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Packaging Industry:
Impact of Trade Policy Reforms on Performance, Competitiveness and Structure

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PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

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RESEARCH PAPER SERIES No. 94-01

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Abbreviations

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Asean	-	Association of Southeast Asian Nations
CIF	-	Cost, Insurance, Freight
CME	-	Census of Manufacturing Establishments
CRC	-	Center for Research and Communications
CVA	-	Census value added
DRC	-	Domestic resource cost
DRCM	-	Domestic resource cost in market
EPR	-	Effective protection rate
FOB	-	Free on Board
LDCs	-	Less developed countries
MES	-	Minimum efficient scale
NEDA	-	National Economic and Development Authority
NEPR	-	Net effective protection rate
NCR	-	National Capital Regions
NSC	-	National Steel Corporation
NSO	-	National Statistics Office
OER	-	Official exchange rate
PDCP	-	Private Development Corporation of the Philippines
PDF	-	Production possibility frontier
Philexport	--	Private Investment and Trade Opportunities-Philippines
PS	-	Polystyrene
PSIC	-	Philippine Standard Industry Classification
PSCC	-	Philippine Standard Commodity Classification
PVC	-	Polyvinyl chloride
SAS	-	Statistical Analysis System
SEC	-	Securities and Exchange Commission
SGV	-	Sycip, Gorres, Velayo and Co.
TEC	-	Technical efficiency coefficient
TLP	-	Trade Liberalization Program

TRP   –   Trade Reform Program
VACR   –   Value added concentration ratio
VAT   –   Value-added tax
WB   –   World Bank

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Introduction

BACKGROUND OF THE STUDY

TRADE liberalization has figured prominently in Philippine development strategies in the past decade. Within this period, two major tariff reform programs, complemented by a series of import liberalization measures, were launched.

According to neoclassical trade theory, an outward-looking trade policy will enhance industrial growth through a "challenge-response" mechanism leading to improvements in efficiency and competitiveness. But past studies seeking to establish the link between trade policy and industrial performance and competitiveness have generally yielded inconclusive results. Recent contributions to the literature suggest that in studying the trade policy-productivity nexus, factors related to the industrial structure as well as other domestic market conditions need to be examined. The main thesis is that trade liberalization exerts only an indirect effect on performance and competitiveness. The degree and direction of this effect depends on the nature of the industrial structure, firm-specific factors, and other domestic market conditions.

From this perspective, this paper aims to evaluate the impact of the country's recent trade liberalization experience on the performance, competitiveness, and structure of the Philippine packaging industry. It will examine changes in the industry's levels of protection and the corresponding changes, if any, on the levels of allocative and technical efficiency, competitiveness, and productivity. It will also study factors related to the industrial structure — concentration, barriers to entry, and market power — and their influence, if any, on the abovementioned variables. The analysis is

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made at the level of the industry, the different subsectors, and at the plant level when possible.

SIGNIFICANCE OF THE STUDY

Several past studies, most of them utilizing cross-country data, have examined the effects of trade reform on industrial efficiency and competitiveness. But few have considered the role of the industrial structure and plant-level characteristics in explaining the differences in the responses of industries or individual plants to trade policy shifts.

This study uses plant-level data from the National Statistics Office (NSO) 1983 and 1988 Census of Manufacturing Establishments (CME). These are supplemented by data gathered from a firm-level survey conducted by the Philippine Institute for Development Studies, covering the period 1986 and 1991.

The packaging industry has been chosen as the subject of inquiry because it is an import-substituting, import-dependent industry insulated from foreign competition prior to the Trade Liberalization Program (TLP). And although it has been subsequently liberalized, it still enjoys a certain degree of protection under the existing tariff structure.

The growing significance of the packaging industry in the economy is undeniable. Most manufactured products require some form of packaging. The demand for packaging has kept pace with the growth of the manufacturing sector, particularly of its end-using industries. Although the industry accounted for only 3.3 percent of manufacturing value added in 1988, its value added grew steadily relative to that of the manufacturing sector, as shown in Figures 1 and 2.

The packaging industry also plays a significant role in the success of the export sector, particularly in the agricultural and processed food subsectors, which require high-quality packaging. The share of packaging to total product cost in the export-oriented processed food subsector, for instance, can run from 20 to 70 percent (Philexport 1992). Policies affecting the packaging industry will thus have

Figures 1 and 2

Census Value Added
The Packaging Industry vs. the Manufacturing Sector: 1972-1988

Figure 1

(P000, at current prices)

11.000E + 09

1.000E + 08

Manufacturing

10,000,000

Packaging

1,000,000

100,00

1972   1975   1978   1983   1988

Figure 2

(P000, at 1972 prices)

11.000E + 08

Manufacturing

10,000,000

Packaging

1,000,000

100,000

1972   1975   1978   1983   1988

Source: Census of Establishments
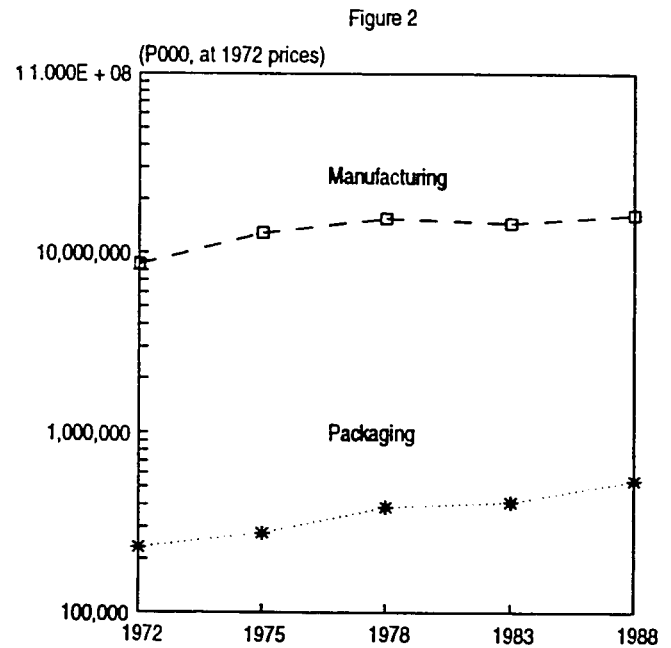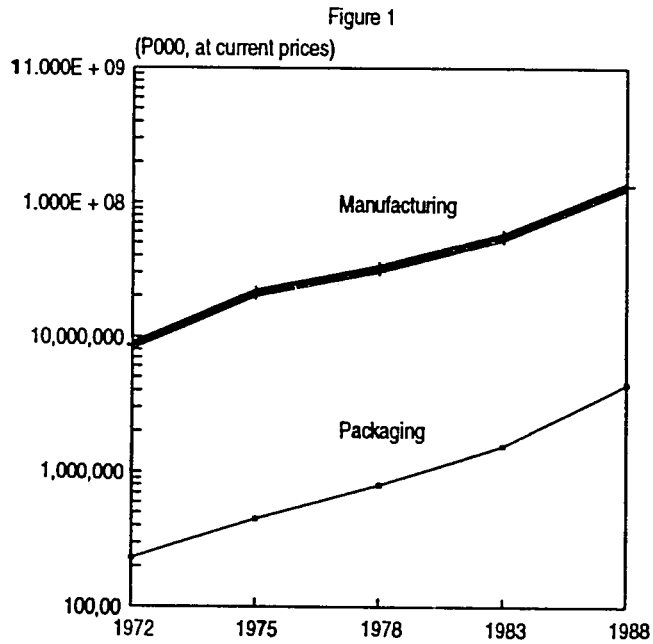
important repercussions on this subsector and on other end-using industries as well.

The role of the industrial structure in the trade policy-productivity nexus is exemplified in the packaging industry because it constitutes different subsectors characterized by different degrees of concentration and different heights of entry barriers. The different subsectors, in varying degrees, typify the dualistic market structure usually found in developing countries. This dualism is characterized by the co-existence of an oligopolistic core (consisting of a few big plants dominating the market in terms of sales, employment, and value added) and a competitive fringe (made up of a number of small plants accounting for only a small portion of total industry sales, employment, and value added) (Rodrik 1988b). The differences in the characteristics of plants in the upper and lower ends of the industry spectrum may explain the discrepancies in their reactions to trade policy reform.

SCOPE OF THE STUDY

The study covers the period 1981 to 1991. The years 1983 and 1988 are viewed as reference points representing the subperiods *before* and *during* the full implementation of the 1981 Trade Liberalization Program (TLP).

The 1981 TLP consisted of the Tariff Reform and the Import Liberalization Programs. Of these, only the former proceeded as scheduled. By 1985, the targeted rates had been achieved. Plans to liberalize import licensing were suspended in 1983, however, because of the severe balance-of-payments crisis in 1983-1984. Import liberalization efforts began anew with the Aquino administration in 1986. It was only then that the 1981 TLP was fully implemented. The years 1983 and 1988 have been chosen as reference points mainly because of data constraints: the most recent Censuses on manufacturing establishments were conducted during these years.

The study also attempts to cover the year 1991, when the next round of major tariff reforms began to be implemented. Survey data

are gathered through questionnaires and are analyzed together with 1986 data, to allow for five-year period of comparison.

The study uses the packaging product classification scheme based on raw materials used, which groups products as follows: (1) glass; (2) metal; (3) paper; (4) rigid plastics; (5) flexible plastics; (6) composite flexibles; and (7) wood. It does not cover wooden packaging. Neither does it make any distinctions between rigid and flexible plastics and composite flexibles.

Following this classification scheme, the packaging industry under study thus comprises four heterogeneous subsectors: (1) glass-based; (2) metal-based; (3) paper-based; and (4) plastic-based. Tables 1 and 2 list the different types of packaging products and the raw materials used in their production, respectively.

HYPOTHESES

The study examines the following hypotheses:

1) Trade reform generally leads to improvements in efficiency and competitiveness.
2) The positive effect of trade liberalization on efficiency and competitiveness may be either enhanced or dampened by the industrial structure and other plant-specific factors.

Table 1

Type of Packaging Products by Raw Materials Used

Products	
Glass-based	Bottles; jars; tumblers; jugs; vials; ampoules; carboys
Metal-based	Cans; collapsibles; caps; closures
Paper-based	Corrugated and non-corrugated cartons; foldings, parcels, and bags; rigid (set-up) boxes; instruction leaflets and labels; fiber drums; other applications such as bracing, blocking, partitioning materials inside boxes to hold products in place
Plastic-based	Bottles and jars; plastic tubes; vials and sleeves; crates and drums; closures; wraps and overwraps; preformed bags; envelopes; form-fill-seal pouches

Source : Philexport, 1992.

Table 2

Raw Material Requirements by Product Type

Raw Materials	
Glass-based	Silica sand; soda ash; limestone; feldspar; dolomite; salt cake; cullet (broken glass); gypsum; sodium nitrate; arsenic trioxide; fluorspar; selenium; sulfur; charcoal pyrite; chromite
Metal-based	Tinplate; tin free steel; two cold-reduced (2CR); aluminum; lead; tin; aluminum; coating materials; fluxing agents; sealing compounds; copper wire
Paper-based	Newsprint; printing and writing paper; tissue paper; corrugating medium (linerboard and fluting material); bleached board; claycoated boxboard; chipboard; cartonboard; sack paper; other kraft and wrapping paper; other types of paper and paperboard
Plastic-based	Polyethylene; polypropylene; polysterene; polyvinyl chloride; polyethylene terephthalate; colorants; plastic films; cellophane; metallized polyester*

* used in composite flexibles

Source : Philexport, 1992.

