Run Advertising Elasticities and Time Trends

Rank	Firm	A 10% increase in own advertising will increase market share by	A 10% increase in rivals' advertising will reduce market share by	Time Trend
1	Gudang Garam	0.31**	0.17	-0.001*
2	Djarum	-0.11	-0.11	-0.003**
3	Sampoerna	0.13	-0.55*	0.004*
4	Bentoel	0.90*	0.30	-0.004*
5	BAT	0.50*	1.10**	0.004*
6	Malboro	0.69*	1.66*	0.012*
7	Rothmans	-0.07	1.67**	insignificant

* Denotes t-ratios of the regression coefficients statistically significant (one-tailed test) at * 1 per cent, ** 5 per cent, *** 10 per cent level.

With the exception of Sampoerna, Djarum and Rothmans, a firm's own advertising expenditure (A) has a positive and statistically significant effect on its market share, as indicated by the long-run own advertising elasticities reported in Table 10.3. The elasticities tell us that a 10 per cent increase in own advertising will increase Gudang Garam's market share by 0.31 per cent; Bentoel's by 0.9 per cent; BAT's by 0.50 per cent; and Malboro's share by 0.69 per cent. These elasticities are not high, but are comparable to those estimated for other countries (Table 10.1). Djarum's advertising has a negative, but statistically insignificant, effect on its market share in the long-run. Examining Djarum's estimated market share equation in Table 10.2 (equation 2), it is apparent that Djarum's advertising only has a short-run effect on its market share. This is indicated by the positive and statistically significant coefficient (0.01) on the difference term ΔA_t and the insignificant coefficient on the long-run advertising elasticity. Sampoerna's long-run advertising elasticity is positive, but just falls short of statistical significance at the 10 per cent level (equation 3, Table 10.2).

Rothmans' advertising has no effect on its market share, both in the short-run and long-run (equation 7, Table 10.2). The result for Rothmans is not unexpected, and is consistent with their misdirected advertising campaign in the mid-1990s. During this period Rothmans launched two advertisements for their Dunhill brand. The first advertisement depicted scenes from the Indonesian soccer league competition. Soccer is the favourite sport among the lower income groups in Indonesia. The second advertisement depicted a successful, young Indonesian businessman dining with his

beautiful fiancée in London. This campaign was obviously directed at the lifestyle aspirations of the urban professional. Given these two opposing images, it is not surprising that the campaign failed to associate Dunhill with the aspired lifestyle of a particular group of smokers. Consequently, the advertising campaign did not persuade smokers to switch to Dunhill, and sales hardly moved.

Rivals' advertising has a negative and statistically significant effect on the market shares of the three smallest firms, as indicated by the long-run rival advertising elasticities reported in Table 10.3. A 10 per cent increase in all competitors' advertising will reduce BAT's market share by 1.1 per cent; Malboro's by 1.66 per cent; and Rothman's by 1.69 per cent. In the case of Bentoel, rivals' long-run advertising elasticity is negative, but just falls short of statistical significance at the 10 per cent level. Rivals' advertising has no significant negative effect on Gudang Garam's and Djarum's market shares. In the case of Sampoerna, rival's advertising has an unexpected positive and significant effect on its market share. These results suggest that larger firms' (Gudang Garam, Djarum, and Sampoerna) market shares are less affected by competitors' advertising. Conversely, smaller firms' (BAT, Malboro, Dunhill) market shares are more vulnerable to competitors' aggregate advertising outlays. This arises because the more successful, larger firms have an image advantage over the smaller firms. This image advantage is an asymmetry that constitutes a barrier to upward mobility of smaller, less-favoured existing firms.

A notable feature of Table 10.3 is that the smaller firms' rival advertising elasticities are larger than their own advertising elasticities, except for Bentoel. This tells us that an equal percentage increase in all firms' advertising expenditure will have a negative net effect on the market shares of the smallest firms. For example, a 10 per cent increase in BAT's advertising expenditure will increase its market share by 0.50 percent, while a 10 per cent increase in rivals' aggregate advertising will reduce BAT's market share by 1.1 per cent. The net effect of a 10 per cent increase in advertising outlays by all firms is a 0.60 per cent reduction in BAT's market share in the long-run. Similarly, a 10 per cent increase in all firms' advertising expenditure will reduce Malboro's market share by 0.97 per cent and Rothman's share by more than 1.69 per cent. This is consistent with our argument that smaller, less-favoured firms have an image disadvantage relative to the more successful, larger firms and,

thus, are more sensitive to rivals' aggregate advertising outlays. This finding is important, and is often overlooked in the industrial organisation literature. For example, Roberts and Samuelson (1988) made the assumption (without testing it) that the advertising effect on market share is equal across firms. Davies and Goreski (1997: 387) specified advertising competition as a zero-sum game with the leading five firms in the market: an equal percentage increase in advertising by all five firms will leave market shares unchanged. In other words, the effectiveness or productivity of each \$1 spent on advertising is the same for all firms. Our results clearly refute this assumption of equality. An equal percentage increase in advertising by all leading firms will change the distribution of market shares in favour of the more successful, larger firms in the long-run. The implication of this finding is that smaller firms must spend more on advertising than larger firms to defend or increase their market shares. This result is consistent with the observation made in the previous chapter that the smaller firms tend to spend a greater proportion of their sales revenue on advertising than their larger rivals.

The carryover effect of advertising on market share appears to be short-lived. Own advertising and rivals' advertising tend to have at most a one month lag effect on the market shares of most firms. There are a few exceptions. Malboro's advertising has a two month lag effect on its market share. Bentoel's advertising has a three month lag effect on its market share. Our results are consistent with recent evidence for the U.S cigarette industry that the effect of advertising on cigarette demand is short-lived (Boyd and Seldon, 1990). Further, current (i.e., this month's) advertising positively affects current (this month's) market share in only three of the seven firms (Djarum, Bentoel and Malboro). This indicates that it takes more than one month from the time the advertisement commenced before there is a significant increase in market shares of the majority of firms. A lagged response in market share is expected because it takes an extended period of repetitive advertising to persuade smokers to switch brands.

Finally, the results show that the coefficients of the time trends (T) are negative for Gudang Garam, Djarum, and Bentoel, and positive for Sampoerna, BAT and Malboro. This indicates that there are other systematic factors beyond advertising expenditures that are shifting market share from Gudang Garam, Djarum, and Bentoel

to the other three firms. In Djarum's case, the negative time trend is partly capturing Djarum's own strategy of down-sizing to fall into a lower excise tax bracket during this period.⁹ Sampoerna's rising market share has as much to do with its brand strategy as it has with its large advertising budget. As mentioned in Chapter 9, part of Sampoerna's success during the last decade has been its strategy of identifying and targeting profitable market segments such as the 'premium kretek' and low-tar, low-nicotine segments. The shift in market share to Marlboro and BAT is indicative of the small shift in demand away from kretek to white cigarettes in the 1990s, and is partly the result of the minimum price and excise tax changes described in Chapter 9.

10.6 Summary

Our study stands out from previous research on the market share effects of advertising on a number of grounds. First, instead of imposing a pre-determined lag structure on the data, we search for the lag structure which is data-acceptable. Second, we make use of the error correction modeling procedure which is considered as a highly appropriate dynamic specification when one works with relatively short time series. The ECM procedure has the added advantage of separating long-run relationships from the short-run impact in the estimated equation. Third, we exploit monthly advertising and market share data which is considered more appropriate than annual data in these kind of studies. Finally, unlike most other studies, our data set has time series sufficiently long to support a regression analysis for a single firm. This allows us to investigate whether the success of advertising differs among firms.

Our results show that advertising competition does shift market shares among firms. Increases in own advertising expands market share in four of the seven firms. Increases in rivals' advertising reduces market share in three firms. An important finding of our study is that an equal increase in advertising by all firms will change the distribution of market shares in favour of the more successful, larger firms in the long-run. This arises because larger firms have an image advantage over the smaller firms. This image advantage is an asymmetry that constitutes a barrier to upward mobility of smaller, less-favoured existing firms.

⁹ This is also consistent with the observed decline in Djarum's relative advertising expenditure during this period, as depicted in Figure 2 of the Appendix to Chapter 9.

Regulation and Competition in the Cement Industry

11.1 Introduction

This Chapter analyses the role of government policies in shaping the structure of the cement industry and the nature of competition among firms. In Indonesia, cement is considered as a 'strategic' commodity because of its importance to the construction sector and the importance of that sector to economic development. As a result, there is substantial public sector investment in the industry. Five of the nine producers are government-controlled firms. These firms produced around 38 per cent of total cement production in 1994. Until 1998, the industry was heavily regulated. There were regulations governing the distribution of cement, both domestically and for exports, and the setting of reference retail prices.

The objective of the regulatory regime was to ensure a continuous supply of cement to all provinces at reasonable and stable prices. The analysis of this Chapter shows that the distribution arrangements had limited success in ensuring a continuous supply at stable prices in the face of cyclical demand for cement. Rather, the government regulated distribution arrangements exacerbated price instability by reducing the contestability of regional markets, deterring new entry and erecting barriers to competing imports. Administrative allocation of supplies prevented supplies from other regions, including imports, entering to dampen price increases when demand rose. The distribution arrangements resembled a cartel. Regional markets and market shares were allocated among firms. The Indonesian cement producers association and the Ministry of Industry and Trade monitored compliance with the distribution system by acting as 'trading posts' whereby market information – market shares, export and import data – was collected by them and widely disseminated among producers. The administered retail prices acted as floor prices during periods of excess capacity. The

industry was a classic case of 'capture' by private commercial interests taking over, and benefiting from, a national 'development objective'.

The remainder of this Chapter is divided into six sections. Sections 2 and 3 discuss the development of the cement industry over the last three decades. Section 4 examines the demand conditions of the industry and estimates the price and income elasticities of demand. Section 5 analyses the role of government policies in shaping the structure of the industry and the nature of competition. Section 6 discusses the competitive implications of the domestic distribution channels. Finally, section 7 summarises the main findings of the Chapter and discusses the competitive implications of the recent deregulation of the industry under the IMF structural reform programme.

11.2 The Development of the Indonesian Cement Industry

Portland cement is one of the oldest heavy industries in Indonesia.¹ Table 1.1 lists the nine cement plants that operate in the Indonesian cement industry. The first cement factory was built in Indarung, West Sumatra in 1910 by the Dutch firm N.V. Nederlands Indische Portland Cement Maatschappij. This company held a monopoly position in Indonesia until the Japanese confiscated the plant during World War II. After the war the Dutch reclaimed ownership of the factory. In 1958 the Soekarno government nationalised the cement plant and renamed it Semen Padang (semen is the bahasa Indonesia word for cement). The Soekarno government built the second cement factory in Gresik, East Java in 1957. The third government-owned cement plant was completed in Tonasa, South Sulawesi in 1968 with financial and technical assistance from the Czechoslovakian government.

Table 11.2 shows the capacity and production levels of cement from 1961 to 1994. Figure 11.1 provides a visual interpretation of the growth in cement capacity and production since 1961. Between 1961 and 1967 cement capacity remained constant at 485,000 tonnes per annum. Capacity increased to 715,000 tonnes in 1969 as a result of the coming on stream of the Tonasa plant in 1968 and capacity expansion at Semen

¹ Portland cement is a mineral binding agent. It is well known as the fine grey powder which, when mixed with sand, aggregate and water in appropriate proportions, sets to form concrete.

Padang. Under the New Order, capacity and production of cement has grown at the fastest rate since independence, reflecting rapid industrialization of the economy during this period, and the opening up of the sector to both domestic private and foreign investment. Between 1968 and 1975 capacity tripled to top 2.05 million tonnes as a result of two new entrants, Semen Cibinong and Indocement. Semen Cibinong started out as a government-foreign joint venture between the Swiss cement producer Kaiser Group (75 per cent equity) and the state-owned Semen Gresik (25 per cent equity). In 1979 Gresik sold its share to Tirtamas Majutama, a private domestic company owned by Hashim Djojohadikusumo, the son of the famous Indonesian economist Sumitro Djojohadikusumo. Later in 1988, Tirtamas purchased Kaiser's controlling share in Semen Cibinong, and the company changed its status from a foreign joint venture to a private domestic company. Indocement is majority owned by Liem Sioe Liong the founder of Indonesia's largest conglomerate (Salim group) today and a close associate of former President Soeharto. The government purchased 35 per cent equity in Indocement as part of a 'bailout' package in the mid-1980s.