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Review of Related Literature

THIS chapter surveys related studies on the relationship among trade liberalization, efficiency, and the industrial structure. It also reviews previous studies on the local packaging industry.

STUDIES ON TRADE POLICY, INDUSTRIAL STRUCTURE, PERFORMANCE, AND COMPETITIVENESS

In a survey article on trade policy and productivity gains in developing countries, Havrylyshyn (1990) stressed *the lack of a cohesive unifying theory of how trade affects efficiency.* Empirical findings are similarly inconclusive. Pack (1988), for instance, noted that "there is no clear confirmation of the hypothesis that countries with an external orientation benefit from greater growth in technical efficiency in the component sectors of manufacturing."

Nishimizu and Robinson (1984), however, established important links between trade policy and industrial productivity performance. They observed that total factor productivity growth (TFP) was more rapid in the export-oriented Korean economy than in the more internally-oriented economies of Turkey and Yugoslavia. But they acknowledged that the causality may have worked in the reverse direction, export expansion being induced by productivity growth.

Tybout, de Melo, and Corbo (1991) revealed that although there was little overall productivity growth in the Chilean manufacturing sector after the trade reform, industries that experienced marked reductions in protection showed the biggest improvements in average efficiency levels. Small plants increased production to minimum efficient scale after the lowering of protection. In view of these positive indications on the sectoral level, the authors posited that the

overall efficiency gains resulting from trade reform may have been eclipsed by the macroeconomic crises which hit the Chilean economy shortly after the policy shift.

Finding no strong direct evidence to support the trade policy-productivity nexus, Havrylyshyn (1990) suggested that one way to explain the link is through the larger total market available when exports are not discouraged, which allows for both (1) increases in capacity utilization and (2) economies of scale arising from specialization.

Page (1980), for instance, found no significant relationship between firm size and technical efficiency in Indian manufacturing industries. He discovered instead the importance of capacity utilization in explaining differences in efficiency.

Despite these conflicting findings and varying propositions, however, a common observation seems to emerge, as pointed out by Pack (1988: 341):

> ...important characteristics of economies exist apart from the international trade regime and may exert decisive effects on economic development, a truism often noted but occasionally lost sight of in the recent emphasis on the importance of trade policies...

And again (p.351),

> While the forces of international competition are undoubtedly an important catalyst for improving economic performance, purely domestic factors have much to contribute.

Along the same line, Caves (1985) noted the "importance of competitive conditions in determining the speed and efficiency of domestic markets' adjustment to international disturbances." He emphasized that product differentiation affects the sensitivity of domestic prices to shifts in import prices.

Harrison (1989) made the same observation. Using firm-level data from the Ivory Coast to examine the relationships among productivity, imperfect competition, and trade reform, she found that

the link was strong when perfect competition is assumed. But the relationship "virtually disappears when variations in price-cost margins resulting from trade liberalization are allowed for." Hence, the need to include the industrial structure variable in any unbiased estimation of productivity growth.

As Kirkpatrick and Maharaj (1992: 106) noted, the role of the industrial structure cannot be overemphasized:

The indeterminacy of the effect that trade liberalization has on productivity performance can be traced to the uncertainty about the way in which industrial enterprises respond to the new set of incentives established by trade policy changes. The reaction of firms is conditioned by the non-competitive structure of the industrial sector market.

Both they and Harrison (1990) suggested that future research focus on country-level disaggregated data to identify the linkages among trade liberalization, industrial structure, and firms' productivity performance.

STUDIES ON THE PHILIPPINE PACKAGING INDUSTRY

Most of the studies on the Philippine packaging industry focused on the business or entrepreneurial aspect. The studies made by the Center for Research and Communication (CRC 1987) and the Private Development Corporation of the Philippines (PDCP 1988) concentrated on the industry's strengths and weaknesses, its viability relative to other industries, its supply and demand conditions, and the formulation of strategies to enhance its competitiveness. Little attention was paid to economic or policy issues, although the PDCP study recommended lowering tariff rates on packaging raw materials to make the industry more competitive.

A recent study by Philexport (1992) examined the structure, standards, technology, and supply and demand conditions of the industry. It compared the local industry with its counterparts in other ASEAN countries such as Malaysia and Thailand and concluded that the local industry is way behind its ASEAN counterparts both in terms

of technology employed and price competitiveness. This was the first study to address the problems between the industry and its end-using industries. It advocated the lowering of tariffs both on finished packaging goods and raw materials.

Closer to this study is the paper by De Dios, Bautista, and De Dios (1993) which examined the relationship between the packaging industry and the agricultural and agro-processing sectors. It focused on the structure and organization of the industry and on its linkages with these two sectors. It also evaluated the effects of the 1991 Tariff Reform Program on all three sectors through a simulation exercise based on the hastened implementation of the rates prescribed under the Program. The results point to a "win-win" situation for all sectors.

Most of these studies have relied on aggregated census data, glossing over changes at the level of the plant.

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Theoretical Framework

Empirical studies have shown that protection reduces industrial sector efficiency (Tybout et al. 1991). First, in markets characterized by entry barriers, the absence of foreign competition allows incumbents to enjoy market power and earn excess profits. The reason is that tariffs drive a wedge between domestic price and the free trade price, which is supposed to be equal to marginal cost. Consequently, these firms may fail to produce at minimum efficient scale (achieve scale efficiency) and achieve the maximum possible output from their input bundles (achieve technical efficiency or "X-efficiency"). Second, in markets characterized by Chamberlinian competition, trade protection may attract inefficient small producers, causing similar increases in average costs. In both cases, the absence of import competition allows the firms to lead a "quiet life," producing uncompetitive products at uncompetitive prices.

It is argued that trade liberalization would reverse the negative effects of protection, enhancing industrial sector efficiency. Domestic firms facing import competition will be forced to cut down on costs, streamline their operations, and adopt new technologies. Inefficient and uncompetitive firms would have to either brace up or be eased out of the market. A new industrial structure better suited to the international environment would then emerge.

However, past studies seeking to establish the relationship between trade liberalization and industrial performance and competitiveness have generally yielded inconclusive results. Recent contributions to the literature stress the role of the less-than-perfectly competitive industrial structure and other plant-specific factors in explaining the trade policy-productivity nexus.

This chapter presents the framework for analyzing the impact of trade liberalization on efficiency, competitiveness, and the industrial

structure. It also discusses the relationship among the last three variables, particularly as trade liberalization impinges on them.

EFFICIENCY

Efficiency within the Economy[1]

Economic performance is generally associated with efficiency. The notion of efficiency within the economy may be explained through the production possibility frontier (PPF) shown in Figure 3. The PPF portrays the maximum attainable output of X against any given amount of Y when all available resources are fully employed using best-practice technology and efficient management techniques. Points *on* the frontier thus represent *technically efficient, attainable* output combinations of X and Y. Points *outside* the frontier represent *unattainable* outpu. A point such as A *"inside"* the frontier, is also attainable but it represents either *underutilization* or *inefficient use* of resources, or both, since available resources could be efficiently and fully utilized to produce a higher output level, that is, a production point on the frontier. A movement to a point such as B on the frontier would thus constitute an efficiency gain.

Suppose that the relative market prices of goods X and Y are given by the price line MM'. Abstracting from consumption, equilibrium in production would be represented by point B where the marginal rate of transformation (the slope of the PPF) is equal to the prevailing price ratio between the two goods. Point B represents a *technically* and *allocatively efficient* output combination. Production at this point *fully utilizes existing resources* and *attains the maximum potential output, yielding a combination of the two goods which is consistent with prevailing relative prices*. Point C, while being a technically efficient point, is not allocatively efficient since it represents an output combination inconsistent with prevailing relative prices.

1. The author is grateful to Dr. John Power for outlining the main ideas of this section.

Figure 3
Efficiency within the Economy
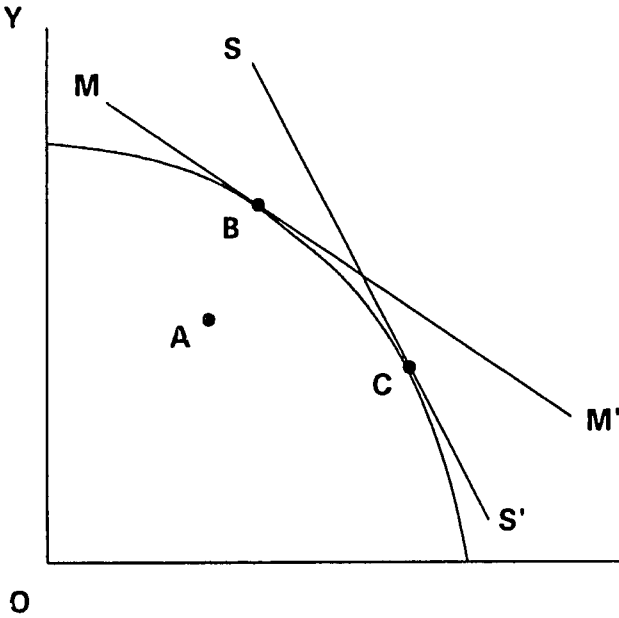
Suppose, however, that *market* prices diverge from *social* or *shadow* prices due to a restrictive trade regime. Assume that the price line MM' gives the ratio of protected prices. Border or shadow relative prices, on the other hand, are given by SS'. Thus, protection has made good Y more expensive and likewise more profitable than X, inducing the allocation of more resources to the production of good Y when, in fact, more of good X should have been produced. Under these conditions, point B would no longer correspond to an allocatively efficient combination. Correcting the distortion in relative output prices such that SS' becomes the price line faced by industries would induce them to *reallocate resources* to produce the more desired output combination, which is point C.

While a movement from point A to B would primarily represent gains in technical efficiency (although it may likewise indicate improvements in allocative efficiency), the movement from point B to C would represent gains in allocative efficiency alone (since any

production point on the frontier would already be technically efficient). Technical efficiency gains may be due only to non-price factors, whereas allocative efficiency improvements would call for changes in relative prices. Among the non-price factors leading to efficiency gains are:

1) increased access to supplier technology,
2) better management techniques,
3) higher quality standards, and
4) growth due to increased demand in end-using industries.

Price-related measures include tariff and tax reforms falling in the realm of public policy.

Plant-level Efficiency

Plant-level efficiency may be measured using the analytical framework based on the economic theory of production and cost (Solow 1967). The core of the theory is the production function, which specifies a certain relationship between a vector of maximum producible outputs and a vector of factors of production.

If a plant employed two factors of production in a well-behaved linearly homogeneous production function, production decisions may be represented in input space by a point giving the combination of primary factors required to generate one unit of output (Page 1980). The different input combinations possible for each plant give rise to a scatter of observations in the input plane which, when joined, represent the industry production function. Figure 3 shows one such production function, FF', defined by a given state of technology.

Since the function limits the range of possible observations, that is, since it refers only to the maximum output attainable from a given bundle of inputs (or, what is the same, the minimum quantities of inputs required to produce a certain level of output), it may be meaningfully called a *frontier* production function (Forsund, Lovell, and Schmidt 1980). Points on the frontier constitute the potential or "best practice" output. The amount by which measured or actual

output is less than potential output may be regarded as a measure of inefficiency.

Following Page (1980), the level efficiency can be decomposed into technical efficiency and choice of technique. Consider Figure 4. Let L and K represent labor and capital and let points A, B, C, and D represent different plants. Plants B and C are both efficient but plant A is inefficient since it uses more inputs than is required to produce the level of output given by the production frontier. The ratio OB/OA measures plant A's level of *technical inefficiency*, implying an *excessive use* of factors of production.

Technical efficiency has often been referred to as X-efficiency (Leibenstein 1966) and is usually associated with the plant's access to technology as well as the role of management in the production process.

Figure 4
Plant-level Efficiency
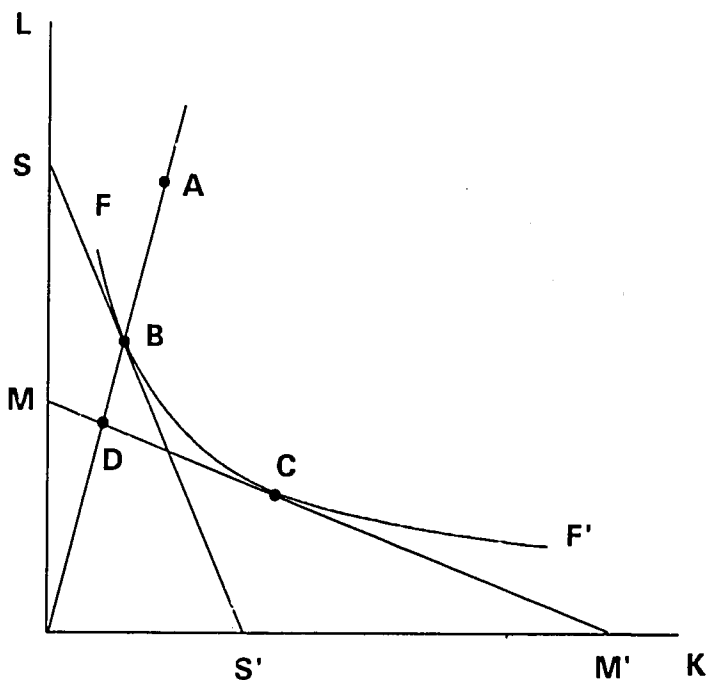
Now let MM' be the prevailing market relative factor price line faced by the plants. Plant B would then be similarly inefficient since it uses the *wrong combination* of factors at the *existing factor prices*. The ratio OD/OB measures plant B's level of *inefficiency due to wrong choice of technique* since it incurs higher costs than plant D which lies on the same price line as wholly efficient plant C. The ratio OD/OA measures *total inefficiency*, that is, technical inefficiency and inefficiency due to wrong choice of technique.

Suppose now that, due to distortions arising from a restrictive policy regime, *market* prices of products and factors diverge from their *social* or *shadow* prices (Page 1980). Assume that the relative social prices of inputs are given by the slope SS'. Plant B thus becomes technically efficient and uses the right technique, while plant C uses the wrong technique. But if the distortions are not corrected, plant C would seem to apply the right technique — instead of plant B — since it saves on input costs by using apparently cheaper capital. Correcting the distortion may induce firm C to adopt the more appropriate production choices of plant B — that is, it would employ more labor, which would cost less at shadow prices.

According to Kirkpatrick and Maharaj (1992), productivity improvements that will enable plant A to move to plant C's position represent only static efficiency gains. A gain in dynamic productivity, usually referred to as technological progress, will occur when the production frontier itself shifts toward the origin. This study is confined to analyzing static efficiency.

The study utilizes the concept of Domestic Resource Cost (DRC) in measuring allocative efficiency and efficiency in terms of choice of technique. Simply put, the DRC is a cost-benefit ratio representing the social opportunity cost of domestic resources used per unit of net foreign exchange earned (or saved) by the export (or import substitution) of a given product (Bautista and Power 1979). In the *ex post* sense, the DRC can be viewed as a measure of allocative inefficiency — that is, of the costs due to the misallocation of resources into industries or sectors where productivity is not maximized. Such misallocation of resources among industries may be due to price distortions under a restrictive trade regime. At the plant

level, misallocation may take the form of wrong choice of technique due to distortions in relative input prices caused by protectionist policies. The higher the DRC, the greater the cost of protection. The economy would do well to cut back on that industry's or plant's activity.

The study measures technical efficiency by estimating the frontier production function through linear programming techniques. The optimization problem minimizes the deviations of actual from maximum potential output subject to a number of constraints.

These two methods of measurement will be explained in the next chapter.

The findings of a recent study linking trade policy, structure, and performance in Colombia (World Bank 1991) revealed the impact of trade reform on efficiency. The study showed that industries with higher import penetration ratios gained the largest productivity improvements. Thus, DRC ratios, representing levels of allocative inefficiency and inefficiency due to wrong choice of technique, may be expected to be inversely related to import penetration ratios — that is, lower DRC ratios may be expected after the trade reform. Technical efficiency, on the other hand, is expected to improve after the trade reform. In the two models presented above, trade liberalization is expected to rationalize the industrial structure (Figure 3) and reduce plant-level costs (Figure 4).

COMPETITIVENESS

International competitiveness refers to the ability of the sector, industry, or plant to compete in domestic markets with importers and in external markets with other exporters (including domestic producers in the destination market) (Tecson 1992). Competitiveness is linked to the concept of comparative advantage. While comparative advantage reflects social profitability, competitive advantage reflects private profitability. The relationship between these two concepts may be expressed by the following formula, where DRC refers to the usual domestic resource cost measure based on shadow prices:

$$\frac{DRCM}{OER} = \frac{DRCM}{DRC} * \frac{SER}{OER} * \frac{DRC}{SER}$$

where

$$DRCM = \text{DRC in market (as opposed to shadow) prices}$$
$$OER = \text{official exchange rate}$$
$$DRCM/OER = \text{competitive advantage}$$
$$DRCM/DRC = \text{ratio representing distortions attributable to}$$
the domestic tax system and the wage structure
$$SER = \text{shadow exchange rate}$$
$$SER/OER = \text{ratio representing distortions attributable to}$$
trade and commercial policy
$$DRC/SER = \text{comparative advantage}$$

DRC differs from DRCM in that it takes wage legislation-, tax-, and tariff-related distortions into account while the latter considers only distortions attributable to the tariff structure. Thus, competitive advantage differs from comparative advantage because of distortions in the local tax system, the wage structure, and the exchange rate regime. These differences are reflected in the above formula. An industry or plant, then, may have comparative advantage in an activity but still be uncompetitive due to the distortions cited.

STRUCTURE

Empirical studies have shown that in markets characterized by Chamberlinian competition, protection encourages the proliferation of small firms operating at suboptimal output levels. Markets characterized by entry barriers, on the other hand, allow incumbents to enjoy market power in the absence of foreign competition. In both cases, protection shapes, as it were, the industrial structure which, in turn, affects efficiency level in the industry.

It is argued that trade liberalization will rationalize the market structure by forcing inefficient firms out of business and reducing the market power of incumbents in "high-barrier" sectors. Nonetheless,

the impact of trade liberalization on the industrial structure and, consequently, on performance and competitiveness, depends on the nature of the industrial structure itself.

Two aspects of the industrial structure that have received considerable attention in recent years are concentration and entry barriers.

Concentration refers to *the extent to which an economic activity is dominated by a few large firms* (Lee 1992). Since the insignificance of individual sellers relative to the market is one of the major forces of perfect competition, the degree of competition is inversely related to the degree of concentration.

A distinction must be made between *production* and *seller* concentration. Technically, seller concentration is *production concentration if imports and exports are ignored* (Lee 1992). The concentration ratios used in the study (discussed in Chapter IV) thus measure production concentration since they do not take imports and exports into account.

Regressions correlating industrial structure with productivity performance in Colombia (WB Report 1991) revealed that the degree of concentration is inversely related to the level of productivity growth. This corresponds to the theory that, in the absence of competition (or, if the degree of competition is very low), firms will produce below efficient output levels.

An SGV study (1992) reiterated the widely-accepted fact that the Philippine industrial structure is characterized by a high degree of seller [that is, production] concentration. The study offered three explanations:

First, concentration may result because the size of the domestic market is too small relative to the minimum efficient scale of technology employed in some industries. If there is a bias against exports, the saturation of the domestic market would leave no room for the entrance of new firms. In this sense, economies of scale themselves imply that the efficient industry is necessarily concentrated.

Second, concentration may be the outcome of deliberate government policy protecting and promoting some industries, such

as: traditional natural monopolies; industries which are subject to explicit promotion programs; and "troubled" or "distressed" industries which benefit from special government rehabilitation and modernization programs.

Third, concentration may result from what is known as the Schumpeterian process, which confers absolute advantages on an innovating firm in the industry. This process implies that the driving force behind truly dynamic efficiencies is not competition but the achievement of economies of scale.

The study concludes that the high degree of seller concentration in Philippine industry is due neither to the exploitation of economies of scale nor to the Schumpeterian principle. Rather, it is the result of deliberate government policy protecting and promoting certain industries, effectively setting up barriers to entry.

Thus, the deeper issue is not concentration *per se* but the degree to which incumbents are insulated from competition by entry barriers. As Kirkpatrick and Maharaj (1992) put it, "even firms in a highly concentrated industry may be driven to adopt competitive price and output levels if there is an effective threat of entry from other firms." In this sense, measures of concentration, or of the absence of competitive pressure, may be understated if effective entry barriers are ignored.

In his pathbreaking work, Bain (1956) considers as an *entry barrier anything that allows incumbent firms to earn excess profits*, that is, *anything that allows prices to diverge from marginal cost*. Thus, the presence of an entry barrier easily secures for the incumbents some degree of *market power,* the latter being measured by the difference between output price and marginal cost, that is, the *price-cost margin.*

It should be noted at this point that previous studies have found a positive relationship between the price-cost margin and the concentration ratio (see Cowling 1976, for example).

If markets are contestable, that is, if entry and exit barriers are absent, and entrants can quickly replicate the cost structures of incumbents (Frischtak 1989), the threat of entry would compel the incumbents to behave like firms in a competitive market structure.

Competitive pressure can come from three sources (WB Report 1991):

1) other producers in the domestic market (internal competition);
2) foreign producers selling in the domestic market (import competition); and
3) foreign exporters competing with domestic exporters in third markets.

For the purposes of this study, only the first and second sources are relevant since the packaging industry is mainly import-substituting, with direct exports accounting for only about 5 percent of total industry output.

Competition may be posed either by existing firms or, in the case of contestable markets, by potential entrants. In the Philippine context, however, the presence of binding entry barriers renders some industries in the domestic market uncontestable.

Bain (1956) cites three sources of entry barriers: (1) scale economies; (2) absolute advantages; and (3) product differentiation. These arise because of the nature of the industrial structure itself and as such are called structural barriers.

But barriers may also result from deliberate government intervention protecting and promoting some firms or industries. These policies may sometimes be prompted by genuine concern for the ailing or retarded firm or industry. But sometimes, vested interests are involved.

The SGV study (1992) has identified the entry barriers in the Philippine industrial structure.

Policy-induced barriers take the following forms: direct restriction of entrants, fiscal incentives. credit subsidies, bureaucratic requirements, import restrictions and tariffs, and price or rate regulation.

Structural barriers to entry include: scale economies and excess capacity, absolute advantages, high capital requirements and imperfect capital markets, predatory or limit pricing, product differentiation and brand loyalty, and incumbent reactions such as the use of the regulatory or judicial system to block competition.

The SGV study concludes that barriers to entry in Philippine industries are generally policy-induced.

Given that entry barriers persist — barring domestic competition — another source of competitive pressure, imports, yet remains. Thus,

the *import discipline hypothesis* becomes the argument for trade liberalization. This hypothesis posits that the mere *threat* of competition, not necessarily *actual* competition, from imports can force incumbents in a market characterized by high entry barriers to alter their price and output decisions, resulting in efficiency gains (Kirkpatrick and Maharaj 1992).