Table 11.1

Producer Ownership, Location and Capacity

(a) Producer Ownership and Location

Firm	Starting Year	Location	No. of Kilns	Ownership
Semen Padang	1910	Indarung, West Sumatra	5	Semen Gresik/Govt
Semen Gresik	1957	Gresik and Tuban, East Java	4	Govt/Public/Foreign*
Semen Tonasa	1968	Tonasa, South Sulawesi	2	Semen Gresik/Govt
Indocement	1976	Citireup, West Java	9	Salim Group/public/govt
Semen Cibinong	1976	Narogong, West Java	3	Hashim Djojohadikusumo/public
Semen Nusantara	1977	Cilacap, Central Java	1	Semen Cibinong
Semen Baturaja	1980	Baturaja, South Sumatra	1	Govt
Semen Andalas	1983	Belawan, Aceh	1	Foreign/public
Semen Kupang	1984	Kupang, NTT	1	Govt

(b) Installed Capacity, 1965 - 1994 (000s of tonnes)

Firm	1965			1975			1985			1994		
	Capacity	%Cap	%MS	Capacity	%Cap	%MS	Capacity	%Cap	%MS	Capacity	%Ca	%MS
Semen Padang	110	23		330	16	27	2130	12	13	3000	13	11
Semen Gresik	375	77		500	24	44	1500	9	13	4100	17	9
Semen Tonasa	---			120	6	10	1210	7	6	1180	5	7
Indocement	---			500	24	10	8700	50	41	9500	40	47
Semen Cibinong	---			600	29	9	1500	9	10	3000	13	11
Semen Nusantara	---	---					750	4	7	1100	5	5
Semen Baturaja	---	---					500	3	4	500	2	3
Semen Andalas	---	---					1000	6	5	1100	5	6
Semen Kupang	---	---					120	0.7	1	120	0.5	1
Total Industry Cap	485	100	100	2050	100	100	17510	100	100	23600	100	100

Source: Indonesian Cement Producers Association. Notes: %Cap indicates percentage share of total industry capacity; %MS indicates percentage market share in terms of actual cement sales. *Mexican cement producer, Cemex, purchased 14 per cent of total shares in Gresik from the government in 1998.

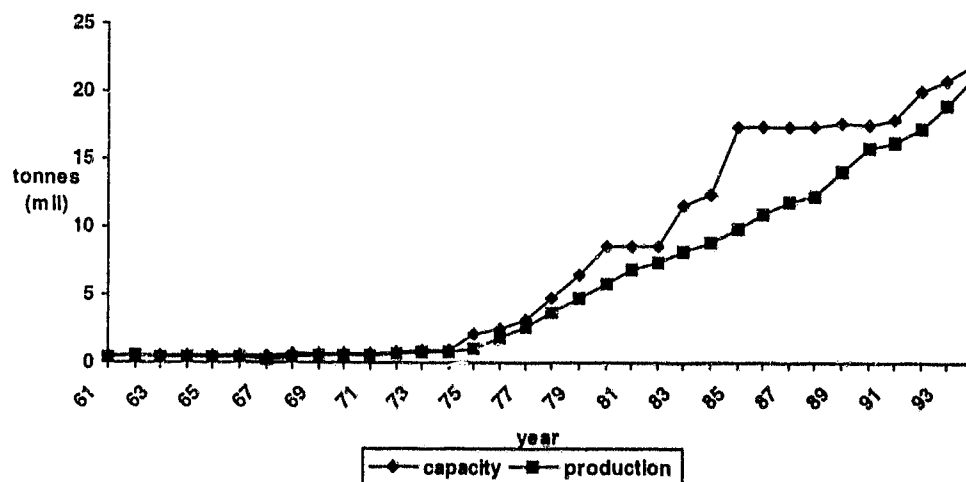
Table 11.2 **Cement Capacity and Production, 1961-94**
(million of tonnes)

Year	Capacity	Production	Capacity Utilisation (%)
1961	0.49	0.45	92
1965	0.49	0.39	80
1970	0.72	0.55	76
1975	2.05	1.09	53
1980	8.50	5.83	69
1985	17.40	9.81	56
1990	17.50	15.78	90
1994	22.00	21.00	95

Source: Indonesian Cement Producers Association

Figure 11.1

Capacity and Production of Cement, 1961-94
(million of tonnes)



Between 1975 and 1985, total industry capacity increased eightfold to top 17 million tonnes. Indocement's capacity expanded the greatest during this period. Its capacity increased from 500,000 tonnes in 1975 to 8.7 million tonnes (or 51 per cent of total industry capacity) in 1985 to become the largest cement producer in Indonesia (Table 11.1). According to Sato (1993: 418), Indocement aggressively expanded capacity to 'overcome the long standing market advantage held by the state-owned producers and to beat out foreign investors who were also moving into the industry'. During this period two new government-owned factories were built. Semen Baturaja (located in Baturaja in South Sumatra) began production in 1980 with a capacity of 500,000 tonnes, and Semen Kupang (located in Kupang, West Timor) commenced operations

in 1984 with a capacity of 120,000 tonnes. Two foreign joint ventures also commenced operations during this period: Semen Nusantara (located in Cilacap, Central Java) and Andalas (located in Belawan, Aceh). Thus, by 1985 almost 60 per cent of cement capacity was generated by domestic private and foreign joint venture investment, and the remaining 40 per cent was government owned.

The drop in oil prices in 1983 and the resulting cancellation of major government infrastructure projects contributed to the fall in cement demand in the mid-1980s. Indocement also experienced severe difficulties in servicing its foreign debt as a result of the devaluation of the Indonesian rupiah in 1983. Sato (1993: 422) describes how Liem used his close connections in government to shift the group's debt burden in cement and other investments in heavy industries (e.g. steel) onto the government. First, to avoid further currency risk the foreign loans were converted by the Indonesian State banks into Rupiah denominated funds in 1983. Second, when the repayments came due in 1985, the group asked and was given permission to reschedule repayments. Third, in June 1985 the government, by an exceptional government regulation (No. 22, 1985), bought up 120,000 shares in this company for Rp.364.3 billion or 35 per cent of total equity. Fourth, in 1989 three charity foundations headed by the then President Soeharto purchased Rp.60 billion worth of Indocement's convertible bonds to assist with fund management. Fifth, in October 1989 another exceptional ministerial decree made possible the listing of Indocement on the Jakarta stock exchange although the company had not made profits during the previous two years, which is a requirement for listing. The company raised Rp.599 billion (about US\$3.4 billion at the average exchange rate of US\$1.00 = Rp.1,770) by this device. About 56 per cent of the raised capital went towards debt repayment. According to Sato the result of this series of exceptional moves was that by the end of 1989 Indocement had moved into the black, and by the end of 1990 it had been transformed into a highly profitable company with a gross profit-sales ratio as high as 37 per cent.

The economic recovery and construction boom after 1987 increased cement consumption, and capacity utilisation rates were well above 90 per cent for most of the first half of the 1990s (Table 11.2). Capacity expanded to reach 23.6 million

tonnes in 1994. However, this expansion in capacity could not keep up with rising demand and seasonal cement shortages developed in the 1990s.

During the 1990s, two acquisitions occurred in the industry, which caused substantial increases in seller concentration. The first of these was Semen Cibinong's takeover of the Japanese-controlled, Semen Nusantara in 1992. The first step in the takeover process was Hashim Djojohadikusumo's (owner of Cibinong) purchase of the local joint venture partner (Gunung Ngadeg Djaya) in 1989, which gave Cibinong a 30 per cent share in Semen Nusantara. Later in 1991, Hashim invoked Indonesia's foreign divestment laws, which required foreign investors to sell their shares after 20 years. Negotiations over the selling price stalemated in 1992. Hashim then threatened to cut supplies of limestone to the cement works. Under Indonesian law foreign companies are not allowed to own the limestone deposits. In Semen Nusantara's case the local partner, Hashim, held the rights to the limestone deposits. This action threatened the viability of Semen Nusantara and after protracted, but failed, court hearings the Japanese sold their 70 per cent share to Semen Cibinong for \$US 48 million, an amount considered as a bargain by some industry analysts (Smith New Court, 1994).²

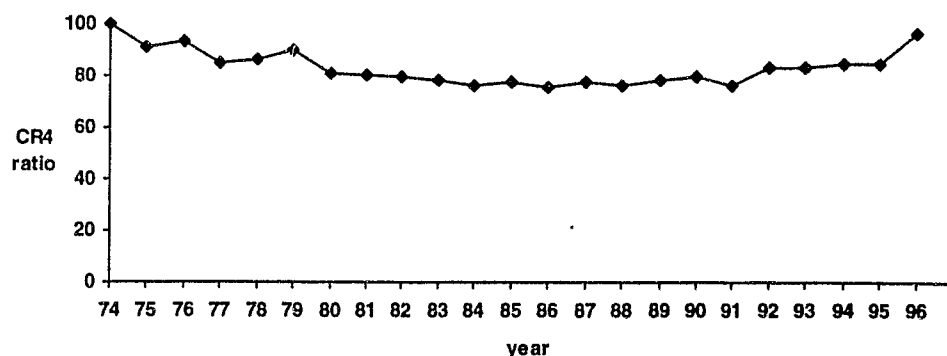
The second acquisition involved three state-owned producers. Semen Gresik, the largest and most profitable state-owned cement producer, was partially privatised in 1995 when the government sold 23 per cent of its shares to the public through the Jakarta stock exchange. One year later, Gresik acquired ownership of two other state-owned factories, Semen Padang and Semen Tonasa, to become the second largest producer with a combined market share of 27 per cent in 1994. In 1998, Mexican cement producer, Cemex, purchased 14 per cent of shares in Gresik, reducing the government's stake in the company to 63 per cent.

The result of these acquisitions was to increase seller concentration. Figure 11.2 shows the trend in seller concentration between 1974 and 1996. The four-firm concentration ratio increased from 76 per cent in 1991 to 83 per cent in 1992, as a

² Smith New Court is an international stock brokerage firm with a subsidiary in Jakarta.

result of Cibinong's acquisition of Nusantara, and to 96 per cent in 1996 as a result of Gresik's acquisition of the two government-owned cement producers.

Figure 11.2 Seller Concentration in the Indonesian Cement Industry



Source: Indonesian Cement Producers Association.

11.3 International Trade in Cement

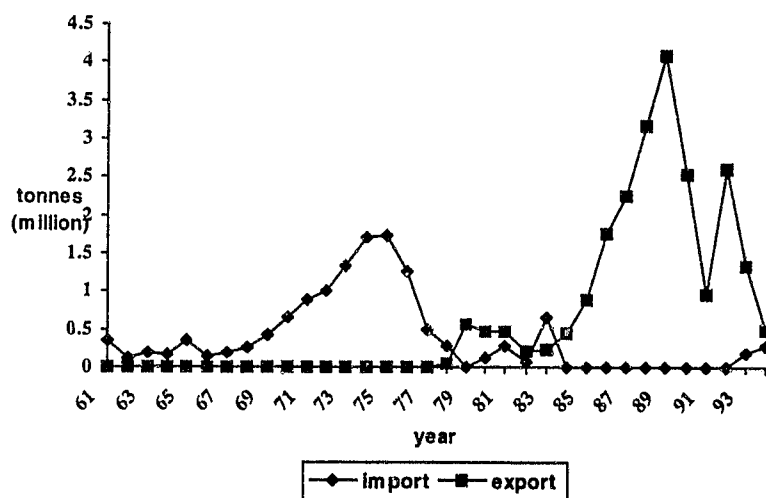
As a result of the rapid expansion in domestic capacity, Indonesia switched from being a net importer of cement in the mid-1970s to a net exporter in the late 1980s. Figure 11.3 shows cement imports and exports between 1961 and 1995. Up until the mid-1970s over half of Indonesia's cement requirements were imported, mainly from Japan. By 1975, Indonesia was importing 1.74 million tonnes of cement, compared to local production of 1.09 million tonnes (an import-penetration rate of 61 per cent). Imports began to decline after Indocement and Cibinong began full commercial operations in 1976 and by the early 1980s no cement was imported.

Part of this import substitution is attributed to tailor-made import protection given to cement producers. In 1974 the government introduced import licences in addition to a 30 per cent tariff on cement imports. These licences were introduced at the time Cibinong and Indocement began constructing their cement plants. Under the licensing system only the cement producers and ten trading companies were allowed to import cement. Initially ten per cent of all imports were allocated to domestic producers, 60 per cent to government-owned trading companies, and the remaining 30 per cent to private domestic trading companies. Many of the latter were affiliated to the cement

producers through interlocking ownership arrangements. The private trading companies were restricted to supply West Java, Jakarta, and West Kalimantan, the former two being the major markets.³ The amount of imports was specified and as such there was a built-in quota under this system. The amount of imports allowed was determined after discussions between the interdepartmental team and the Cement Producers Association (Asosiasi Semen Indonesia), representing all cement producers.

Figure 11.3

Exports and Imports of Cement, 1961-95



Source: Indonesian Cement Producers Association

In response to the rising cement shortages in the 1990s, the government removed the 30 per cent tariff and all official quantitative restrictions on cement imports in 1990. Imports of cement have remained low, at around 1.4 per cent of total domestic supply in 1994. Most of these imports are concentrated in the northern and eastern parts of Indonesia - markets that are closer to producers in The Philippines than to most domestic producers (see Table 11.8 below). The low import penetration rates are not unusual in the cement industry and can be partly explained by the structural characteristics of the product. First, cement is a bulk low value commodity, so transportation costs make up a relatively high proportion of the retail price. Data on transportation costs, as a share of regional retail prices, are not available. However,

³ In 1976 the Director General of Domestic Trade was given power to vary the respective shares of the trading companies.

rough estimates of average shares can be extracted from the Input-Output Tables. According to the 1990 Tables, in cement the domestic transport cost margin alone was 12 per cent of average producer price, compared with the manufacturing average of around 5.0 per cent. As transport costs are an important component of the price of cement to consumers, there will be a significant margin between ex-factory and import prices. Thus, we would expect some natural protection from import competition in local markets further away from foreign exporters.