Following Helpman and Krugman (1985), the competitive effect of trade on a market structure characterized by entry barriers may be demonstrated using partial equilibrium analysis. This framework may also be applied when trade levels increase due to the lowering of protection.

Consider a single good produced in two countries with cost functions $C(w,x)$ and $C^*(w^*,x)$, respectively. Assume that there are m consumers in the first country, m^* in the second, and that all of the consumers have the same per capita demand function:

$$D = D(p).$$

Assume now that there is restricted entry into this industry because of government regulations or other natural barriers. Instead, there is a predetermined number of firms in both countries, n and n^*.

In the absence of trade, the industry demand curve will be the sum of individual demands, so that

$$X = Md(p),$$

where X is industry output. The inverse demand is

$$p = D^{-1}(X/m) = D(X/m).$$

Firms are assumed to maximize profits and to take other firms' outputs as given, implying the first-order condition that expresses the equality of marginal cost to marginal revenue:

$$p + (x/m)D'[D(p)] = C_x(w,x),$$

where x is the output of a representative firm and $C_x(.)$ is its marginal cost. The left-hand side represents marginal revenue. But since all firms are assumed alike

$$x = X/n = [Md(p)]/n$$

This yields the basic equilibrium condition:

$$p \{ 1 - [1/ne(p)] \} = C_x [w, D(p)m/n]$$

where $e(p)$ is the elasticity of demand. Price is greater than marginal cost, denoting some degree of market power.

With the opening up of trade and under the assumption that the countries are completely symmetric (that is, $C(.) = C^*(.); w = w^*; n = n^*$), the marginal revenue of a representative firm becomes:

$$MR = p \{ 1 - [1/(n+n^*)e(p)] \}.$$

It is evident that at the pre-trade price, $MR > C_x$ since the elasticity of demand faced by a firm increases.[2] This forces firms to expand their output, consequently lowering the price. Thus, even if no trade actually results — the two countries being symmetric — *the possibility of trade, by increasing competition, has mattered. It has altered the price and output behavior of firms, creating a more competitive industrial structure and generating efficiency gains.*

If actual trade occurs, the degree of import competition may be measured by the import penetration ratio, which is defined as the proportion of imports to total domestic demand.

According to the World Bank (1991), an inverse relationship exists between the import penetration ratio and the price-cost margin which, as we have noted, is a measure of market power. This implies that imports do exert a price-discipline effect on domestic producers.

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2. In fact, under the more realistic small-country assumption, the elasticity of demand approaches as the number of countries, and consequently, of firms, increases.

It also appears that the largest reduction in price-cost margins occurred in the highly-concentrated industries and in those with relatively larger plant sizes, implying that these were the major gainers in terms of the welfare effects of trade. The study also found that the profits of large plants were the ones which experienced the greatest reductions in the face of trade. Thus, import competition had its most substantial effect on the rents being earned by the largest plants in the domestic industry.

These findings show that the welfare losses of uncompetitive domestic markets may indeed be lessened by import competition.

The competitive effect of trade reform on the industrial structure may be vitiated, however, by the behavioral reactions of the firms themselves. For instance, the increase in imports may increase seller [as opposed to production] concentration if major producers are also importers (Kirkpatrick and Maharaj 1992). Moreover, the lower cost of imported supplies may increase profitability if sellers can keep domestic prices at their existing levels. Lobbying may also enable domestic firms to influence the pattern and degree of implementation of trade liberalization so as to leave their domestic rents largely unaffected. In any of these cases, the potential efficiency gains resulting from the competitive environment created by trade reform may not be realized.

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Data Sources and Methodology[3]

THIS chapter presents the data sources and the methodology used in computing the various measures of protection, efficiency, and productivity and the various indicators of industrial structure analyzed in the study. Estimates at the subsector and industry levels are not simple averages of plant-level estimates. These aggregate figures were obtained by first summing up plant-level values for each component of a given formula and plugging these aggregate values into the formula. All computations were made using the Statistical Analysis System (SAS) Package, version 5.

DATA SOURCES AND LIMITATIONS

Census and other Published Data

As earlier mentioned, the study's main data base was the 1983 and 1988 Census of Manufacturing Establishments. This data base consisted of plant-level observations classified according to the Philippine Standard Industry Classification (PSIC) codes. Published census data from various years were also consulted.

Tariff and tax rates were obtained from various issues of the Tariff and Customs Code of the Philippines and the National Internal Revenue Code, published by the Tariff Commission and the Bureau of Internal Revenue, respectively. Export and import values were taken from various issues of the Foreign Trade Statistics, published by the NSO. Export ratios were computed based on data from the

3. The reader is referred to the 2-volume Development Incentive Assessment Project Report for more details on the methodology used in the study.

Interindustry Accounts of the Philippines (Input-Output Tables), also published by the NSO.

Survey Questionnaire, Interviews, Plant Visits, and Consultations

The survey questionnaire covers the years 1986 and 1991. It consists of six parts: (1) general information about the plant, (2) production technology, (3) human resources, (4) financial resources, (5) research and development, and (6) policy environment.

Of the 100 questionnaires sent to plants in the different subsectors, only 14 were retrieved. And since none of the retrieved questionnaires was completely answered, financial statements of the concerned respondents were obtained from the Securities and Exchange Commission to serve as a supplementary data base.

Interviews with industry sources also form an integral part of the data base. These were conducted mostly during plant visits. The study also utilized exchanges with management-level representatives from producing and end-using firms during consultative meetings held in November 1992 and September 1993. These were used extensively in qualitative analysis.

METHODOLOGY

Effective Protection Rate (EPR)

Trade liberalization, through tariff reform and import deregulation, is expected to create a more open and outward-oriented trade regime by lowering the high protection levels created by past protectionist policies. Changes in these levels are usually measured using the concept of the effective protection rate (EPR).

The *EPR* is defined as *the percentage excess of domestic value added [at protected prices] over world value added [at free trade or border prices, that is, in the absence of protection]* (Tariff Commission undated). Value added is simply the difference between the value of output and the corresponding value of inputs used (both net of sales taxes).

Under a restricted trade regime, domestic prices exceed world prices due to protective devices such as tariffs, advance sales taxes on imports, mark-ups, and other non-tariff or quantitative trade barriers. Hence, the difference between domestic and world value added. The EPR measures the levels through which the protection structure raises an industry's or a plant's value added per unit over the world market value added, as expressed in the following formula:

$$EPR = \frac{DVA - FTVA}{FTVA} * 100$$

$$= \left[\frac{DVA}{FTVA} - 1\right] * 100$$

where   DVA = domestic value added
FTVA = free trade value added

Based on the definition of value added, the formula becomes:

$$EPR = \left[\frac{\dfrac{PQ}{(1+s_j)} - \dfrac{RM}{(1+s_i)}}{\dfrac{PQ}{(1+T)} - \dfrac{RM}{(1+T)}} - 1\right] * 100$$

where   PQ = value of production
RM = cost of material inputs used
s_j = sales tax on output
(used to deflate the value of production into domestic ex-factory terms)
s_i = sales tax on input
(used to deflate the cost of material inputs into domestic ex-factory terms)
T_j = implicit tariff on output
(used to deflate the value of production into free trade terms)
T_i = implicit tariff on inputs

(used to deflate the cost of material inputs into free trade terms)

The implicit tariffs used in the study are based only on tariffs and taxes. The resulting EPRs thus do not take quantitative restrictions and other non-tariff means of protection into account.

The Census data do not directly provide information on the value of production. PQ was, thus, obtained by adding total revenue to the change in inventories of finished goods and work-in-process. Only 50 percent of work-in-process inventory was considered part of total production; the other half was assumed to have undergone very little processing.

The other item necessary for computing value added is the material input cost, RM, which was taken directly from the Census data.

Net Effective Protection Rate (NEPR)

The measure of effective protection discussed above indicates the relative incentives given to different subsectors. It focuses on the relative position of subsectors or plants in the EPR scale since "protection is a relative concept" (Tan 1979). High protection in some subsectors implies low protection in others. If all subsectors were highly protected, no particular subsector or group of subsectors would then be effectively protected. However, Tan stresses that, as a whole, tradeable goods may be penalized relative to non-tradeables by an overvalued currency or can be protected by an undervalued currency.

Thus, the EPR estimates which are computed at the actual exchange rate can be *adjusted for the extent of overvaluation of the currency* (which is the usual case) as compared to the hypothetical free trade situation to yield the *net EPR*, as follows:

$$NEPR = \left[\frac{OER\ (EPR + 1)}{FTER} \right] - 1$$

where   NEPR = net effective protection rate
           OER = official exchange rate
          FTER = free trade exchange rate

Implicit Tariff

   Implicit tariffs are, in principle, the *proportional difference between domestic prices and the border prices of homogeneous goods* (Tariff Commission undated). This difference occurs because of various protective devices, such as tariffs, taxes, and import restrictions. If protection due only to tariffs and taxes is to be estimated, the formula for computing implicit tariffs is as follows:

$$T = [(1 + t)(1 + s)] - 1$$

where   T = implicit tariff
           t = book or nominal tariff
           s = sales tax

Average Implicit Tariff on Importables (T)

   The formula cited above is applicable when implicit tariffs on particular commodities are to be estimated. The aggregated nature of the Census of Establishments data, however, does not permit the computation of implicit tariffs on particular products. Neither does it allow the estimation of plant-level implicit tariffs which requires detailed information on the products manufactured by each plant. Nonetheless, implicit tariffs at the level of the subsector can be computed based on Census data since the PSICs falling under each subsector, and their corresponding PSCC lines, can be identified.
   To estimate the implicit tariff applicable to a subsector, the formula above was modified. Instead of values for a particular product, the components of the basic formula for estimating implicit tariffs now represent aggregated subsector figures:

T = implicit tariff for the subsector
t = average nominal tariff for the subsector
s = average sales tax for the subsector

Based on these modifications, implicit tariffs for 1988 were estimated as follows.

First, the PSCC lines (or products) falling under each subsector were identified. These PSCC lines were segregated into those representing finished goods and those representing material inputs since separate implicit tariffs were to be calculated for outputs and inputs. The nominal or book tariff rates corresponding to the different PSCC lines were then taken from various issues of the Tariff and Customs Code of the Philippines and their simple average computed.

The same procedure was employed in computing the average sales tax for the subsector. The computed average tariff and sales tax were then plugged into the formula to obtain the implicit tariff for the subsector.

Average Implicit Tariff on Importables and Exportables (T)

Although exports are usually assumed tariff-free, implicit tariffs on output and inputs which cover both exportables and importables may be estimated. This measure, denoted by T_j or T_i for outputs and inputs, respectively, is considered more precise than the average implicit tariff on importables presented above since it reflects the weights proper to the two components of trade. The formula for obtaining $\overline{T}_j$ is as follows:

$$\overline{T}_j = \frac{Domestic\ value\ of\ output}{Border\ (free\ trade)\ value\ of\ output} - 1$$

$$\text{since} \quad \frac{PQ * x}{1 + 0} + \frac{PQ * (1-x)}{1 + Tj} = PQ_b$$

where PQ = domestic value of output, obtained as previously explained (EPR estimation)

x = export ratio, computed from the input-output tables

T_j = average subsector implicit tariff on import substitute, obtained as previously explained

PQ_b = border value of output

and 0 is the tariff on exports.