Second, cement, if imported in bulk, requires specialised transportation and port unloading and storage facilities. This requires significant investment in equipment and silos (storage tanks). As a consequence, bulk cement imports are normally undertaken by specialised cement importers, distributors and producers. In Indonesia, many of the producers and some of their main distributors have port unloading facilities but, according to a World Bank (1996) report, these unloading and storage facilities are not available to third party importers. However, according to an interview with executives from Cemex, imports of bagged cement do not require specialised unloading and storage facilities at the port. They can easily be imported using standard containers. Thus, general importers and/or construction companies can import bagged cement without having to invest in specialised facilities. However, according to the same interview, ship and overland transportation costs per unit of bagged cement can be substantially higher compared with bulk cement, as there are significant economies of scale in transportation.

Distribution controls in the Indonesian cement industry also made it difficult to import cement, and this partly explains the low imports in the 1990s as well. Distribution controls are discussed in sections 5 shortly.

With the emergence of excess capacity in Indonesia in the mid-1980s, three producers – Semen Andalas, Semen Padang and Indocement – began to export cement and clinker,⁴ so as to maintain full production capacity. By 1989 exports of cement reached 2.6 million tonnes and exports of clinker reached 1.5 million tonnes, or 23.5

⁴ Clinker are marble-sized chunks that go through a process of grinding to produce cement.

per cent of total industry capacity. Most of these exports went to Bangladesh and Sri Lanka. Producers export cement at prices lower than those charged to domestic consumers. This arises because transportation costs create a margin between ex-factory prices and import prices in local markets, which in turn allows local producers to price discriminate between the domestic market and the more competitive export markets. For example, estimates of Semen Padang's average fob export prices were 50 per cent lower than its local wholesale price in Padang in 1994 (Table 11.3).

Table 11.3
Comparison of Semen Padang Export and Wholesale Prices in 1994
 (US\$/40kg)

Price	1994
Export price	1.41
Wholesale price	2.91

Notes. The export price is estimated by calculating the average fob export price per 40kg of cement. Wholesale price refers to Semen Padang's average wholesale price in Padang, converted into US dollars at the average 1994 exchange rate of US\$1.00=Rp.2,160.

Ex-factory prices are not available.

Source: BPS, Export Statistics and Indikator Ekonomi.

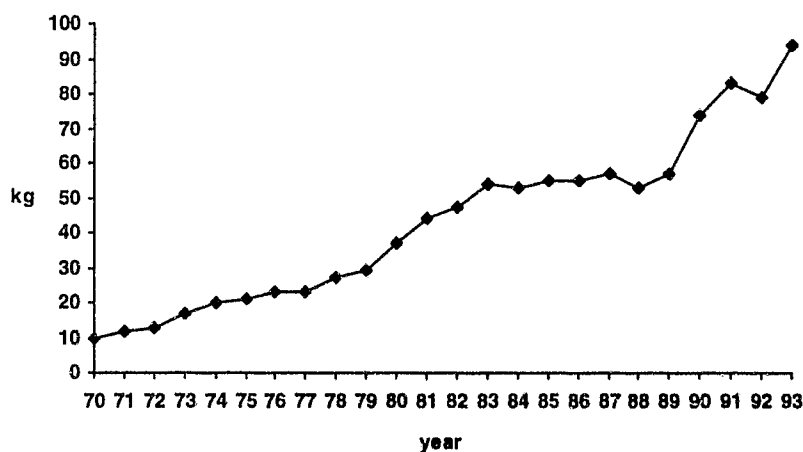
In response to the rising cement shortages in the 1990s, the government also imposed export quotas on producers. Under the quota system, each export order was required to have approval from the Ministry of Industry and Trade. The decision to give approval was based on the Ministry's assessment of the demand and supply conditions at the time. The drop in exports after 1990 was a direct result of restrictive export quotas. Producers complained that the quotas disrupted exports and hindered the development of long-term relationships with overseas buyers. For example, in 1995 Semen Padang was forced to cancel an export order to Bangladesh that had already been delivered to the local harbour, apparently resulting in the loss of a long-term buyer.

11. 4 Demand Conditions of Cement

Demand for cement is derived from the demand for construction activities. The primary determinant of the level of construction activity is economic growth. This is strongly influenced by government through macro-economic policy and the development budget, especially infrastructure provision. Because of its dependence on

growth, demand for cement can be potentially unstable - a widespread slowdown in the rate of growth can cause significant falls in cement consumption. Figure 11.4 depicts per capita consumption of cement during the period 1970 - 1994. Per capita consumption is measured as the annual consumption of cement (in kilograms) over the total Indonesian population. It is apparent that cement consumption per person has increased substantially over the last 25 years, and this is indicative of rapid industrialisation. Cement consumption increased from 10.2 kilograms per person in 1970 to 94 kilograms in 1993. The average annual growth of consumption for the period was 9.0 per cent.

Figure 11.4 **Per Capita Consumption of Cement**
(kilograms)



Annual Growth Rate		(%)
1970-94		9.0
<i>Sub-periods:</i>		
Oil boom	1970-83	12.2
Low growth	1983-88	0.4
<u>Economic recovery</u>	<u>1988-94</u>	<u>11.3</u>

Table 11.4 shows the consumption of cement according to different regions in Indonesia between 1980 and 1993. In 1993, Java accounted for 68 per cent of total consumption, of which West Java contributed 22.8 per cent, Jakarta 19 per cent, East Java 13.6 per cent, and Central Java 11 per cent. Sumatra accounted for a further 18.4 per cent of total consumption. The other regions (Kalimantan, Sulawesi, Nusa Tenggara, Irian Jaya and Maluku) accounted for the remaining 13.6 per cent of total

consumption. Growth in demand for cement has been relatively uniform across all regions over the period 1985 to 1993, as indicated by the relatively constant regional percentages in total consumption.

Table 11.4 **Regional Consumption of Cement**
(000s of tonnes and % share of national consumption)

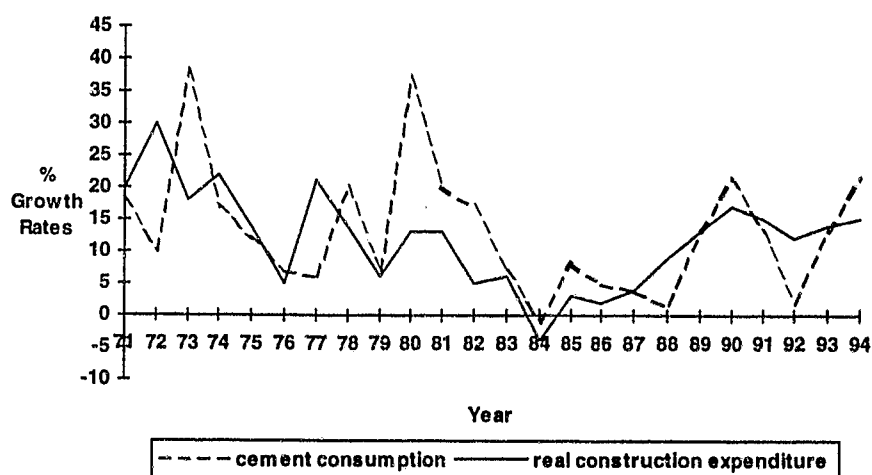
Year		1980	1985	1993
Sumatra	Vol	1390	1708	3278
	%	24.8	18.8	18.4
Java	Vol	3429	6152	12186
	%	61.2	67.8	68.4
Kalimantan	Vol	151	250	480
	%	2.7	2.8	2.7
Sulawesi	Vol	403	484	926
	%	7.2	5.3	5.2
Nusa Tenggara	Vol	155	357	661
	%	2.8	3.9	3.7
Irian Jaya/	Vol	76	129	273
Maluku	%	1.4	1.4	1.5

Source: Indonesian Cement Producers Association

The demand for cement in Indonesia follows two distinct and persistent cycles. First, cement demand closely follows the pattern of growth in construction activities. Figure 11.5 shows the growth rates in cement consumption and real construction expenditure over the period 1971 to 1994. Real construction expenditure is defined as total national construction expenditure valued at 1983 prices (National Income Statistics, BPS). Examining Figure 11.5, it is apparent that cement consumption is pro-cyclical. That is, cement is positively correlated with construction expenditure. Furthermore, growth in cement consumption fluctuates widely over the business cycle, indicating that cement demand is very sensitive to changes in economic activity.

Figure 11.5

Growth in Cement Consumption and Real Construction Expenditure



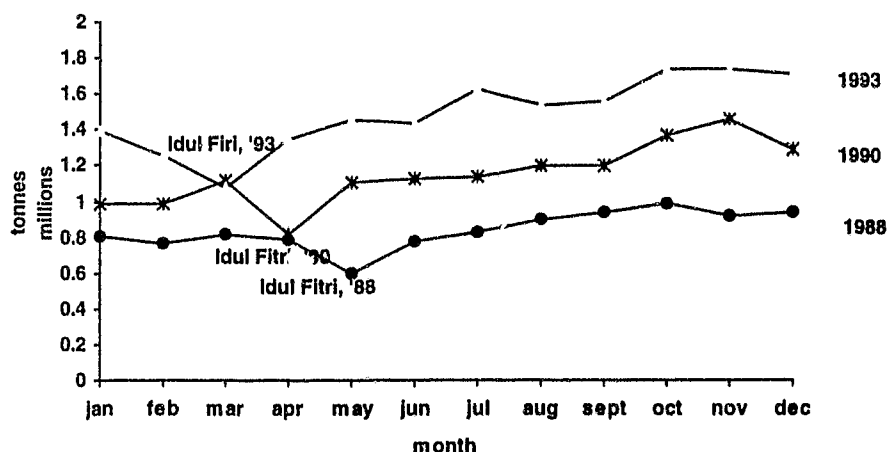
Source: Growth in cement consumption: Indonesian Cement Producers Association.

Real construction expenditure: BPS, National Income Statistics.

Second, cement demand follows a seasonal pattern. Figure 11.6 shows the pattern in monthly cement consumption for selected years: 1988, 1990, and 1993. The figure shows that the demand for cement is higher in the second half of the year than in the first half. Typically, 55 per cent of total cement consumption occurs in the second half of the year and only 45 per cent in the first. This variation in demand reflects the split between the wet (November to March) and the dry season (April to October), and is accentuated by the government's development budgetary allocation of funds for infrastructure projects between April and June of each year. Demand for cement also falls during the month of Idul Fitri (the moslem fasting month) when economic activity slows down across most sectors of the economy, including the construction sector. Usually cement purchases fall by about 30 per cent of average monthly demand during this period. The fasting month moves back 11 days each year and, thus, the fall in cement purchases shifts back 11 days as well.

Figure 11.6

Monthly Cement Consumption for Selected Years: 1988, 1990, and 1993
(Million of Tonnes)



Source: Indonesian Cement Producers Association, ASI

Determinants of Cement Demand

In this section we estimate the price and expenditure elasticities of the demand for cement in Indonesia. As noted earlier, the demand for cement is derived from the demand for construction activities. Several researchers have investigated the determinants of cement consumption for other countries. In general, these studies find that demand is price inelastic and expenditure elastic (Rosenbaum, 1994). We follow these studies and specify the demand function for cement as:

$$Q_t^D = f(\dot{P}_t, \dot{Y}_t) \quad (1)$$

where Q_t^D is the quantity demanded of cement in period t ($t=1 \dots N$), P is the relative price of cement, Y is construction expenditure (proxies demand for construction). P is expected to be inversely related to cement demand. Construction expenditure is expected to be positively related to demand.

In estimating the demand function, it is necessary to allow for possible time lags involved in the hypothesised price and construction expenditure relationships. For this, we make use of the error correction method (ECM). This procedure was discussed in detail in Chapter 9 when we estimated the demand for cigarettes, and we do not need to repeat the discussion here. The sample period is 1970 to 1994. We use annual data. Cement demand is measured by per capita cement consumption. The price of cement is measured by the relative cement price index (ratio of the wholesale cement price index to the producer price index; the base year is 1983). The source is the various issues of Indikator Ekonomi (economic indicators) published by BPS. Construction expenditure is measured by real construction expenditure per capita (National Income Statistics, BPS, various issues). All variables are used in log form so that the coefficients can be directly interpreted as constant elasticities.

The final parsimonious estimates of cement demand are reported in Table 11.5 together with the diagnostic statistics. The long-run construction expenditure and price elasticities derived from the estimated coefficients of the lagged level variables are also reported in Table 11.5. The equation passes the F-test for overall significance at the 5 percent level. Statistically, the equation performed very well, exhibiting no problems of functional form misspecification (RESET), heteroskedasticity (HSC), or serial correlation (LM).

Table 11.5 Determinants of Cement Consumption: Regression Results

$$\Delta Q^d = -2.364 + 1.115 \Delta Y + 0.667 Y_{t-1} - 0.164 P_{t-1} - 0.419 Q^d_{t-1}$$

(2.1)** (1.3)*** (2.4)* (1.4)*** (2.7)*

Long-run elasticity of price with respect to $Q^d = -0.39$

Long-run elasticity of construction expenditure with respect to $Q^d = 1.59$

$R^2 = 0.27$ $F(4, 19) = 3.1$ $LM(1, 18) = 0.33$ $RESET(1, 18) = 1.36$

$JBN(2) = 2.00$ $HSC(1, 22) = 0.26$

* t-ratios of regression coefficients are given in brackets with the level of statistical significance (one-tailed test) denoted as * 1 per cent, ** 5 per cent, *** 10 per cent

Test statistics

LM Lagrange multiplier for serial correlation; *RESET* Ramsey RESET test for functional form misspecification; *JBN* Jarques-Bera test for normality of residuals; *HSC* test for heteroskedasticity (based on squared residuals). Except *JBN* which is based on the χ^2 distribution, all other tests are based on the F-distribution. The degrees of freedom for the respective tests are given in brackets.