Dividing everything by PQ, adding, and rearranging, we obtain:

$$\frac{PQ}{PQ_b} = 1 + \bar{T}_j$$

or

$$\bar{T}_j = \frac{PQ - 1}{PQ_b}$$

as defined. $\bar{T}_i$ was similarly derived.

The average implicit tariffs computed based on these formulas will yield values that are more consistent with the computed EPR values, as will be shown in Chapter 6.

Domestic Resource Cost (DRC): DRC at Shadow Prices

The *DRC* is a *cost-benefit ratio* representing *the social valuation of domestic resources used per unit of foreign exchange earned (or saved) by the export (or import substitution) of a given product* (Bautista and Power 1979). In general, the formula for estimating DRC is represented by

$$DRC = \frac{Domestic\ cost\ in\ shadow\ prices}{Border\ value\ of\ output - Foreign\ cost\ in\ border\ prices}$$

$$= \frac{Social\ value\ of\ domestic\ resources\ (in\ P)}{Social\ value\ of\ net\ foreign\ exchange\ earned\ or\ saved\ (in\ \$)}$$

Lower DRC values for a particular product [plant, or industry] will benefit the economy since it implies that value added at international prices is maximized for a given input of domestic resources allocated to the production of the tradeable good [or the operation of the plant or industry producing the good] (Page 1980).

As a cost-benefit measure, the DRC ratio expressed in shadow or social prices and in terms of net foreign exchange earned or saved is particularly useful in less developed countries (LDCs) characterized by (1) highly distorted markets and (2) the scarcity of foreign exchange.

In a world of distortions arising from genuine market failures (increasing returns, imperfect competition) and/or created by government policy intervention (price controls, protectionist trade policies, state trading), market prices do not reflect the true social costs and benefits of goods and resources (Tariff Commission undated). The DRC measure corrects for these distortions by valuing output and factors of production (including foreign exchange) at shadow or accounting prices. The *shadow price* of an item is defined as the *social* [as opposed to private] *value of endowing the private sector with one more unit of it* (Tower 1992).

Since the DRC expresses social domestic cost in terms of an additional unit of net foreign exchange earned or saved, it explicitly treats foreign exchange as a scarce resource, thus reflecting the situation prevalent in most small open LDCs like the Philippines. It indicates the *price* or the *cost of foreign exchange.* The higher the cost, the more unfavorable the production activity utilizing domestic resources to generate or save foreign exchange. Logically, then, the common benchmark used in determining the maximum DRC still socially profitable is the *shadow exchange rate* (SER). More specifically, the ratio of the DRC to the SER, *DRC/SER,* is used to measure *allocative efficiency* and comparative advantage.

For the purposes of this study, a positive DRC/SER ratio less than or equal to 1.2 is taken to indicate allocative efficiency and comparative advantage. The excess of 20 percent over the more commonly used benchmark of 1.0 is an allowance for computational errors. A DRC/SER ratio between 1.2 and 1.5 is taken to indicate

mild inefficiency, while a ratio greater than 1.5 is considered to indicate inefficiency. A negative DRC value indicates negative net foreign exchange earning or saving. This means that the border value of the output generated by the activity in question is not enough to cover the free trade foreign cost of the activity, not to mention the corresponding domestic costs.

The DRC may be used in an *ex ante* sense to rank hypothetical projects. In the *ex post* sense, however, it may be used to evaluate past or existing trade and industrial policies. The present study will use the DRC to measure the cost of resource misallocation arising from the past protectionist trade regime and to assess possible changes in resource allocation after the implementation of the TLP.

Although some adjustments had to be made to suit data available for a particular year, the basic method used for estimating DRCs based on data from the Census of Manufacturing Establishments is as follows.

First, the elements constituting the three major components of the DRC formula (domestic cost, foreign cost, and value of output) were determined. The major components of cost are:

1) interest and depreciation costs of fixed assets;
2) interest cost on working capital;
3) cost of material inputs and supplies;
4) labor cost; and
5) other domestic costs.

Other foreign costs are not included in the Census data.

Interest and Depreciation Costs of Fixed Assets

Fixed assets include buildings, machines, transportation equipment, and other assets such as furniture, fixtures, and office equipment. Land was excluded from the computations since most of the establishments did not report land value.

In computing the interest and depreciation costs of fixed assets, the following notations were used:

N = useful life of the asset; specific to the type of asset and the subsector

Y = year when the asset was acquired

CY = current year, or the year for which the DRC is being computed

K = age of the asset as of the current year

PI = price index inflator

PI_Y = price index of the year when the asset was acquired

PI_{CY} = price index of the current year

i = shadow interest rate for the current year

g = productivity growth rate of the asset

D = depreciation cost charged against the asset per year

BV = book value of the asset at the end of the current year

RC = replacement cost of the fixed asset

IC = computed interest cost of the asset

DC = computed depreciation cost of the asset

The replacement cost of fixed assets were then estimated as follows:

$$K = \frac{[(N * D) - BV]}{D}$$

$$Y = CY - K$$

$$PI = PI_{CY} / PI_Y$$

$$RC = \frac{(N * D) * PI}{(1 + g)^K} \text{ if } BV > 0 \text{ and } K > 0$$

The replacement cost of an asset may be computed only if its book value, BV, and its computed age, K, were both positive. The price index inflator, PI, considered inflation in the capital asset while the productivity deflator, g, took into account the offsetting increase in the productivity of the asset. These two adjustments had to be made 'because rapid inflation outstripped growth in productivity beginning

1970. The productivity growth rate was assumed to be 3 percent for all types of assets and for the all the reference years.

The interest and depreciation costs of fixed assets were then computed from the replacement cost, as follows:

$$IC = RC * i \quad \text{if } BV > 0 \text{ and } K > 0$$
$$DC = \frac{RC}{N * 1.5} \quad \text{if } BV > 0 \text{ and } K > 0$$

In computing for depreciation cost, the replacement cost of the asset was deflated by the product of its useful life and a factor of 1.5, based on the assumption that the economic life of an asset is usually longer than its reported accounting life.

After computing the interest and depreciation costs, the next task was to determine the proportions that would be considered domestic and foreign. To segregate the domestic from the foreign component, the following allocation ratios were used:

		Domestic	Foreign
a.	*Interest cost*		
	Buildings	0.85	0.15
	Machines	0.85	0.15
	Transportation equipment	0.85	0.15
	Other fixed assets	1.00	0.00
b.	*Depreciation cost*		
	Buildings	1.00	0.00
	Machines	0.00	1.00
	Transportation equipment	0.20	0.80
	Other fixed assets	0.15	0.85

These ratios are based on the assumptions made regarding the sources of financial capital — to which the interest cost would accrue — and the sources of physical assets — to which the depreciation cost would accrue. It was assumed that much of financial capital is sourced locally whereas physical capital, except for buildings, is imported. Thus, at least 85 percent of the interest cost of all assets was assumed

domestic, while at least 80 percent of depreciation cost, except that of buildings, was considered foreign.

To correct the distortions due to the domestic tax system and to fully convert the computed costs into shadow values, the domestic component of interest and depreciation costs of each type of fixed asset was deflated by one plus the sales tax (VAT in 1988). The foreign component was deflated by the official exchange rate (OER) multiplied by one plus the appropriate implicit tariff on the fixed asset, to express it in borders terms.

Interest Cost on Working Capital

Working capital consists of the inventories of material inputs, work-in-process, and finished goods. To estimate the interest cost on working capital, an average inventory level based on a simple average of beginning and ending inventory levels was first computed separately for finished goods and material inputs. Fifty percent of work-in-process was considered part of finished goods; the other half was assumed to have undergone very little processing and was thus included in the material inputs inventory.

The interest cost on working capital was obtained by applying the shadow interest rate to the computed average inventories. These computed interest costs were then broken down into their domestic (15 percent) and foreign (85 percent) components and divided by the appropriate deflators to convert them into domestic ex-factory and free trade terms.

Cost of Material Inputs and Supplies

Material inputs include both the major and minor material inputs used in the manufacture of the product. Supplies constitute packaging materials, office supplies, fuel, gasoline, electricity, water, and other utilities. The Census-based value of each of these items was broken down into its domestic and foreign components according to the following allocation ratios:

	Domestic	Foreign
Major and minor material inputs		
Glass-based	0.90	0.10
Metal-based	0.10	0.90
Paper-based	0.70	0.30
Plastic-based	0.10	0.90
Packaging materials	0.10	0.90
Office supplies	0.15	0.85
Water	1.00	0.00
Electricity	1.00	0.00
Other non-tradeable utilities	1.00	0.00
Lubricants	0.00	1.00
Diesel	0.00	1.00
Fuel and gasoline	0.00	1.00
LPG	0.00	1.00
Bunker fuel	0.00	1.00
Coal	0.00	1.00
Other purely importable utilities	0.00	1.00

The computed domestic and foreign cost components were then divided by the appropriate deflators to express them in ex-factory and free trade terms.

Labor Cost

Labor costs comprise basic salaries and wages and overtime pay, but do not include contributions to government or private insurance institutions and other benefits.

Actual labor costs of unskilled workers were adjusted since the market wage rate of unskilled workers is usually lower than their true marginal productivities. Thus,

$$SWU = l * WU$$

where SWU = shadow wage rate of unskilled workers

l = assumed factor to convert the market wage rate into to the shadow wage rate

WU = market wage rate of unskilled workers.

The market wages of skilled laborers were not adjusted since it may be assumed that their market wage rates already reflect their true marginal productivities. The total domestic social cost of labor is the sum of the shadow labor cost of skilled and unskilled workers.

Other Domestic Costs

Other domestic costs include industrial and non-industrial services done by others. Subsidies are also considered as domestic costs because these constitute social costs to society. These costs were not deflated because the proper tax deflators could not be determined.

Value of Output

Value of output was computed using the same method as that used in EPR estimation. This was divided into the exported and domestically-sold components (import substitutes) using an export ratio computed from the Input-Output tables. The domestically-sold portion was then deflated by the official exchange rate multiplied by one plus the implicit tariff, to express it in border or free trade terms. The exported component was deflated only by the official exchange rate since exports are assumed tariff- and tax-free.

All costs were thus evaluated at social opportunity cost. Domestic costs (in the numerator) were expressed in peso values. The value of output as well as all foreign costs (in the denominator) were expressed in free trade terms and converted into dollar values.

DRC at Market Prices (DRCM)

To measure competitive advantage, another DRC measure was computed based on market prices (denoted by *DRCM*, where *M* signifies *market*, instead of shadow prices). The latter is essentially similar to the former except that all the items in its numerator were not deflated by sales taxes and converted into domestic ex-factory

terms. Moreover, the cost of unskilled labor was not converted into its shadow value in the computation of DRCM.

Because of the modifications given to convert DRC into DRCM, it is evident that DRCM/OER will always be higher than DRC/SER. That is, a socially low-cost enterprise (low DRC/SER ratio) may appear high cost in the market (high DRCM/OER ratio). Such is the case because the numerator of DRC is deflated while that of DRCM is not. Also, the SER is usually higher than the official exchange rate. Thus, an industry or a plant which has comparative advantage (with a low DRC/SER ratio) may appear uncompetitive (since DRCM/OER is always higher than DRC/SER) in the domestic and international markets because of distortions (that is, in the tax system, wage structure, and exchange rate regime).

Technical Efficiency Coefficient (TEC)

A plant is considered *technically efficient* if it *produces the maximum quantity of output attainable from a given bundle of inputs* (Farrell 1957). Most studies use Farrell's (1957) frontier production function approach to measuring technical efficiency. It involves estimating a frontier or "best practice" production function which is thought to represent the maximum achievable output for any given level of inputs. When the maximum output is known, it is possible to construct an index of technical efficiency using the ratio between *actual* output and the *maximum attainable* or *potential* output derived from the frontier model. That is, with a given bundle of inputs and a given state of technology,

$$\textit{Technical efficiency} \quad = \quad \frac{\textit{actual output}}{\textit{potential output}}$$

Several methods of estimating the production frontier have been proposed. The two most prominent ones are the deterministic and stochastic models. The deterministic model attributes the difference between actual and potential output wholly to symmetric random disturbances. That is, it does not isolate the proportion of the

difference between actual and potential output which is due to inefficiency from other random disturbances. The stochastic model, on the other hand, explicitly includes an efficiency component in the error term of the estimated production function to isolate the difference between actual and potential output due only to efficiency factors. Thus, estimates from stochastic models are considered more accurate than estimates from deterministic models. However, the statistical package for estimating technical efficiency using the stochastic model could not run on available data. The study thus used a deterministic linear programming model using the SAS package.

The model employed, taken from Page (1980), simply minimizes the deviations of actual output from the maximum potential output, subject to some constraints. It sets out a translog production function which is used to represent the "best practice" frontier.

The linear programming problem was set up as follows:

$$Min \, Y_e - Y,$$

where

$$
\begin{aligned}
Ye = \; & \alpha_o + \alpha_L \, ln \, L + \alpha_K \, ln \, K + \alpha_M \, ln \, M \\
& + \alpha_{LK} \, ln \, L \, ln \, K + \alpha_{LM} \, ln \, L \, ln \, M + \alpha_{KM} \, ln \, K \, ln \, M \\
& + 1/2 \, \alpha_{LL} \, (ln \, L)^2 + 1/2 \, \alpha_{KK} \, (ln \, K)^2 + 1/2 \, \alpha_{MM} \, (ln \, M)^2
\end{aligned}
$$

subject to the following constraints:

(i) $\quad \alpha_L + \alpha_K + \alpha_M \qquad\qquad = \qquad 1$

(ii) $\quad \alpha_{LK} + \alpha_{LM} + \alpha_{LL} \qquad = \qquad 0$
$\qquad \alpha_{KL} + \alpha_{KM} + \alpha_{KK} \qquad = \qquad 0$
$\qquad \alpha_{ML} + \alpha_{MK} + \alpha_{MM} \qquad = \qquad 0$

(iii) $\quad \alpha_{LL} \; \leq \; 0$
$\qquad \alpha_{KK} \; \leq \; 0$
$\qquad \alpha_{MM} \; \leq \; 0$

where

Y_e = estimated maximum potential output
Y = value of actual output, computed in the same manner as in the DRC estimation
L = total number of man-hours
K = user cost of capital
M = cost of material inputs

The above problem produces a set of coefficients which describe the frontier production function.

Technical efficiency is thus measured as follows:

$$\textit{Technical Efficiency} = \frac{Y}{Y_e}$$

This ratio, called the *technical efficiency coefficient (TEC)*, simply denotes the extent to which a plant is able to achieve the maximum potential output given its choice of technique.

A separate function was constructed for each of the four subsectors. No function was constructed for the entire packaging industry because the technologies employed in the different subsectors are quite different and cannot be represented by one industry production function. TEC estimates were, thus, obtained only at the plant and subsector levels.

The import discipline hypothesis predicts that trade liberalization will improve the technical efficiency level in local industries and individual plants since they will be induced to use their inputs more efficiently to compete successfully with imports.

Industrial Structure Indicators

Two aspects of the industrial structure are discussed in this paper — concentration and barriers to entry. As defined in the preceding chapter, *concentration* refers to *the extent to which an economic activity is*

dominated by a few large firms [i.e., plants, in this study] (Lee 1992). Also, the measures of concentration used in the study indicate production — rather than seller — concentration since imports and exports are not taken into account. An *entry barrier*, on the other hand, is defined to be *anything that allows incumbents to earn excess profits* (Bain 1956).

The measures of concentration used in the study are: the *value added concentration ratio-4* (VACR-4) and the Herfindahl index. *VACR-4* refers to the *share of the four largest plants in total industry or subsector CVA*. The *Herfindahl index (H)*, on the other hand, refers to the *sum of the squared share of each plant's CVA to total industry or subsector CVA*. That is,

$$H = \Sigma\, s_i^2$$

where s_i = share of the ith plant to total subsector or industry value added.

Thus, while taking into account the shares of all the plants in the subsector or industry, the Herfindahl index properly weighs the shares of large and small players. It is thus considered superior to VACR-4. This index is compared with the ratio $1/n$, where n is the number of plants in the industry or subsector. The ratio $1/n$ represents the perfectly competitive concentration ratio where the plants in the industry or subsector all have equal shares. The higher the Herfindahl index relative to the ratio $1/n$, the less competitive — or the more concentrated — the subsector.

The indicators of entry barriers used in the study are the price-cost margin and the minimum efficient scale. By definition, the *price-cost margin* is the *excess of price over marginal cost, expressed as a proportion of price* — that is,

$$PCM = \frac{P - MC}{P}$$

Since it is usually difficult to estimate marginal cost, other measures are used to estimate price-cost margins. A commonly used formula (Lindsey 1977) is:

$$PCM \; = \; \underline{\underline{Census\,value\,added - Compensation}}$$
$$Value\,of\,Output$$

The difference between value added and compensation represents payments to factors other than labor, which roughly represents the profitability of an enterprise. The higher this figure, the higher the market power exercised by a plant or a subsector.

Another measure of entry barriers used in the study is the minimum efficient scale (MES). The *minimum efficient scale* for a subsector is defined as the *ratio of the average CVA of the largest plants accounting for the first 50 percent of total subsector CVA, to total subsector CVA.* That is,

$$MES \; = \; \frac{Average\,CVA\,of\,largest\,plants\,accounting\,for}{first\,50\%\,of\,total\,subsector\,CVA}{Total\,subsector\,CVA}$$

As discussed in the previous chapter, economies of scale can act as a barrier to entry.

Measures of Factor Productivity and Factor Use

Measures of factor productivity compare some indicator of output with the amount of input used.

Capital productivity was measured as the *ratio of census value added to the total stock of capital* valued at replacement cost. Value added was converted into constant 1972 prices using the gross domestic product (GDP) deflator for the manufacturing sector, while replacement cost was adjusted using the deflator for capital goods. The replacement cost of capital used was the value obtained from the DRC computations. The formula for estimating capital productivity is:

$$Capital\,Productivity \; = \; \frac{Census\,Value\,Added}{Capital\,Stock\,at\,Replacement\,Cost}$$

Labor productivity represents *the ratio of census value added to total employment,* or

$$\text{Labor Productivity} \quad = \quad \frac{\text{Census Value Added}}{\text{Number of Workers}}$$

The *capital-labor ratio,* or *capital intensity,* represents the *ratio of the total stock of capital* valued at replacement cost (also at constant 1972 prices) *to total employment, or*

$$\text{Capital Intensity} \quad = \quad \frac{\text{Capital stock at replacement cost}}{\text{Number of workers}}$$

Factor productivity is expected to increase with trade liberalization, for the same reasons that efficiency is also expected to rise. Plants would be induced by competitive pressure to use factors more efficiently. However, observed improvements in factor productivity may only be due to improvements in capacity utilization. Since data on capacity utilization were not available, however, this aspect could not be verified.

Trade-Related Indicators

Trade liberalization is expected to increase the volume of trade. To assess changes in the industry's degree of openness to trade between 1983 and 1988, the study used the export ratio and the import penetration rate.

Export ratio refers to the *share of exports to total domestic production.* It refers to *direct* exports alone, since indirect packaging exports, although constituting a significant portion of total exports in the industry, could not be properly measured. The *import penetration rate,* on the other hand, represents the *proportion of imports to total domestic demand,* that is, to total domestic production plus imports, less exports.

$$Export\ ratio\ =\ \frac{Exports}{Domestic\ production}$$

$$Import\ penetration\ rate\ =\ \frac{Imports}{Domestic\ production\ +\ Imports\ -\ Exports}$$

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Industry Background

THE PRODUCT

Definition and Function

PACKAGING may be defined as *the totality of products, services, and systems used to prepare goods for preservation, transport, distribution, storage, retailing, and consumption* (Philexport 1993). It may perform any or all of these functions: (1) containment and protection; (2) information and marketability; and (3) transportation and storage.

Classification of Packaging Products

Packaging products may be classified in different ways. One classification refers to the manner through which these are used: as a primary, secondary, or tertiary package (Philexport 1993). Another is based on end-use: consumer, industrial/transport/bulk, or military.

This study follows the classification scheme based on raw materials used.

THE INDUSTRY

Composition and Linkages

In terms of the PSIC scheme, packaging firms fall under the following industry codes:

34120   Paper and paperboard container manufacturing
35609   Manufacture of plastic products, n. e. c.
36202   Manufacture of glass container
38131   Manufacture of tin containers
38139   Manufacture of metal containers, n. e. c.

The industry also comprises other groups of players: raw material and equipment suppliers; firms from end-using industries; government agencies involved in the industry; and various industry associations and other organizations linked to the industry (Philexport 1992).

Number of Establishments[4]

The number of plants operating in the industry nearly doubled between 1983 and 1988, a sudden rise in the otherwise stable number of establishments since 1972. In 1988, 408 establishments, or 4 percent of the manufacturing total, were engaged in the manufacture of packaging products. Of these, 64 percent belonged to the plastic-based subsector. Paper- and metal-based packaging manufacturers made up 20 percent and 13 percent of the total, respectively. The remaining 3 percent consisted of the 10 glass container manufacturers.

4. The figures reported in this and the following sections cover the PSICs cited above. A careful examination of plant-level product codes in 1988 revealed, however, that some plants classified under PSIC 35609 were not actualy engaged in the manufacture of packaging products. Moreover, a few plants under PSICs 34230 and 35603 (covering commercial and job printing and and plastic industrial supplies, respectively, which were not included in the original data set) were engaged in packaging production. The time-series presentation of these sections could thus have been made more accurate with these adjustments. However, a parallel identification of the product codes corresponding to each plant in the 'critical' PSICs could not be made for 1972 and 1983 due to data constraints. Hence, the study simply utilized the data covered by the aforementioned PSICs for consistency.

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Value of Output[5]

In 1988, total industry output amounted to P1,575,557, 3.4 percent of total manufacturing output. This amount represented 33 percent more than 1983 output and more than twice the output in 1972. Of the four subsectors, the plastic-based group, which accounted for 44 percent of industry output in 1988, consistently registered the largest share in the industry total throughout the period 1972-1988. The paper-based subsector made up 22 percent; while the glass- and metal-based subsectors each accounted for 17 percent.

Employment Size

The industry employed a total of 30,439 workers, around 3.5 percent of the manufacturing total, in 1988. This represents a 54 percent increase over its 1972 employment size and a 3 percent gain over the 1983 total.

The plastic-based subsector accounted for half of total industry employment in 1988, followed by metal container fabricators (19 percent), paper converters (18 percent), and the glass-based subsector (13 percent).

5. Value is in constant 1972 prices. Industry sources claim that these figures understate the actual size of the packaging industry. Several multinational companies and local fruit exporters produce their own tin cans and paper boxes the value of which is never reported to the NSO under the packaging-related PSICs. Another important omission is the value of paper-based packages used by cigarette companies. There are the so-called 'backyard operators' whose production data are not recorded. For these reasons, the paper-based subsector supposedly accounted for the largest share in the industry output in 1988, followed by the metal-based group. The actual figures could not be determined, however, since the firms concerned refrained from furnishing the necessary data.