As expected, cement price impact negatively and real construction expenditure positively on cement demand. The long-run price and expenditure elasticities are -0.39 and 1.59 respectively. The estimated price elasticity is less than one, suggesting that cement demand is price inelastic: A 10 per cent increase in the relative cement price will reduce cement demand by 3.9 per cent in the long-run. The estimated expenditure elasticity is greater than one, suggesting that cement demand is construction expenditure elastic. A 10 per cent increase in real construction expenditure will increase the demand for cement by 15.9 per cent in the long-run. The short-run construction expenditure elasticity of demand of 1.12 is slightly lower than the long-run expenditure elasticity of 1.59. This suggests that the demand effect of a change in real construction expenditure is slightly greater in the long-run compared with the short-run. In our earlier econometric work we found that the coefficient of the change in the cement price (ΔP) variable was statistically insignificant, and was thus dropped from the model. This result indicates that there is no short-run impact of a price change on cement demand. This result is not entirely unexpected. Developers and construction companies are contractually committed to a construction project and, thus, they have little scope for reducing cement purchases during a short-run period such as a construction project.

11.5 Government Policy and the Nature of Competition

In industrial organisation theory, the cement industry is characterised as a regional oligopoly facing a cyclical pattern of demand (Iwand and Rosenbaum, 1991). Cement plants are geographically dispersed and sell within distinct regional markets, which arise due to the relatively low value of cement compared to the costs of transporting cement (Scherer and Ross, 1990). A few firms primarily serve a particular regional market. The plants operate under conditions of high fixed and sunk costs and, thus, substantial economies of scale. Combined with the limited number of competitors and a low price elasticity of demand, these cost conditions give rise to an oligopolistic pricing structure (Koller and Weiss, 1989). Regional market segmentation introduces two effects: (1) it permits a rigid and discriminatory price structure; and (2) it protects each plant's market to the extent that the plant is a spatial monopolist. A particular

plant feels the effects of competition in areas with an overlap with other firms' plants (McBride, 1983). Over time the boundary of regional markets may become blurred with improvements in transport infrastructure and costs, and cement plants typically penetrate each other's markets at times of excess capacity.

The Indonesian cement industry can be characterised as a regional oligopoly (Table 11.6). There are nine producers, of which the largest four firms accounted for 83 per cent of total domestic supply in 1994. The nine cement plants are geographically dispersed. Transportation costs are an important component of the price of cement to consumers. According to the 1990 Input-Output Tables, in cement the transport cost margin was around 12 per cent of average producer prices, compared to an average margin of 5 per cent for the manufacturing sector as a whole. This provides plants with some natural protection in local markets further away from other suppliers, including foreign exporters. The degree of natural protection in local markets is likely to have declined as real transportation costs have fallen with improvements in transport infrastructure in recent years. This is partly reflected in the decreasing transport cost margins reported in Table 11.6.

Table 11.6

Structure of the Cement Industry

	1985	1994
Number of firms ^a	9	9
National seller CR4 ^a	72	83
Average regional CR2 ^a	96	92
Transport cost margin ^b	19	12
Average for manufacturing sector ^b	7.2	5.0
Price elasticity of demand	0.39 (inelastic demand)	

Source: a) Indonesian Cement Producers Association. b) 1985 and 1990 Input-Output Tables. Transport margin is calculated as the ratio of total transportation costs to value of production at producer prices. The national CR4 ratio increased to 83 per cent in the 1992 as a result of Semen Cibinong acquiring Semen Nusantara. The CR4 ratio increased to 96 per cent in 1996 as a result of Semen Gresik's acquisition of Semen Padang and Semen Tonasa.

However, government regulations have shaped the structure of the industry and the nature of competition.⁵ Until February 1998, when the industry was deregulated, the regulatory arrangements in the cement industry were based on a decree issued by the

⁵ See Plunkett et al (1997) for a recent discussion of the price and distribution arrangements in the Indonesian cement industry.

Minister of Trade in April 1979. The decree governed the distribution of cement, both domestically and for export, and included the setting of retail prices for principal cities in each of the 27 provinces. Table 11.7 lists the main elements of the regulatory arrangement in the cement industry.

Table 11.7 The Regulatory Arrangements in the Cement Industry

Regional Markets	The national cement market is divided into 27 regional sub-markets. Each local market corresponds to a province. Each producer is assigned quotas to particular regional markets. Producers are not permitted to sell cement in non-allocated markets.
Distributors	Producers are allowed to appoint their own distributors
Prices	The Ministry of Industry and Trade sets reference or guidance retail prices for each regional market, known as Harga Pedoman Setempat (HPS). In 1995 the government established reference ex-factory prices, known as Harga Jual Pabrik (HJP)
Imports	Up until 1990, imports of cement were restricted to cement producers and selected trading companies. There was also a 30 per cent tariff on cement imports. All official import restrictions were removed in 1990.
Exports	Export quotas
Investment	New entry was restricted in the mid-1980s
Raw Materials	Foreign owned firms are prohibited from owning limestone deposits.

Source: Decree No. 318/KP/UV/79 of April 21, 1979; Decree No. 147/KP/V/90 of May 28, 1990; Decree No. 48/KP/III/95 of March 31, 1995; Decree No. 10/KP/IV/95 of April 17, 1995; Priority Investment List 1985, BKPM.

Administered prices, distribution controls and the export quota system were eliminated in February 1998 under the IMF Structural Reform programme.

Under the regulatory arrangements, the national cement market was divided into 27 regional markets. Each regional market corresponded to a province. Producers were assigned quotas to specific markets, and were not allowed to sell their product in non-allocated markets. Distribution quotas for the domestic and export markets were negotiated at monthly meetings between officials from the Ministry of Industry and Trade and the Cement Producers Association (Asosiasi Semen Indonesia), which represents the nine cement producers. The Ministry of Industry and Trade also set reference or guidance retail prices for each province, known as Harga Pedoman Setempat (HPS). The Cement Producers Association and the Ministry of Industry and Trade monitored compliance to the distribution system by acting as 'trading posts' whereby market information – regional cement sales, regional retail prices, import and export data – was collected by them and widely disseminated among producers.

The objective of this system was to ensure a continuous supply of cement to all provinces at stable prices. However, as shown below, the distribution system had limited success in stabilising prices in the face of cyclical demand for cement. Rather, the distribution arrangements exacerbated price instability by greatly reducing the contestability of regional markets. The administered allocation of supplies prevented supplies from other regions, including imports, entering to dampen price increases when demand rose. The regulatory arrangements and their effects on competition are discussed in the remaining sections of this Chapter. The cement industry was deregulated in 1998 under the IMF Structural Reform programme. This is discussed later in Section 11.8.

11.5.1 The HPS Pricing Arrangement

The Minister of Industry and Trade set HPS prices for the capital cities of each province. The HPS prices were not fixed prices, but reference or guidance prices. The objective of the HPS price system was to create price stability by providing producers and distributors with benchmark prices.

The reference prices were based on an ex-factory price for cement derived from 'representative' operating costs. The Ministry estimated average production costs of a representative firm based on information collected from domestic producers. Added to this cost base was interest paid on borrowings, depreciation and other overheads to derive operating costs. A 10% gross profit margin was added to this amount to derive the ex-factory price. The HPS price was established by adding transport costs from the closest cement plant or supplier, distribution and retail margins, and value added tax. Thus, HPS prices were lowest in capital cities closer to a cement plant, such as in Jakarta, Bandung, Semarang, Yogyakarta, Surabaya, Padang, Bandar Lampung. Conversely, HPS prices were highest in cities without a cement plant nearby, such as in Manado in North Sulawesi, Jayapura in Irian Jaya, and the capital cities in Kalimantan. HPS prices for 1994 are listed in the appendix to this Chapter. The HPS prices were designed to provide a normal return to the higher cost or least efficient firms. This allowed the lower cost firms to earn a higher return than the one implicit in the HPS price. HPS prices were adjusted upwards every one or two years. The

adjustment was based on the Ministry's assessment of changes in the cost conditions of the industry, demand conditions and installed capacity. For example, increases in HPS prices could be justified on the grounds that it would encourage new investment in the industry or to compensate for rising input costs or exchange rate depreciation.

The basing of HPS prices on the ex-factory plus freight cost from the nearest plant resembles the oligopolistic pricing structure that might occur under an unregulated cement market (McBride, 1983; Iwani and Rosenbaum, 1991; Plunkett et al, 1997). However, there are a number of important differences between the administered HPS system and the price structure that might occur in an unregulated oligopoly. First, the HPS system eliminates any potential for price competition in areas where firms overlap with each other. Second, according to Plunkett et al (1997), the HPS system does not necessarily imitate its efficiency, as in the Indonesian case pricing is not driven solely by commercial considerations. In a deregulated and more contestable market, the producer located closest to the consumer would become the dominant supplier and price leader. Other producers would absorb the additional costs of transport in order to compete in the market. In the short run, producers would be willing to absorb additional transport costs to sell in more distant markets until their marginal revenue equals marginal costs.

Compliance with HPS Prices

As indicated above, HPS prices were not fixed, but reference or guidance prices. Retail prices were allowed to deviate from HPS prices. In practice, HPS prices acted as floor prices and actual retail prices often rose above reference prices, especially during peak demand periods, or when HPS prices had not been adjusted for some time. Typically, retail prices remained close to HPS prices in the first half of the year, but rise sharply in response to increased demand for cement in the second half. In recent years market prices have risen sharply in response to increased demand for cement, and domestic capacity constraints, as a result of the 1990s construction boom. Figure 11.7 shows the variation in actual retail prices from HPS prices in Jakarta for the years 1993 to 1995. In the first eight months after the increase in the HPS price in January 1993, local retail prices remained close to the HPS price - on average they

were one per cent above it. In October 1993, retail prices rose sharply in response to increased demand for cement, and in November peaked at around 14 per cent above the HPS price. Retail prices remained at this level for most of the first half of 1994. They increased again in August, peaking in October 1994 at 56 per cent above the HPS price. Retail prices eased a little in January 1995, but remained around 40 per cent above the HPS price until April 1995. In March the Ministry of Industry and Trade increased HPS prices by an average of 40%, more or less in line with retail prices prevailing at the time. However, in response to consumer outrage the Minister reduced the average HPS price by 14 percentage points a month later, thus, resulting in a net increase of 26 per cent over the pre-March HPS price.⁶ In August 1995 retail prices again rose in response to increased demand, and were 15 per cent above the new HPS price in September. This pattern of retail prices in Jakarta was typical of other provinces at the time. Figure 11.8 shows the variation in actual retail prices for 27 provinces during the period 1993 to 1995. Prices varied most and were highest in regions without a cement plant nearby such as in Irian Jaya, Kalimantan and other parts of east Indonesia.

During periods of cement shortage, according to firm interviews, private producers monitor retail prices and change delivery prices to ensure that part of the increase in retail prices is returned to them (firm interviews). However, because of the non-transparent nature of price setting in the industry the actual proportion returned to private producers is unknown. Their distributors and retailers capture some proportion of the increase in retail prices. Each producer has one main distributor, which in turn appoints sub-distributors to regional markets. The main distributor is affiliated to the private producer through interlocking ownership arrangements, and this allows the producer to capture part of the increase in retail prices through the main distributor changing delivery prices to sub-distributors. For example, the main distributor of

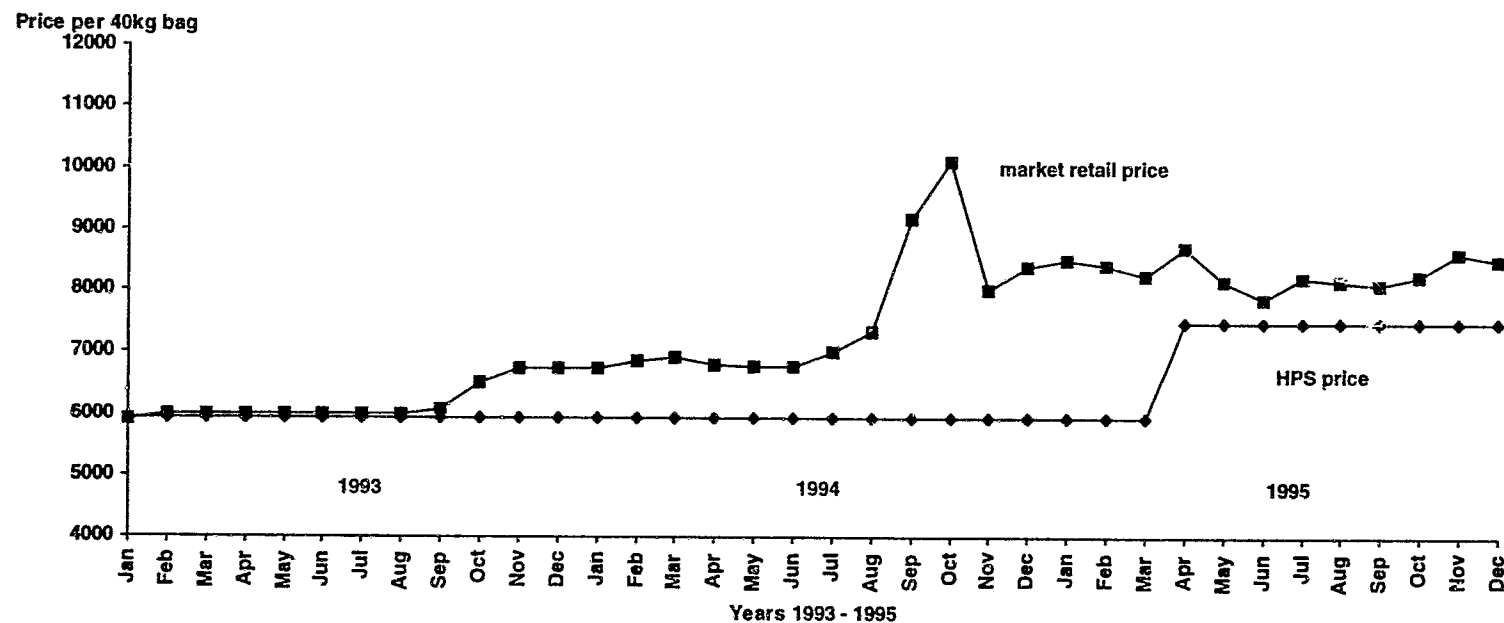
⁶ The March decree also established separate HPS prices for 50kg bags of cement (25% above those for 40kg sacks) and specified that the HPS prices would apply to all cities within a 100km radius of the reference city, rather than just in the reference city as previously regulated. The Ministry also introduced separate single reference ex-factory prices (known as Harga Jual Pabrik), in both 40kg and 50kg sacks, and provided for HJP and HPS prices to be updated twice yearly, in January and July. According to Plunkett et al (1997: 88) the March-April decrees were an attempt to re-establish the influence of HPS prices in the cement distribution system.

Semen Cibinong and Semen Nusantara is the majority shareholder of these two companies, Tirtamas Majutama. Semen Cibinong allows its main distributor to change delivery prices to ensure that part of the increase in retail prices is returned to the group (HG ASIA, 1995). The state-owned cement producers were under strong pressure from the Ministry of Industry and Trade to continue to charge only the ex-factory price implicit in the HPS price, in the belief that this would dampen rising retail prices. The result of this compliance by SOEs was that their distributors gained a windfall profit during periods of cement shortages. This in effect acted as a tax on government-owned cement producers, except the revenues went to distributors. However, in recent years the government-owned producers have begun to change delivery prices to capture part of the increase in retail prices.

The cement crisis in 1994 and 1995 aroused intense public criticism of the cement industry and its regulatory arrangements. The industry was accused of cartel control by vested interest groups, hoarding and speculation by producers and distributors, and there were calls for the industry to be deregulated. Representatives of the Cement Producers Association were even summoned to a special parliamentary hearing to explain the cement shortage in 1995. At the peak of the concern in late 1995, an army general threatened to slap a charge of sabotage on a producer, distributor or any one else found guilty of 'manipulating' cement prices above the HPS prices. While no one took this particular threat seriously, it did highlight the depth of the public's frustration with cement prices as well as the political sensitivity of the industry.

Figure 11.7

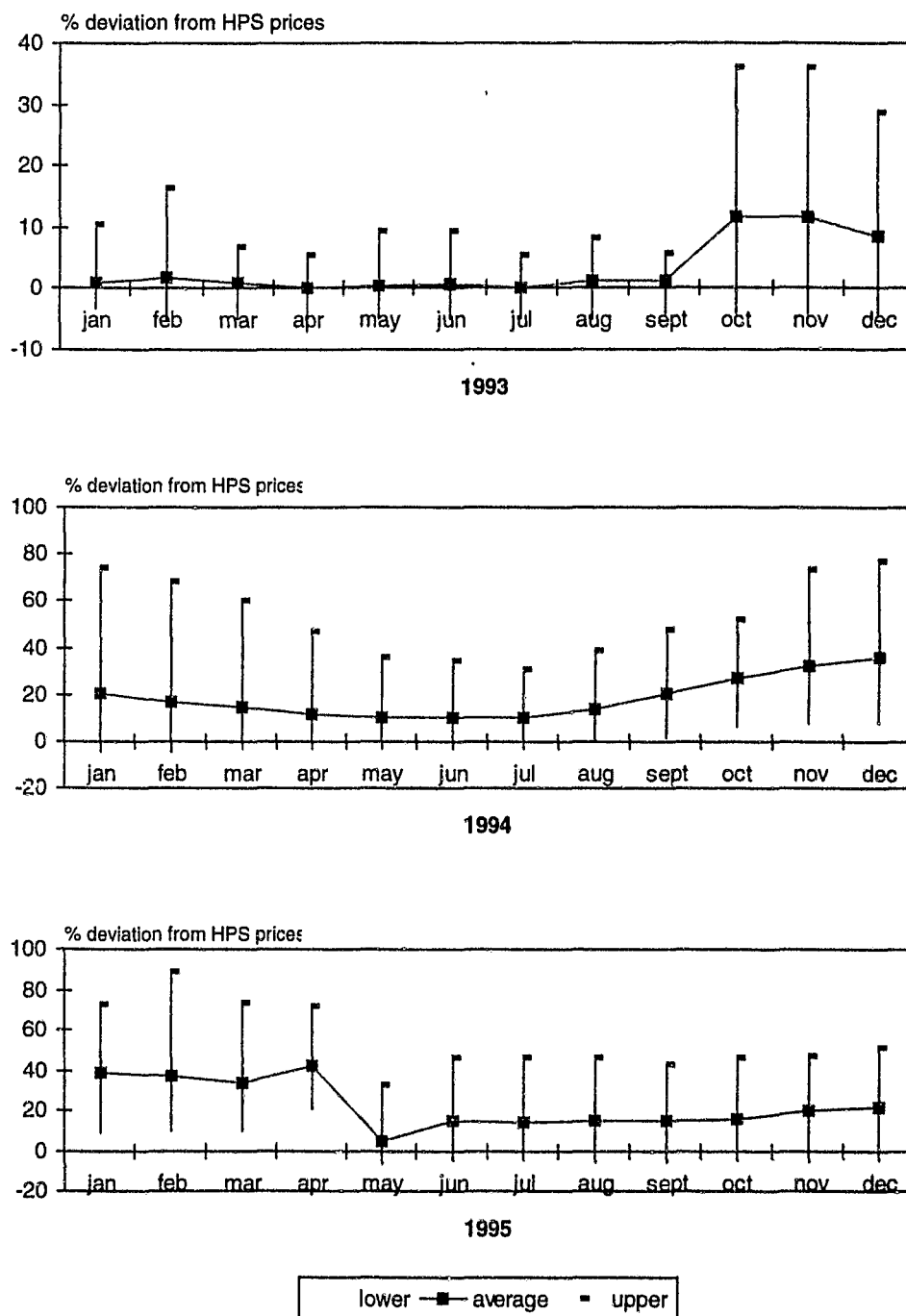
HPS and Market Retail Prices in Jakarta, 1993-95
(Rp per 40 kg bag)



Source: Indonesian Cement Producers Association and Ministry of Industry and Trade, Jakarta

Figure 11.8

**Retail Price Deviations from HPS Prices, 1993-95
(27 provinces)**



Updated version of Figure 4 of Plunkett et al (1997)

11.5.2 Distribution Controls

Control of the regional distribution of cement was the most important element of the regulation of the industry. Under the distribution arrangement producers were allocated both natural and special marketing areas. The natural marketing area was defined as the province in which the plant was located. For example, Indocement's plants are located in West Java, so its natural market was West Java. Special marketing areas were allocated to each producer based on plant location and installed production capacity. Distribution quotas for the local markets were negotiated at monthly meetings between officials of the Ministry of Industry and Trade and Cement Producers Association. Each producer was assigned delivery quotas to particular provinces based on historic supply, and the cement market situation as assessed from data on prices, orders and stocks.⁷ For example, if local retail prices were consistently above HPS prices then this suggested a 'cement shortage'. The Ministry would then require assigned producers to increase cement supplies to these regions. Producers could fill their quotas from their existing production, by importing cement, by importing clinker to produce cement, or by purchasing cement from other domestic producers.

Table 11.8 shows the quantities of cement supplied to the provinces by each producer in 1994. The Cement Producers Association provided us with the data on cement deliveries to the regions. A number of observations can be made. First, each province was supplied by only two or three firms: in general, there was one main supplier and one or two smaller suppliers. The second feature is that, there appeared to be considerable cross-hauling of cement within Indonesia, more so than would be expected in an unregulated market.⁸ In particular, two firms, Semen Padang (a government-owned factory) and Indocement (a private firm), made deliveries to over 80% of total provinces in Indonesia. Semen Padang supplied 22 of the 27 provinces,

⁷ Each month staff at the provincial offices of the Ministry of Industry and Trade surveyed retail prices and cement stocks in each capital city and selected provincial towns and villages. This data was then used to assess regional cement market conditions. The data was, and still are, published in the Ministry's monthly bulletin on trade statistics.

⁸ For example, in the U.S.A cement market, producers sell around 83 per cent of their cement to consumers located within a 360km radius of their plant. Producers operating sea barges can ship cement up to 1,000km along the U.S.A coast (Iwand and Rosenbaum, 1991).

and Indocement supplied 20 in 1994. Semen Padang supplied consumers in Bali (1,850 km from Padang), East Timor (2,870 km from Padang), Maluku (3140 km from Padang), and Irian Jaya (4,450 km from Padang), all located in East Indonesia and markets far away from Semen Padang, and closer to Semen Gresik and Semen Tonasa. Indocement supplied consumers in North Sumatra (1,420 km from Jakarta) - a market closer to Semen Padang and Andalas. Both Semen Padang and Indocement supplied significant amounts of cement to consumers in Sulawesi, the natural market of Semen Tonasa.

Third, and as indicated earlier, most cement imports were concentrated in the northern and eastern parts of Indonesia - markets that are closer to The Philippines than to most domestic producers. High import penetration rates were recorded for North Sulawesi (22.7 per cent) and Maluku (29.3 per cent) in 1994. However, cement producers and selected state trading enterprises imported all of this cement under the distribution arrangements (Table 11.9).⁹ Thus, these imports can not be considered as competitive imports since they were not effectively competing with local producers. A few independent importers were reported to have imported bagged cement during the peak demand season in 1995, but this was apparently on a small scale (*Jakarta Post*, April 25, 1995). Shortly we explain how the distribution controls deterred competitive imports.

Table 11.9 shows the number of firms and regional concentration ratios for the 27 provinces in 1985 and 1994. Seller concentration was very high in all provinces. The average market share of the dominant supplier was 72 per cent, and the average two-firm concentration ratio was 92 per cent in 1994.

⁹ State enterprises were PT Karya Niaga and PT Dharma Niaga.

Table 11.8 **Actual Cement Sales by Provincial Market and Producer in 1994 (in tonnes)**

Province	P.T Padang	P.T Gresik	P.T Tonasa	P.T Indocement	P.T Cibinong	P.T Nusantara	P.T Baturaja
Aceh	11,756	0	0	0	0	0	0
North Sumatra	421,988	0	0	29,848	0	0	0
West Sumatra	498,030	0	0	0	0	0	0
Riau	545,210	0	0	47,579	18,975	0	0
Jambi	158,840	0	0	11,959	3,025	0	18,227
South Sumatra	72,461	0	0	19,740	9,935	0	348,488
Bengkulu	111,029	0	0	0	0	0	6,349
Lampung	92,600	0	0	69,448	0	0	261,625
Jakarta	378,809	0	0	2,804,795	1,244,603	0	0
West Java	0	0	0	4,142,665	868,537	40,793	0
Central Java	58,075	155,105	0	879,043	162,270	802,402	0
Yogyakarta	0	48,156	0	64,622	0	238,415	0
East Java	164,790	2,256,492	0	584,346	69,634	15,976	0
Central Kalimantan	600	9,064	8,400	5,460	0	0	0
South Kalimantan	16,485	49,8970	51,090	32,368	0	0	0
West Kalimantan	10,180	0	14,300	85,326	7,885	0	0
East Kalimantan	18,550	0	174,134	22,616	0	0	0
West Sulawesi	0	0	74,252	0	0	0	0
Central Sulawesi	10,000	0	92,400	5,288	0	0	0
South Sulawesi	0	0	667,384	0	0	0	0
North Sulawesi	76,425	0	56,870	32,868	0	0	0
Bali	35,600	127,679	33,450	128,214	0	0	0
West Nusa Tenggara	33,300	0	78,700	45,146	0	0	0
East Nusa Tenggara	0	0	0	0	0	0	0
East Timor	15,521	0	39,740	0	0	0	0
Maluku	32,000	0	65,820	10,376	0	0	0
Irian Jaya	48,900	0	53,480	45,784	0	0	0
Domestic deliveries	2,811,159	2,646,393	1,410,020	9,067,511	2,384,864	1,097,586	634,689
Cement exports	137,600	0	0	114,504	32,902	0	0
Total	2,948,759	2,646,393	1,410,020	9,182,015	2,417,766	1,097,587	634,689
Clinker Imports	0	0	91,806	51,534	0	116,249	149,909