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Value Added Contribution to GDP[6]

The industry's census value added (CVA) rose by 74 percent from 1972 to 1983 and by 31.4 percent from 1983 to 1988. The industry CVA of P541,285,000 accounted for 3.3 percent of total manufacturing CVA in 1988.

The plastic-based group posted the largest share (40 percent) of total industry CVA in 1988. Although it had the least number of plants, the glass-based group accounted for the second largest CVA (31 percent) because it had the least production costs. The paper- and metal-based subsectors made up 15 percent and 14 percent of industry CVA in 1988, respectively.

Geographical Location

In 1988, around 85 percent of the plants in the industry were located in the National Capital Region (NCR) (a sharp increase from 1983's 79 percent), with Quezon and Caloocan cities each accounting for around 40 percent of the establishments in the region. The primary reason for this concentration is the NCR's proximity to major markets. Roughly 7 percent were situated in Central Visayas (Cebu); the rest of the plants were dispersed in the Southern Tagalog, Central Luzon, and Mindanao regions.

Direct Exports of Finished Goods

Direct exports of packaging products amounted to P681.3 M (FOB, at P21.0947/$) in 1988, a 3 percent gain over that of 1983. The glass-based subsector posted the biggest export share in 1988 (79 percent), followed by the metal- (12 percent) and paper-based (8

6. Value is in constant 1972 prices. As indicated in the census of Manufacturing Establishments, CVA represents the value of output, net of total production and other costs which include: materials, supplies, and fuel consumed, electricity purchased, contract work and industrial services done by others, and goods purchased for resale.

percent) subsectors. Exports of plastic-based containers constituted less than 1 percent of the industry total.

The share of exports to total industry output in 1988 was only 7 percent, a slight gain from 1983's 2 percent. However, this figure was computed from available input-output data at the two-digit level of disaggregation and, thus, may not reflect the exact export ratio of the packaging industry.[7]

Imports of Finished Goods

Imports of finished packaging goods in 1988 (P672.6 M, CIF) gained 20 percent over the 1983 figure. These imports consisted of metal containers (58 percent), glass bottles (30 percent), paper-based (10 percent) packaging goods, and plastic containers (2 percent).

The industry import penetration ratio fell from 10 percent in 1983 to 8 percent in 1988.[8] Only that of the plastic-based subsector increased (from 2 to 9 percent). Ratios for the metal- and paper-based subsectors decreased (from 23 to 8 percent, and from 7 to 6 percent, respectively). The ratio for the glass-based group slightly increased (from 8 to 9 percent).

Imports of Packaging Raw Materials

The plastic-based subsector imported the most raw materials, accounting for 66 percent of total industry imports (P672,619,044,

7. Moreover, industry sources claim that these export figures are understated since they do not include the large volume of indirect exports, particularly of corrugated cartons and sanitized tin cans, used by multinationals exporting fresh and processed fruits and dairy products. This claim is supported by the fact that the share of packaging to the total product cost of processed foods can run from 28 to 70 percent. In view of these, the reported relative shares of the different subsectors in the total packaging exports are considered inaccurate. Metal containers supposedly topped the list of packaging exports in 1988.

8. Domestic demand equals domestic production plus imports minus exports. These ratios may not reflect the exact shares of the packaging subsectors, since they were taken from imput-output data at the two-digit level of disaggregation.

CIF) in 1988. This is because only two of its five major raw materials, polystyrene (PS) and polyvinyl chloride (PVC), are locally manufactured. Moreover, industry sources say that local PVC is not food grade, which explains why the plastic-based subsector imports around 80 percent to 90 percent of its raw material requirements. The paper-, metal-, and glass-based subsectors accounted for 24 percent, 8 percent, and 2 percent of raw material importations in 1988.

Structure

The Philippine packaging industry typifies the dualistic market structure usually found in LDCs, which is characterized by the co-existence of an oligopolistic core (a few large plants dominating the market in terms of sales, employment, and value added) and a competitive fringe (a large number of small plants accounting for but a small percentage of industry sales, employment, and value added) (Rodrik 1988b).

In 1988, 77 percent of plants in the industry belonged to the small-scale category (Table 3).[9] (Small-scale refers to plants employing 5 to 99 workers; the Census data set does not include plants with less than five workers.) Medium-scale establishments (employing 100-199 workers) and large-scale plants (employing more than 200 workers) made up only 11 and 12 percent of the total. Among the subsectors, only the glass-based group consisted mostly of large plants. The rest all had small-scale plants in the majority.

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9. The number of plants reported here does not tally with the figure cited earlier under the section on Number of establishments, which represents the sum of all the plants under the five covered PSICs. The adjustments mentioned under that section were incorporated in the 1988 portion of the present tabulation. Hence, the smaller, yet more accurate, number of plants reported here. The 1983 data was not adjusted, however, due to the unavailability of plant-level product code data. This implies a certain asymmetry between the 1983 and 1988 data sets, which is deemed not too serious to distort the analysis since the adjustments on 1988 data were made mainly for the plastic-based subsector. Only four plants from PSIC 34230 were added to the 1988 data base for the paper-based subsector.

Table 3

Size* Distribution of Packaging Plants by Subsector: 1983 and 1988

	1983				1988			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Glass-based	0	1	7	8	2	1	6	9
Metal-based	21	3	10	34	35	8	8	51
Paper-based	34	5	4	43	69	7	8	84
Plastic-based	62	17	13	92	108	15	12	135
Industry	117	26	34	177	214	31	34	279

*Size refers to the number of employed workers:
   Small   :   5 - 99
   Medium   :   100 - 199
   Large   :   200 and above

The sharp polarization between plants in the upper and lower ends of the industry spectrum is evident in the differences in technology employed, training of technical personnel, product quality, and prices charged by the firms. Competition in terms of product quality and variety is generally keener among the larger plants catering mostly to multinational corporations. Prices are generally high since quality fetches a corresponding price. However, price differences increasingly become the basis of competition toward the industry's tail-end.

Although entry into the lower end of the spectrum is relatively free, barriers — usually in the form of huge capital requirements and scale economies — inhibit possible entrants from getting into the upper end. Between 1983 and 1988, for instance, the proportion of small-scale plants to the industry total increased from 66 to 77 percent, which may mean that the rise in the number of plants was due mainly to the entrance of small-scale concerns. The proportion of medium- and large-scale plants to the industry total correspondingly fell between the two years. The same trend is apparent at the subsector level.

Although the number of small plants increased during the two years, the total census value added of plants belonging to this size category declined (Table 4). In contrast, the total census value added of large plants increased despite the drop in the proportion of large plants to the industry total. Medium-sized plants showed minimal changes.

The preceding pattern of CVA shares reflects the high degree of production concentration in the industry. In 1988, subsector VACR-4 ratios clustered around 48 percent, with the exception of the glass-based group which had an even higher VACR-4 of 96 percent (Table 5).

Another measure of concentration used is the Herfindahl index (Table 5). This index is compared with the ratio $1/n$, where n is the number of plants in the industry or subsector. The higher the Herfindahl index relative to the ratio $1/n$, the less competitive — or the more concentrated — the subsector.

Table 4

Total Census Value Added by Subsector and Plant Size: 1983 and 1988

| | Total Census Value Added | | | | | |
| | 1983 | | | 1988 | | |
	Small*	Medium**	Large***	Small*	Medium**	Large***
Glass-based	0	20,003,025	237,417,141	8,908,080	3,153,064	**1,290,149,397**
Metal-based	155,291,548	12,992,602	141,946,481	38,120,913	84,954,308	**157,188,474**
Paper-based	18,927,900	61,811,916	67,817,071	53,064,178	117,994,564	**307,104,179**
Plastic-based	93,839,457	93,258,219	202,250,661	415,898,753	148,875,209	**365,174,578**
Industry	**268,058,906**	**188,065,762**	**649,431,354**	**515,991,923**	**354,977,145**	**2,119,616,628**

* Plants with 5 - 99 workers
** Plants with 100-199 workers
*** Plants with 200 workers or more

Source of basic data : Census of Manufacturing Establishments.

Table 5

Measures of Seller Concentration by Subsector: 1983 and 1988

	4-Plant Concentration Ratio (%)		Herfindahl Index (%)	
	1983	1988	1983	1988
Glass-based	90	96	25 (12.5)	35 (11)
Metal-based	71	45	30 (3)	8 (2)
Paper-based	64	51	13 (2)	9 (1)
Plastic-based	38	47	5 (1)	8 (0.7)

Notes :   4-Plant Concentration Ratios and Herfindahl Indices are based on value added.
Figures in parentheses represent 1/n ratios.

Source of basic data : Census of Manufacturing Establishments.

Comparing the subsector indices with their respective *1/n* ratios (Table 6), it is easy to see that all the subsectors were concentrated, particularly the glass-based subsector.

The study used the price-cost margin and the minimum efficient scale to determine the presence of entry barriers. Based on the price-cost margin, only the glass-based subsector appears to have been characterized by high entry barriers in 1988. Despite its attractive high price-cost margin (Table 6), the number of players in this subsector remained quite stable, with only two new entrants from 1983 to 1988.

Another measure of entry barriers used was the minimum efficient scale (Table 6). The glass-based subsector again had the highest ratio in the industry.

The high entry barriers in the glass-based subsector may be explained by the dominance of a highly vertically-integrated conglomerate. This conglomerate has plants operating in the different subsectors which, according to industry sources, account for more

Table 6

Indicators of Entry Barriers by Subsector: 1983 and 1988

	Price Cost Margin (%)		Minimum Efficient Scale (%)	
	1983	**1988**	**1983**	**1988**
Glass-based	16	44	37	47
Metal-based	27	4	53	11
Paper-based	11	9	22	14
Plastic-based	14	16	8	12

Notes: Price Cost Margin   = (Value Added - Compensation) / Value of Output

       Minimum Efficient Scale   = Average value added of firms accounting for top 50% of

                                       subsector value added / Subsector value added

Source of basic data : Census of Manufacturing Establishments.

than 20 percent of total industry sales. This firm recently entered into a contract with a technologically-advanced Japanese glass manufacturer, thus boosting its strength in the domestic marketplace.

Another characteristic of the packaging industry is the considerable number of affiliated firms among the industry leaders, which are mostly spin-off enterprises from an expanding parent company.

PROBLEMS, ISSUES, AND EVOLUTION OF GOVERNMENT POLICIES

Problems and Issues

Packaging end-users have long bewailed the high costs, inconsistency, and often inferior quality of locally-produced packaging goods. Container manufacturers have the same problems

with raw materials. Both parties contend that high tariff rates (even with the institution of tariff reforms) discourage the importation of usually-preferred imported substitutes. They also acknowledge the need for standards and the means to enforce already existing standards to ensure the quality of packaging goods and raw materials. Two of the critical problems of the industry thus pertain to high tariff rates and the lack of standards.

The problem of standards is related to market-niching. Exported goods, as well as those destined for the local market but produced by multinationals, generally come in packages of higher quality than those produced by small domestic-oriented end-users. The quality of the package thus becomes a function of the quality of demand.

Industry sources say that the industry is indeed demand-driven. Most efforts to upgrade technology and acquire more modern equipment were only reactions to the demands of end-using firms. The link between packaging producer and end-user can become so close as to almost completely tie the growth of the former to that of the latter.