Province	Andalas	Kupang	Total Domestic deliveries	Imports	Total deliveries	Import Penetration Rate (%)
Aceh	247,995	0	259,751	0	259,751	0
North Sumatra	610,663	0	1,062,509	0	1,062,509	0
West Sumatra	0	0	498,030	0	498,030	0
Riau	162,424	0	774,188	1,326	775,514	0.2
Jambi	0	0	192,051	0	192,051	0
South Sumatra	0	0	450,624	5,100	455,724	1.1
Bengkulu	0	0	117,378	0	117,378	0
Lampung	0	0	423,673	9,260	432,933	2.1
Jakarta	0	0	4,428,207	77,140	4,505,347	1.8
West Java	0	0	5,051,995	0	5,051,995	0
Central Java	0	0	2,056,895	7,000	2,063,895	0.3
Yogyakarta	0	0	351,193	0	351,193	0
East Java	0	0	3,091,238	47,548	3,138,786	1.5
Central Kalimantan	0	0	23,544	0	23,544	0
South Kalimantan	0	0	149,840	0	149,840	0
West Kalimantan	0	0	118,641	8,300	126,941	6.5
East Kalimantan	0	0	215,300	18,000	233,300	7.7
West Sulawesi	0	0	74,252	0	74,252	0
Central Sulawesi	0	0	107,688	10346	118,034	8.8
South Sulawesi	0	0	667,384	0	667,384	0
North Sulawesi	0	0	166,163	48,886	215,049	22.7
Bali	0	0	324,943	6,500	331,443	2.0
West Nusa Tenggara	0	0	157,146	0	157,146	0
East Nusa Tenggara	0	159,657	159,657	0	159,657	0
East Timor	0	9.168	64,429	0	64,429	0
Maluku	0	0	108,196	44,810	153,006	29.3
Irian Jaya	0	0	148,164	6,500	154,664	4.2
Domestic deliveries	1,022,032	168,825	21,243,079	290,716	21,533,795	1.4
Cement exports	201,849	0	486,164			
Total	1,223,881	168,825	21,729,534			
Clinker Imports	1,326	0	144,666			

Table 11.9

Regional Seller Concentration in 1985 and 1994

		1985				1994				
Province	N	CR1	CR2	CR3	CR4	N	CR1	CR2	CR3	CR4
Aceh	1	100				2	96	100		
North Sumatra	3	53	85	100		3	59	95	100	
West Sumatra	1	100				1	100			
South Sumatra	4	92	98	100		3	74	82	100	
Jambi	3	64	94	100		3	73	88	100	
Bengkulu	3	76	90	100		3	85	98	100	
Lampung	2	79	100			3	53	80	100	
Jakarta	3	65	91	100		3	69	94	100	
West Java	3	72	99	100		2	82	100		
Central Java	4	66	97	99	100	4	53	95	99	100
Djogakarta	3	81	96	100		3	61	84	100	
East Java	2	85	100			4	63	91	98	100
Central Kalimantan	1	100				3	65	90	100	
South Kalimantan	4	51	88	95	100	3	43	71	100	
West Kalimantan	2	84	100			3	83	94	100	
East Kalimantan	3	77	97	100		3	74	92	100	
West Sulawesi	2	84	100			1	100			
Central Sulawesi	2	77	100			2	79	100		
South Sulawesi	1	100				1	100			
North Sulawesi	2	53	100			3	62	93	100	
Bali	4	61	91	96	100	4	69	85	93	100
West Nusa Tenggara	6	51	92	96	98	3	52	91	100	
East Nusa Tenggara	2	86	100			1	100			
East Timor	3	60	87	100		3	67	94	100	
Maluku	3	68	97	100		3	68	88	100	
Irian Jaya	3	49	93	100		3	51	93	100	
Average regional concentration	2.7	74.4	96.0	99.5	100	2.7	72.3	92.2	99.6	100
National concentration	9	39	51	63	72	9	47	63	74	83

Source: Indonesian Cement Producers Association, ASI. N = number of suppliers

The distribution arrangements had little success in stabilising prices or supply to all provinces. As shown in Figures 11.7 and 11.8, retail prices remained significantly above HPS prices for most of the last three years, and supply shortages were reported during the peak demand periods. Rather, the distribution controls had probably exacerbated price instability across provinces. The administrative allocation of supplies prevented supplies from other regions quickly entering to dampen price increases when demand rises. Under such conditions, producers and distributors would earn additional profits without the threat of supplies from other regions entering to erode additional profits. If regional markets were contestable, firms would allocate sales to the most profitable markets. Under such circumstances regional shortages would probably be less pronounced than they were during this period.

Over time the distribution system had evolved into a market system that resembled a cartel. Indeed, the distribution system described above exhibited standard textbook characteristics of a cartel (see Scherer and Ross, 1990). Regional markets and market shares were negotiated between officials from the Ministry of Industry and Trade and the Cement Producers Association. The number of suppliers to each province was kept small, regional concentration was very high and market shares of dominant suppliers to each province were relatively stable. Both the producers association and the Ministry monitored compliance to the distribution system by acting as 'trading posts' whereby market information – producers' regional cement sales, imports, exports, and regional retail prices – were collected by them and widely disseminated among members.

The regulated distribution arrangements had also erected barriers to new entry and competitive imports. The need for new entrants to negotiate with both members of the Cement Producers Association and the Ministry of Industry and Trade on plant location, regional markets and quotas had deterred independent entrants. Instead, the regulatory arrangements encouraged potential entrants to establish joint ventures with existing producers to make entry easier. The only new entrant announced since 1985

is a joint venture between a South Korean cement producer, Kodeco, and Indocement.¹⁰

While the government eliminated the restrictive import licensing system and the 30 per cent tariff on cement imports in 1990, the distribution controls erected non-tariff barriers to competitive imports. Under the distribution arrangements cement producers and selected state trading enterprises were given responsibility to import cement. The amount of imports allowed was determined after negotiations between the interdepartmental team and representatives of the Cement Producers Association. As indicated earlier, producers were assigned delivery quotas to particular provinces. Producers would fill their quota from their existing production and by importing cement to meet any shortfall. The state trading companies would also be allocated cement import quotas for particular regional markets. As such there was a built-in import quota under this distribution system. This heavy involvement of cement producers and state trading enterprises in importing cement crowded out independent, private sector importers of cement. Press statements by Ministry officials indicated that the Government viewed imports as only temporary measures whenever there was a domestic supply shortage, and were not intended to be competing with producers. Furthermore, while general importers were officially free to import cement, it was unclear whether they were allowed to distribute cement themselves or had to distribute through producers. Under the distribution arrangements, only producers were allocated regional supply quotas (and state trading enterprises for imports). General importers were technically in violation of the distribution regulations if they distributed cement themselves, as they did not have regional quotas.

There are also infrastructure barriers to potential competitive imports. According to a World Bank (1996) report on the distribution system in Indonesia, independent, private sector importers of cement are constrained by limited availability of port unloading facilities. As noted earlier, importers of bulk cement require access to port unloading facilities, including sufficient storage facilities or silos. Many of the cement producers and some of their main distributors have their own port unloading facilities

¹⁰ At the time of completing this study, the joint venture was still in its planning stages to construct a plant in Central Kalimantan at a cost of US\$480 million.

and silos, but these are not available to third party importers. Thus, general importers tend to be confined to importing bagged cement.

However, despite the apparent 'tightness' of the formal distribution system, producers did occasionally cheat on the quota system, especially during times of excess capacity in the late 1980s. On a few occasions, producers had complained to the Ministry of Industry and Trade about other producers penetrating their allocated markets (*Indocommercial*, 1991). Cheating arises because monitoring compliance to the distribution arrangements is not an easy task, despite the involvement of both the Ministry and Cement Producers Association in this process. This is essentially due to the characteristics of the cement industry and the buyers involved. The major cement buyers are construction companies which often have construction activities spanning several provinces and buy on an irregular basis. Because of this, cement companies are able to make secret deals with these construction companies (especially the large construction firms) to undercut their rivals' prices and supply cement in non-allocated markets. These characteristics make cartel practices in the cement industry vulnerable to periodic breakdown and price wars, unless, as was the case in the Indonesian cement industry, there are regulations reinforcing cartel practices.¹¹

11.6. Restrictive Trade Practices in the Distribution Channels

Restrictive trade practices also exist within the distribution channels in the cement industry. As indicated earlier, each producer appoints one main distributor, which in turn appoints distributors in the regions. The main distributor is usually affiliated to the cement producer through interlocking ownership arrangements. Producers impose two types of restrictions on their distributors. The first restriction is known in economics as exclusive dealerships; distributors are not allowed to handle competing brands, including imports, without the producer's permission. The second restriction is known as territorial restrictions. Producers limit the number of distributors per sub-region (although, distributors are often assigned more than one sub-regional market).

¹¹ See Losecher (1954), Stigler (1954), and Scherer and Ross (1990) for a discussion on why cartel practices in the US cement industry in the 1930s and 1940s was vulnerable to periodic breakdown and price wars.

For example, Semen Padang had appointed five distributors to West Java in 1995. Limiting the number of distributors per region reduces competition among distributors of the same brand (intrabrand) and, thus, helps maintain attractive profit margins for distributors. Attractive profit margins in turn deter distributors from violating their agency agreements with producers (World Bank, 1996). Producers are able to impose these restrictions on distributors because they have allocated regional markets, and distributors have limited alternative sources of supply, including imports.

In general, these vertical restraints are not anti-competitive *per se* if there is sufficient competition at the producer level, or inter-brand rivalry (Tirole, 1988). Vertical restraints in the cement industry could have positive efficiency effects. They enable producers to better coordinate distribution and marketing activities in the regions and more effective management of delivery of cement. By providing the right financial incentives (i.e., attractive distribution margins), producers can influence distributors to increase their investment in specialised cement storage facilities and materials handling and information systems necessary for efficient distribution of the commodity. These benefits are more likely when there is enough inter-brand competition, because of both competing manufacturers and the possibility of easy access to imports through low tariffs and non-tariff barriers. However, as discussed in section 11.7, the administrative allocation of markets had greatly restricted competition among cement producers and this had also constrained rivalry among main distributors.

11.7 Summary

This Chapter has described the development of the cement industry over the last three decades, and the role of government policies in shaping the structure of the industry and the nature of competition. The industry was heavily regulated. There were regulations governing the allocation of markets and setting of reference retail prices. The objective of this regulatory regime was to ensure a continuous supply of cement to all provinces at reasonable and stable prices. However, the analysis of this Chapter has shown that the distribution arrangements had little success in stabilising prices in the face of cyclical demand for cement. Rather the distribution system exacerbated

price instability by reducing the contestability of regional markets. Administrative allocation of markets prevented supplies from other regions, including imports, entering to dampen price increases when demand rose.

Under the Indonesian government and IMF structural reform programme, the industry is being deregulated, including the elimination of the distribution controls, export quotas, and reference cement prices. It is too early to examine empirically the impact of deregulation on competition and regional prices. However, deregulation is likely to improve overall economic efficiency in the industry. The removal of administered prices will improve the transparency of pricing in the industry. Producers are now free to change delivery prices to capture most of the increase in retail prices during periods of high demand. Distribution margins will not vary over the demand cycle as much as they did under the previous pricing arrangements. Eliminating distribution controls should also reduce excessive cross-hauling of cement within Indonesia that existed under the previous distribution arrangements. Deregulation should also promote efficient regional investment. The continuation of high cement prices in significant regional markets will signal the opportunity for profitable new regional investment in the cement industry without having to negotiate plant location and capacity size with officials from the Ministry of Industry and Trade and existing cement producers.

Eliminating the distribution controls increases the 'contestability' of regional markets, and this should reduce regional price instability compared to the previous regulatory regime. In a contestable regional market, the nearest producer is the price leader, with other distant suppliers (including importers) matching its price in order to compete (Plunkett, et al, 1997). In periods of excess capacity, producers are willing to accept lower net prices in more distant (including export) markets to maintain full capacity.

However, there is the possibility that monopolistic or cartel practices, similar to those under the previous regulatory regime, could develop in the domestic market, at least in the short run. For 20 years the Cement Producers Association has been allocating regional markets and market shares among its members. Cartel monitoring mechanisms are well developed within the industry. These 'institutionalised' cartel

practices are likely to take some time to breakdown. The success of the recent deregulation of the industry in promoting competition among firms will partly depend on the government's competition policy, including the implementation of the competition law, which is likely to be enacted into law in 1999. The draft competition law prohibits market sharing arrangements. The draft law is discussed in Chapter 13.

Chapter 12

Summary and Conclusion

12.1 Introduction

This Chapter summarises the major findings of the study and provides a discussion of competition policy in Indonesia. Our study has investigated the interrelationship between market structure, firm rivalry and various forms of government intervention in the non-oil/gas manufacturing sector over the period 1975 to 1995. Two research methodologies were used for this purpose: the Structure-Conduct-Performance (S-C-P) approach to industrial organisation, and two industry case studies.

Using the S-C-P framework, we specified a simultaneous equations model consisting of six endogenous variables and equations. The endogenous variables were seller concentration, industry profitability, import penetration, export-orientation, foreign-ownership and trade policy (measured by real effective rates of protection). The model was estimated for two different policy regimes using the 2SLS estimation technique. For this purpose, a database of 67 four and five-digit ISIC manufacturing industries for the years 1985 (a proxy for the pre-liberalisation period) and 1993 ('post' trade liberalisation) was constructed from a variety of sources, including the annual manufacturing surveys and input-output tables produced by the central bureau of statistics. In Chapter 8, the S-C-P framework was extended to include an estimation of the determinants of changes in leading firms market shares during the trade liberalisation period.

For the second research approach, two industry studies are undertaken to explore aspects of firm rivalry and government policy not adequately captured in the aggregated S-C-P model. The two industry studies are cigarettes and cement. Both industries have high levels of seller concentration. However, they differ in the extent

of government intervention in the industry, the nature of rivalry among firms and the competitive outcome.

12.2 Findings of the Study

There are several important findings from the study that provide invaluable insights into the development of market structures and the competitive process in a rapidly developing economy, and into how government policies impact on this process. Many of the findings of the study, summarised below, are established in economic theory and are consistent with the results of similar studies for other developing economies. However, other aspects of this study have not been fully explored in most studies of developing economies. For example, while there are several studies analysing the dynamics of market shares in developed economies, there are no similar studies for other developing economies known to the author and, thus, our study is the first to examine market share dynamics in a developing economy.

Trends in Industrial Concentration (Chapter 4)

Contrary to popular public perceptions, there is a long-term declining trend in industrial concentration, particularly in those industries that were highly concentrated in the mid-1970s. The descriptive analysis presented in Chapter 4 (Trends in Industrial Concentration) shows that there is a tendency towards industrial deconcentration across manufacturing over the period 1975-93. The simple average CR4 ratio declined from 64 per cent in 1975 to 53 per cent in 1985, but increased slightly to 54 per cent by 1993. Similarly, the output weighted average CR4 declined from 55 per cent in 1975 to 47 per cent in 1985 and to 44 per cent by 1993. When we adjusted the industrial concentration statistics to include oil/gas manufacturing, the decline in weighted average CR4 was even greater compared with non-oil/gas manufacturing. The weighted average CR4 declined from 58 per cent in 1985 to 51 per cent in 1993, a fall of 10 percentage points. The greater decline in the weighted average CR4 for all manufacturing was principally due to the significant decline in the oil and gas sector's share of total MVA during this period. As noted in Chapter 4, oil/gas share of total MVA declined from 28 per cent in 1983 to 13.3 per cent in 1993. The percentage of total industries that are classified as highly concentrated (CR4

above 75 per cent) declined from 40 per cent in 1975 to 29 per cent in 1993. Introducing foreign trade reduces average concentration substantially. In 1993, for example, the average concentration of a sample of 67 non-oil/gas manufacturing industries without adjustment for foreign trade was 53 per cent whilst allowing for foreign trade it was 41 per cent. Thus, allowing for trade indicates that competition is *prima facie* stronger in Indonesian markets than domestic concentration ratios would suggest.

This pattern of change in industrial concentration is typical of a rapidly growing, small industrial sector: initially high levels of concentration, declining over time as rapid growth reduces barriers to entry and broadens the industrial base. Further, the results suggest that liberalisation has not had the major effects on industrial structure that its opponents - or in some cases proponents - maintain. Average concentration in import-competing industries has remained fairly stable since 1986. There has been a slight increase in concentration since 1991, but it is too early to reach a conclusion on whether this increase is due to liberalisation. However, more confident conclusions can be reached about the impact of policy reforms on export-oriented industries. The results show that there has been a continuous reduction in average concentration since 1986. The reduction is due to an expansion of the market facing domestic sellers. The expansion of export opportunities means that the domestic industry can support a greater number of viable producers, thereby reducing concentration.

Changes in Leading Firms' Market Shares (Chapter 8)

As indicated earlier in the study, a major limitation of seller concentration statistics is that they are static measures of competition; they simply record the characteristics of a size-distribution at some particular point in time. Recent literature has shown that previous studies of seller concentration, including studies emphasising changes in seller concentration over time, conceal much of the nature of the underlying competitive process (Geroski and Toker, 1996). The industrial organisation literature has long recognised that high concentration ratios can be found along with considerable instability in leading firms' market shares. Industrial organisation theory tells us that, in the absence of regulatory constraints on competition, changes in the relative positions or market shares of the leading firms would indicate healthy

competitive conditions prevailing in that industry (Baldwin and Gorecki, 1994; Davis and Geroski, 1997). According to Geroski and Toker (1996), turnover in firms' rankings provide at least some useful information on the vibrancy of the competitive process, and turnover-based measures of competition [i.e. changes in market shares] may reflect the dynamics of the competitive process more accurately than conventional static measures of competition.

The descriptive analysis of changes in leading firms' rankings and market shares during the period 1985 to 1993 shows considerable turbulence in market shares for several persistently concentrated industries, suggesting healthy competitive conditions prevailing in many of these industries. Concentrated industries that were characterised as having turbulent market shares included cigarettes, sheet glass, carpets, structural clay products, and cosmetics. Conversely, industries that were identified as having stable market shares during this period included cement, fertiliser, malt beer, and wheat flour milling. The study identified regulatory constraints on competition as a major factor insulating dominant firms' market shares from encroachment by their rivals or new firms in these 'stable' oligopolies.

The descriptive analysis on concentration and changes in leading firms' market shares provided the backdrop for the statistical analysis into the underlying factors explaining the observed levels of concentration and market share instability and their effect on other aspects of market structure and performance in Chapters 7 to 8. These results are summarised below.

Empirical Results:

The Structure-Conduct-Performance Model (Chapters 7 and 8)

Industrial Concentration

Our estimation results suggest that market structure factors are the major determinants of industrial concentration in Indonesian manufacturing: economies of scale, capital requirements, industry size, regional market fragmentation, and product differentiation all have the expected significant relation with concentration. We could

not find a direct significant relation between trade policy, regulation and concentration, either in 1985 or 1993. However, trade policy and regulation may affect concentration indirectly through other variables such as economies of scale. The poor performance of these two variables may also arise due to problems associated with cross-sectional tests of government policies. Generally, one should approach a cross-sectional test of the effect of protection and regulation on seller concentration cautiously, because protection and regulation may take time to affect market structures. Our results for the export and import variables suggest that foreign trade does not have a significant impact on the degree of industrial concentration. The result for export orientation is consistent with the observation in Chapter 4 that export-oriented and unconcentrated industries share common structural characteristics, namely low barriers to entry, and it is the barriers to entry variables that are dominant in the concentration equation. Finally, foreign and state ownership of industry do not have significant effects on industrial concentration over and above the other variables considered in the analysis. This also arises because MNCs and SOEs share common structural characteristics, namely product differentiation and high capital cost requirements - the estimation results of the determinants of MNC presence verify this relationship. This result may also be due to measurement problems associated with the ownership variables discussed in Chapter 6.

Industry Profitability

Our analysis of the determinants of industry profits is consistent with the established proposition that higher levels of concentration lead to higher profitability. The results also show that it is in the more protected industries that concentration has a greater impact on industry profits. In other words, concentration and protection interact to produce relatively high profit rates in manufacturing. The study also provides evidence that this positive association has weakened since the 1980s policy reforms, establishing a direct link between trade liberalisation and industry profits in concentrated industries. The reduction in import protection reduces excessive profits in concentrated industries. By contrast the positive relationship between profits and barriers to entry postulated in the literature is not strongly supported by Indonesian data. Only the capital intensity variable is significant with the expected sign, and only weakly significant in the 1993 post-reform equation. The other hypothesised barrier to

entry, product differentiation, is not statistically significant. The growth variable gave us inconsistent results between the two years. These results are consistent with previous studies for other small, open economies.

Foreign ownership

Our results on the determinants of foreign ownership in manufacturing show that there is a similarity between the determinants of foreign ownership in developed and developing economies. Most of the conventional industrial organisation factors (concentration, capital intensity and technology intensity) are statistically significant with the expected signs. There are, however, some unconventional results. These are the negative, but insignificant, influence of product differentiation, and the insignificance of the industry growth variable. The results also show that there has been a shift in the pattern of FDI in manufacturing towards export-oriented industries since the mid-1980s. This is attributed to trade and investment reforms during this period.

Export orientation

Our analysis of the determinants of export orientation shows that the factor intensity variables are the major structural determinants of export performance in Indonesian manufacturing. Our results show that exports are concentrated in products that Indonesia has a comparative advantage. These are the labour-intensive industries and the forestry-based products. The market structure factors do not appear to be important determinants of Indonesia's export orientation in the 1990s. Concentration appears to have no significant relationship with export orientation. Economies of scale, regional market segmentation, and product differentiation all have the expected signs, but are statistically insignificant. Finally, we observe an inverse relationship between export orientation and trade protection (RERPs).

Import penetration

The import penetration equation generally supports the findings of the export intensity equation. The factor intensity variables are important determinants of import penetration in manufacturing industries since the 1980s reforms. Our results show that imports are concentrated in industries in which Indonesia has a comparative

disadvantage such as capital (PC) and technology (TI) intensive activities. Foreign ownership and market structure variables - economies of scale, product differentiation, and regional market segmentation - are statistically significant, with the expected signs. Concentration is not statistically significant in the import penetration equation. Finally, our results for the trade policy variable (FERPs) show that trade protection reduces foreign competition in the domestic market.

Trade protection

Our results support previous findings for Indonesia that political-economy factors are important determinants of the pattern of protection. This of course is consistent more broadly with the political economy of decision-making processes in Indonesia, and in particular the vulnerability to capture of micro-level policy-making processes. A number of variables generated results consistent with the political economy models, such as concentration, price-cost margins, and industry size. Concentration and industry size variables are positive and significant in both the pre-form and post-reform periods. The profit variable has the expected negative sign and is significant in the 1993 equation.

Changes in Market Shares of Leading Firms (Chapter 6)

The estimation results of the market share equation show that government regulations of a selected number of industries- processed sugar, beer, cooking oil, fertiliser, cement, and steel - constrain domestic rivalry in these industries. This provides a direct link between deregulation and competition. Removing regulatory constraints on firm behaviour should trigger rivalry among firms in these industries. However, trade liberalisation (measured by changes in real effective rates of protection) does not appear to have disturbed market shares, except in export-oriented industries. Second, there is no evidence that MNCs have any impact on domestic rivalry over and above the other variables considered in the analysis. This result provides some evidence to reject the proposition that large MNCs' business practices reduce market rivalry in the host developing country's markets. Finally, the results of most of the other industrial organisation factors tend to be consistent with studies for other countries. Market shares tend to be more stable in highly concentrated industries, all other things being equal. Rapid growth in industry destabilises market shares, while large absolute

capital requirements constitute a barrier to entry and upward mobility, thereby insulating leading firms' market shares.

At least two major conclusions can be drawn from the findings of the S-C-P study. First, the study shows that high seller concentration is not a *sufficient* condition for anti-competitive behaviour. The possibility of anti-competitive behaviour depends on a number of factors including the height of barriers to entry and government trade and industry policies. Our estimation results in the industry profitability equation show that it is in the more protected industries that high concentration leads to anti-competitive outcomes. Conversely, trade liberalisation reduces excessive profits in concentrated industries. Furthermore, high concentration can be found along with considerable instability in leading firms' market shares in Indonesian manufacturing, suggesting that competitive conditions prevail in these industries.

Second, the estimation results for the RERP and regulation variables in the concentration, profitability and market share equations provide insights into the mechanisms through which trade liberalisation and deregulation increase domestic competition. Recall that the trade policy variable (interacted with concentration) was only statistically significant with the expected (positive) sign in the profitability equation, and not statistically significant in the concentration and dynamic market share equations. Together these results suggest that trade liberalisation increases domestic competition and economic efficiency directly through influencing price behaviour of dominant firms in an industry, rather than by reducing the level of seller concentration or changing the distribution of leading firms' market shares. In other words, greater import competition through low tariff and non-tariff barriers puts pressure on dominant firms to cut their prices towards world prices, thereby reducing excessive profits. The exception is export-oriented industries: market shares were relatively unstable in export-oriented industries during the liberalisation period. The regulation dummy variable was statistically significant with the expected (negative) sign only in the market share equation. The conclusion drawn from this result is that deregulation of industry – removal of entry restrictions, distribution controls, and price fixing – should destabilise leading firms' market shares, indicating increased domestic rivalry based on this measure of competition.

Industry Case Studies

Findings from the two case studies provide further insights into the development of market structures in a rapidly growing developing economy, the competitive process, and how government interventions impact on this process. In the cement industry, government regulations had created and reinforced cartel-like practices. Regional markets and market shares were allocated among firms. The Cement Producers Association and the Ministry of Industry and Trade monitored compliance with the distribution system by acting as 'trading posts' whereby market information – market shares, export and import data – were collected by them and widely disseminated among producers. These distribution arrangements had deterred new entry and competitive imports, and exacerbated instability in regional cement prices. Administrative allocation of supplies prevented supplies from other regions, including imports, entering to dampen price increases when demand rose.

The highly concentrated cigarette industry can be characterised by intense rivalry as reflected in continuous turnover in leading firms' rank and market shares during the past twenty years. The major instrument of competition among large firms is advertising. The estimation results of the dynamic market share – advertising model specified in Chapter 10 shows that advertising competition destabilises market shares in this industry, suggesting that competitive conditions prevail in the cigarette industry. However, government interventions in the cigarette industry have constrained other forms of rivalry. Foreign firms were not permitted to enter the kretek segment, and were therefore prevented from directly competing with local kretek producers. This restriction exacerbated the decline in MNCs' market shares during the 1980s when demand switched from white cigarettes to kretek. In 1991 the government introduced higher minimum retail prices for large firms. This restriction removed price competition among large firms. The objective of these regulations is to reserve a share of the market for small-scale firms. However, our study shows that the competitive fringe is gradually declining due to changes in technology and consumer tastes from cheap, low quality kretek to higher quality, filter kretek brands produced

by the larger firms. This gradual decline in the competitive fringe has occurred despite the added protection through higher minimum retail prices for large firms' brands.

A conclusion that can be drawn from the findings of these case studies is that market structure itself does not fully determine the degree of competitiveness in an industry. The case studies show that a range of firm behaviour and competitive outcomes are possible across concentrated industries. An important influence in all these studies is government policy. Government controls reduced competition in cement.

12.3 The IMF Structural Reform Programme and Competition Policy

Indonesia's approach to competition policy (broadly defined here to include trade liberalisation, deregulation, privatisation and competition law) has been *ad hoc* and unsystematic. By the time the financial crisis began in 1997, substantial progress had been made in dismantling barriers to entry and other restrictions on competition. Deregulation of the industrial sector over the past decade or so eliminated many (but not all) of the restrictions on new entry, including foreign investment. The reform of international trade policies over the same period eliminated most of the licensing requirements related to importing goods (Chapter 2). This liberalisation, however, had been accompanied by several egregious exceptions as well as increased reliance on other forms of regulation – e.g., the national car programme, and protection of Chandra Asri, a large petrochemical producer. Furthermore, many of the government-sanctioned monopolies and cartel arrangements, as well as other so-called 'sensitive' regulated sectors – cement, fertiliser, processed sugar, BULOG, aircraft manufacturing and steel – remained relatively untouched during the deregulation period, and new 'exceptions' emerged (e.g., cloves monopoly).

At the time of completing the thesis, the banking and financial crisis erupted in Indonesia and other countries in the region. The massive drop in the rupiah during 1997/98, combined with the capital flight and severe banking sector crisis, led to a series of agreements between the Indonesian government and the IMF, World Bank, ADB and major bilateral donors for a structural reform loan programme of US\$43

billion. The programme is comprehensive, covering trade and industry, the banking and financial sectors, and commercial laws and institutions. Measures announced under the IMF agreement in January 1998, and later amended/supplemented in April (and June/July), were aimed at improving economic efficiency by removing anti-competitive regulations in specific industries. The elimination the statutory basis of many of the remaining monopolies - e.g., cement, plywood, cloves, sugar, wheat flour milling - was also included. The IMF programme also included a commitment from the Government to introduce a competition law. Paragraph 15 of the April MOU with the IMF is of relevance here:

The Government has already taken steps as part of its restructuring program to improve competitive conditions in a number of specific markets. In order to enhance the overall efficiency of markets, the Government will write and implement a law on competition policy to establish guidelines for fair business practices and to avoid anti-competitive behaviour. Competition policy will benefit consumers by making quality goods available at the lowest possible price: small enterprises will benefit from improved access to the widest range of goods and trade facilities.

The measures under the IMF structural reform programme dealt with a number of the most important anti-competitive aspects of economic policy. However, it would be incorrect to assume that competition is now largely unfettered by regulation. The policy environment is still characterised by a myriad of regulatory and licensing requirements that undermine efficiency. For example, a number of important government created monopolies are not dealt with under the programme - e.g., fertiliser, wholesale and retail trade in gasoline and oil products. Restrictions in several industries adversely impact on economic efficiency such as in salt, alcoholic beverages, and plastics (Table 2.8). In addition, the complex system of approvals and licences required for almost any commercial activity impose a significant cost burden on firms, of which the greatest is borne by small and medium enterprises.¹

¹ A recent report estimated that the cost of compliance with the licensing system amounted to at least 30 per cent of gross profits of micro and small enterprises (Asia Foundation, 1998).

The focus now should be on strengthening the broader policy framework as the foundation for competition policy. This would entail developing and implementing reforms in those areas not addressed under the IMF programme. This should also include developing the institutional resources necessary to maintain and promote competition. In the current policy environment these reforms should include a comprehensive deregulation that eliminates a large share of the existing requirements for approvals and licences, removal of the statutory basis of remaining anti-competitive market structures, and acceleration of trade liberalisation already committed under the IMF programme, especially the remaining import licensing restrictions.

In November 1998, the Indonesian Parliament had drafted an anti-monopoly law and submitted it for discussion among its members. The draft law includes provisions prohibiting price fixing and market-sharing arrangements, vertical restrictions on trade (exclusive dealerships and territories, etc), vertical integration, firms undercutting rivals' prices, and limits on market shares of 30 per cent. While it is beyond the scope of the study to discuss the advantages and disadvantages of a competition law or anti-monopoly law, there are serious concerns about the draft law submitted to Parliament. As it stands, the law greatly risks damaging competition, rather than promoting and maintaining it. The reason is that the law protects competitors, rather than the competitive process. The former generally tends to protect inefficient firms and gives rise to a distorted economy. It is worth elaborating on some of the major provisions of the draft law.

As noted, the draft law prohibits most kinds of vertical restrictions – exclusive dealerships and territories. This prohibition has little foundation in economics. Recent developments in industrial organisation show that vertical restraints on trade are not as serious as was once thought to be (Tirole, 1988). In some instances vertical restraints may improve economic efficiency and consumer welfare. This would occur if vertical restraints reduce transaction and coordination costs involved in marketing and distribution. By providing the right financial incentives, producers can influence distributors to increase their investment in materials handling and information

systems necessary for efficient distribution of commodities. These benefits are more likely when there is enough inter-brand competition, because of both competing manufacturers and the possibility of easy access to imports through low tariff and non-tariff barriers. For these reasons, most countries that have implemented competition laws do not prohibit vertical restraints. Usually, these various types of practices are assessed on a case-by-case basis under a rule of reason approach, which weighs the relative costs and benefits of the business practice. Under the draft law, the blanket prohibition of vertical restraints would reduce efficiency in cases where the effects of these practices on consumer welfare and economic efficiency are positive.

Vertical integration of production and distribution is prohibited in the draft law where it 'damages competition'. There are no definitions of 'damaging competition' or monopoly in the draft law. There is no economic rationale for prohibiting vertical integration. The literature shows that vertical integration usually enhances economic efficiency by reducing transaction costs (Tirole, 1988). The apparent rationale behind this provision in the draft law is to prevent an upstream monopoly from monopolising a downstream industry. There are a few publicised cases in Indonesia where large, vertically integrated firms have monopolised downstream markets, but in all cases known to the author these have occurred because of regulatory barriers to entry in the upstream input market. For example, Indofood's dominant position in the instant noodle industry by the early 1990s was made possible only because the government granted a wheat flour monopoly to the noodle producer, and not because of vertical integration *per se*. Under the IMF programme, the government has eliminated the domestic wheat flour monopoly by allowing free imports of wheat and wheat flour – quantitative import restrictions were removed in 1998. Economic theory and empirical evidence show that, if there are no regulatory or natural barriers to vertical integration, rival firms will integrate to avoid paying higher prices to the upstream monopoly. If a sufficient number of firms integrate, the input will eventually be supplied competitively (Tirole, 1988). Thus, in the absence of constraints on vertical integration or imports of the input, any market power arising from an upstream monopoly is likely to be short lived.

Equally concerning is the prohibition on firms undercutting rivals' prices, if they threaten to increase seller concentration in the future. This clause was probably intended to capture cases of 'predatory pricing'. However, depending on the evidential burden of the plaintiff, it is conceivable that firms could use this provision to prevent healthy price competition, or price wars from breaking out among firms. In such circumstances, the provision would be protecting inefficient firms from competition or reinforcing cartels. In both cases this would lead to economic distortions, resulting in consumer welfare losses.

The anti-monopoly law includes structural-based measures. The law puts a ceiling on firms' market shares at 30 per cent. Beyond a 30 per cent market share, the firm would have to divest assets under the law. No country has ever included such a clause in their competition laws. Moreover, there is no economic reason why firms should have limits on their market shares. One theme of this study is that, in the absence of regulatory constraints on competition, changes in market shares reflect the outcome of the competitive process. Efficient firms grow and become larger, while inefficient firms decline and become relatively smaller. We observed for several highly concentrated industries considerable instability in leading firms' market shares, suggesting competitive conditions prevailing in these industries. Thus, placing a ceiling on firms' market shares would greatly damage the competitive process.

Moreover, the provision reflects a misunderstanding of the determinants of market structures. Indonesian manufacturing is concentrated partly because of its small industrial size. A structure-based attempt to reduce the level of concentration would lead to overcrowding of sub-optimal plants, duplication of products and excessive costs of production. The higher costs of production would be passed on to consumers and the welfare loss to them might be greater than if industries remained concentrated. Many countries deal with the potential for abuse of market power in concentrated industries by liberalising trade and industry regulations. Indonesia has substantially reduced protection for many concentrated industries, and the empirical results of the study show that trade liberalisation reduced anti-competitive pricing and excessive profits in concentrated industries.

Political, rather than efficiency, considerations appear to dominate the drafting of the law. This is partly driven by the political environment in which the law is drafted. Government rhetoric and policy in the post-Soeharto era has placed much attention on the so-called 'empowerment' of cooperatives and small and medium-scale firms and the 'peoples economy'. At the same time, large firms and conglomerates (many owned by ethnic Chinese) have been blamed for the economic crisis. In the preamble of the anti-monopoly law, a stated objective is to protect small and medium-sized firms from unfair competition from larger firms. Cooperatives are exempted from the anti-monopoly law, despite the fact that they hold local monopoly rights over the distribution of key agricultural commodities such as fertilisers and pesticides. There is a widely held view that the draft anti-monopoly law is designed to break up large firms and conglomerates through the enforcement of the provisions on vertical integration and market shares.

It is important that the draft law be kept simple. The primary objective of a competition law should be to maintain and encourage competition as a vehicle to promote economic efficiency and to avoid business practices that unambiguously reduce consumer welfare. The focal point should be on the actual conduct of the firm and not on absolute or relative firm size or the structure of the industry. Objectives like 'protection of small firms and cooperatives', 'public interest' and 'asset redistribution to the cooperatives' usually lead to rent-seeking behaviour and are generally recognised to be inconsistent with marketplace efficiency. In this connection, a distinction needs to be made between protecting competition (and the competitive process), and protecting competitors – whether small or large enterprises or cooperatives. The latter generally tends to protect inefficient firms and gives rise to a distorted economy.

The law should target blatant cases of anti-competitive behaviour such as price fixing and market sharing arrangements, rather than developing complex rules for competition. The aforementioned clauses should be removed on the grounds that they are likely to reduce economic efficiency. Clear anti-competitive business practices could be captured under a carefully worded 'abuse of dominant position' clause. Moreover, the anti-monopoly law or competition law should not be viewed as a

substitute for continued efforts to remove regulations which, our study shows, limit competition.

12.4 Implications for Further Research

Our study has investigated the interrelationship between market structure, firm rivalry and various forms of government intervention in the non-oil/gas manufacturing sector over the period 1975 to 1995. Two research methodologies were used for this purpose: the structure-conduct-performance (S-C-P) framework and two industry case studies. There are, however, several research areas that require further work. These can be classified into two areas: (1) data improvement and methodologies, and (2) industrial organisation issues pertaining to Indonesia, as well as other developing countries.

Data improvement: The Central Bureau of Statistics (BPS) produces one of the richest manufacturing surveys in the region. Compared to other countries in the region, the quality of the surveys (and access to them) is among the best. However, there are areas for further improvement. First, one of the most important improvements would be the provision of enterprise data, in addition to establishment data already provided by BPS. This would enable researchers to calculate concentration and market share statistics with more accuracy. A limitation of our S-C-P model was the unavailability of statistical proxies for other important market structure variables, such as vertical integration and buyer concentration. It would be useful if BPS could include data on vertical integration, and if possible, buyer concentration.

Methodologies: The structure-conduct-performance framework is a very useful tool in industrial analysis. However, the implementation of the model using cross-sectional data is based on the implicit assumption that each market is in long-run equilibrium. However, in more dynamic market conditions, responses to change are continuous and non-instantaneous and in such conditions simple forms of comparative static analysis are less appropriate. We attempted to overcome this weakness by comparing cross-sectional estimates of the six equations between two points in time, 1985 and

1993. Thus, we assumed that all markets reached a new long-run equilibrium in 1993. This may not be the case in practice, particularly for a developing economy where market structures are not yet 'stabilised' to the degree that is found in mature industrial economies. Many markets may still be in a process of structural adjustment. A dynamic S-C-P model would be better able to capture the structural adjustment process from a long-run equilibrium to a new one in the endogenous variables, such as concentration and profitability and exports. One direction for further research would therefore be to modify the S-C-P model to include structural adjustment in the endogenous variables. Business cycle effects on concentration and profitability could also be incorporated into the dynamic model. For this purpose, a panel data base (cross-sectional, time series data) would have to be constructed.

Industrial organisation issues: There are several relevant areas of research that were not explored in this study, but are pertinent to Indonesia, as well as other developing economies. For example, little research has been undertaken on the pattern of firm entry, growth, and exit in developing economies. In particular, the impact of liberalisation of trade policy and industry regulation on firm entry, growth and exit, and the impact of these on industrial concentration and market performance. Therefore, one area of further research would be on firm entry and exit. Empirical tests of the relevance of the Theory of Perfectly Contestable Markets to Indonesian manufacturing could easily be incorporated into such studies. In addition, little research has been done on firm strategic behaviour – both price and non-price forms of rivalry – in developing economies, especially on how firms respond to liberalisation of trade and industry regulation. For this purpose, industry case studies using primary time series data would be needed.

With the attention on competition policy in Indonesia, substantial research on domestic competition issues is needed to provide greater input into informed discussions on the future direction of competition policy in Indonesia, as well as other countries in the region.

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