Upgrading and maintaining standards presupposes huge investments on expensive capital equipment. High interest rates coupled with imperfect capital markets are the main obstacles to this goal.

Another important issue is the limited variety of packaging products available, particularly to small end-users (mostly exporters). This stems from the nature of the processes involved in packaging manufacture, which require long production runs and, consequently, volume orders. This is particularly true in glass-based packaging production, which is characterized by large economies of scale owing to the high cost of interrupting an almost continuous production process and the high cost of moulds (De Dios, Bautista, and De Dios 1993). Product differentiation in the end-using markets, on the other hand, calls for a large range of package sizes and designs. Hence, the mismatch between the technology requirements of producers and the differentiated products of end-using firms.

To go around this problem, packaging producers have suggested that end-users pool their packaging requirements together to generate

volume orders. But the prospect of revealing their packaging requirements — and, consequently, their share of market demand — to their competitors makes this suggestion unacceptable to end-users. They propose, instead, that the packaging manufacturers arrange for the pooling of orders among themselves since they possess information about the end-users' requirements. No agreement has yet been reached as of this writing.

The industry faces other problems, including technical smuggling and the lack of trained personnel which has sometimes resulted in pirating. These problems take on singular significance depending on the subsector under study.

Evolution of Government Policies Before the Trade Reform

Before the 1980s, the industrial incentive system biased toward import substitution in consumer goods encouraged new production activities, which consisted of assembly and packing operations heavily dependent on imported materials and capital equipment (Bautista and Power 1979). An import-dependent, import-substituting enterprise, the packaging industry benefited from the "cascading" tariff structure within this protectionist trade regime. The "essentiality" criterion favored the importation of capital equipment and raw material inputs against finished consumer goods, imports of which were considered less essential. The 1978 average tariff rates on finished packaging goods and raw materials (Tables 7 and 8, respectively) show that the metal- and paper-based subsectors were the biggest beneficiaries of this protection structure in the industry.

The Tariff Reform Programs of 1981 and 1991

In 1981, following Executive Orders (EO) 609 and 632-A, the first TRP was launched, to be completed over a period of five years until 1985. Under the new tariff structure, there was a significant drop in the duties applied to all finished packaging goods. By 1985, paper-based goods, formerly the most protected, could be imported at rates 60 percent lower than their pre-TRP levels (Table 7). The

Table 7

Average Tariff Rates on Finished Packaging Goods by Subsector: 1978 to 1995
(In percent, weighted by import shares)

	1978	1981	1983	1986	1988	1991	1993	1995
Glass-based	35.36	29.92	29.92	29.92	29.92	29.92	23.64	16.83
Metal-based	63.02	48.53	36.30	35.05	35.05	36.21	31.00	28.05
Paper-based	100.00	80.00	55.31	40.00	40.00	40.00	25.00	25.00
Plastic-based	50.00	13.75	12.81	11.87	11.87	13.75	12.81	11.87

Source of basic data : *Tariff and Customs Code of the Philippines, Foreign Trade Statistics.*

Table 8

Average Tariff Rates on Packaging Raw Materials by Subsector: 1978 to 1995
(In percent, weighted by import shares)

	1978	1981	1983	1986	1988	1991	1993	1995
Glass-based	20.00	5.59	3.00	3.00	3.00	16.29	13.70	13.70
Metal-based	29.41	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Paper-based	71.82	56.14	41.60	40.16	40.16	29.36	21.91	20.00
Plastic-based	32.87	22.82	21.49	20.15	20.15	16.79	15.85	15.65

Source of basic data: *Tariff and Customs Code of the Philippines, Foreign Trade Statistics.* Tariff Commission.

average tariff rate on plastic-based goods was reduced by 76 percent from its pre-TRP to its 1985 level. The metal-based subsector also experienced significant tariff rate reductions. Although the rates on glass-based packaging goods were lowered at the onset of the TRP, these remained unchanged within the duration of the program. This is probably due to the fact that the rates were already much lower than those levied on most other goods. Moreover, this subsector is dominated by a conglomerate capable of wielding strong political influence.

As for packaging raw materials, the paper-based subsector again experienced a significant reduction in tariff rates, with the maximum rate of 75 percent in 1981 gradually being lowered to 50 percent in 1985 (Table 8). Inputs to plastic- and glass-based packaging products were also accorded tariff rate reductions. Rates on metal-based raw materials retained their 1981 level of 20 percent, effectively encouraging the purchase of tinplates from the sole domestic supplier, the then government-owned and -controlled National Steel Corporation (NSC).

Under the 1991 tariff restructuring scheme covered by Executive Order 470, packaging products are now levied average tariff rates ranging from 23 to 32 percent (Table 7). The average tariff rate on plastic-based finished packaging goods rose from 11.87 percent in 1988 to 13.75 percent in 1991, the first year of implementation of EO 470. The increase was not due to the "tariffication" of previously-lifted import restrictions since the importation of plastic-based finished packaging goods had never been regulated. This may have been part of efforts to compensate for the low protection levels previously given the subsector (details in the section on Effective Protection).

The tariff rates that apply to packaging raw materials now range from 10 to 30 percent, with a mean of 20 percent (Table 8). Note that the average tariff rate on glass-based raw materials increased from 3 percent in 1988 to 16.29 percent in 1991. Subsector-level data show that this is attributable to the increased rates on all glass-based raw materials. As in the case of plastic-based finished goods, this does not seem to be the result of "tariffication" efforts since glass-based raw

material imports had never been restricted. Note also that the average tariff rate on metal-based raw materials, which remained at its 1981 level all through the first phase of the TRP, still retains this level until the end of the current phase. This points to the high level of protection being accorded the NSC.

In general, rates that now apply to packaging raw materials are relatively lower than those being levied on packaging products. Thus, even with the instituted reforms, the "cascading" tariff scheme is still in force, according the industry substantial protection.

For this reason, end-users claim that the cost of packaging is still too high. Even with the full implementation of EO 470, the 1995 rates on finished packaging goods would still be on the high side, mostly ranging from 20 percent to 30 percent. Considering the natural barriers to importing, packaging products will practically remain as "non-tradeables" unless the tariff rates are drastically reduced.

An example of a natural barrier to importing is the bulky nature of packages, which will entail higher freight costs. It is also inconvenient to import packaging products because they appear to unnecessarily use up space (importing packages is said to be like "importing air"). Moreover, the large volume of orders associated with importing packaging goods would mean more storage costs for the importer.

Still another natural barrier is the longer lead time required in placing orders for imported packages. End-users (mostly exporters), whose production patterns may be subject to factors beyond human control, have difficulty meeting lead time.

PHILFOODEX, an association of local food manufacturers and exporters, is currently lobbying for the free importation of raw materials and semi-finished packaging products not locally manufactured. It is also pushing for a 3 percent duty on: (1) raw materials that are not locally available and (2) finished packaging products that cannot be sourced locally in the quality, quantity, and design required by small food processors. The association claims that this will enable the small- and medium-scale food manufacturers to compete in the world market.

A Senate bill seeking to decrease the import duty on Tetra Brik aseptic packaging has also been proposed. By virtue of EO 470, aluminum foil backed with paper, paperboard, plastics or similar materials from which Tetra Briks are made are currently levied a 20 percent import duty. If passed, Senate Bill 843 will bring down the tariff rate on this item to 5 percent when used for domestically-manufactured milk products and 10 percent when produced for other local food products such as fruit juices. This will reduce the total product cost of milk and other food products.

The suggested tariff rates seem too low, however, considering foreign exchange rate distortions. A tariff rate of 20 percent would seem sufficient to correct the distortions in the foreign exchange rate and effectively equalize domestic and free trade prices.

Import Liberalization

During the first phase of the Import Liberalization Program — that is, before its suspension in 1983 — only paper — and glass-based packaging raw materials were deregulated (Table 9). A more comprehensive rationalization of licensing procedures for the importation of packaging-related goods was undertaken in 1986. Note, however, that between April 1986 and July 1987, only packaging raw materials were deregulated. Import restrictions on all regulated finished packaging goods and metal-based raw materials were lifted only in December 1987.

The 'delay' in the lifting of import restrictions on finished goods relative to those on raw materials (except for metal-based inputs) reinforced the bias of the "cascading" tariff structure against raw material production in favor of finished goods manufacture. Nonetheless, this seems to have worked well for the industry. The easier access to raw materials resulting from the earlier liberalization of packaging inputs relative to output probably enabled small-scale concerns to enter the industry (Table 3). The more competitive atmosphere created by the lowering of tariff rates on finished goods, on the other hand, forced both old and new plants to operate at more efficient levels. The level of allocative efficiency in the industry appears

Table 9

**Packaging Products and Raw Materials
Covered by the Import Liberalization Program**

CB Circular	Effectivity Date	Product
CBC 850	2-15-82	Paper, corrugated, embossed or perforated Other glass, not elsewhere classified (n.e.c.)
CBC 1100	4-30-86	Polyethylene in primary forms Copolymers of vinyl chloride in primary forms Paperboard, embossed or perforated
CBC 1109	7-18-86	Polysterene in primary forms
CBC 1150	7-23-87	Paperboard, ruled, lined, or squared, but not otherwise pointed Paper and paperboard, coated or impregnated with artificial or synthetic resins Paper and paperboard, coated or impregnated, n.e.c.
CBC 1167	12-31-87	Paperboard, corrugated Coated or gummed kraft paper Paperbags and sacks for articles weighing 11.36 kg or less Paperbags and sacks for articles weighing more than 11.36 kg Multi-wall bags and sacks of dimension 17" x 4" or smaller Multi-wall bags and sacks for articles weighing 11.36 kg or more Boxes, corrugated carton Boxes and other packaging containers or paperboard or cardboard except 31.6 mm Tinned sheets and plates of steel Tinplates when imported directly by food processors upon prior authorization of the Iron and Steel Authority

Source of basic data · List of Liberalized Items (1981-1992). Tariff Commission.

to have improved between 1983 and 1988, and this seems to be due mainly to the increased efficiency of small-scale establishments.

Other Domestic Regulatory Conditions and Policy Issues

Apart from the general incentive scheme embodied in the Board of Investments 1987 Omnibus Investments Code, no government incentive or development programs have been particularly designed for the packaging industry, mainly because the industry is already overcrowded.

The log ban has also taken its toll on the supply of pulp for the production of paper and paperboard container.

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Analysis of Results

CHANGES IN THE LEVEL OF EFFECTIVE PROTECTION

THE protection structure of the packaging industry may be analyzed using effective protection rates (EPRs). The *EPR* is the *percentage excess of domestic value added (at protected prices) over world value added (at free trade or border prices)* (Tariff Commission undated). Value added is simply the difference between the value of output and the corresponding value of inputs used (both net of sales taxes).

In 1983, the packaging industry registered an EPR of 58.91 percent, higher than the manufacturing sector average of 38 percent (Table 10). The industry EPR was also higher than those of some end-using industries — garments and dairy — but lower than those of other end-users — processed meat, appliances, and semi-conductors (Table 11).

Although the computed EPR for the packaging industry was higher than the manufacturing sector average, 52 percent of the plants received lower protection than that enjoyed by the average manufacturing plant (Table 12). The high industry EPR may be due to the fact that the plants which had EPRs higher than the manufacturing sector average — constituting 44 percent of the industry total — were large. The remaining 4 percent of the plants had negative EPRs.

A negative EPR may imply negative protection if it results from a negative EPR numerator. A more detailed examination of plant-level data reveals that none of the plants with negative EPRs received negative protection. All registered negative free trade value added instead — that is, their negative EPRs resulted from a negative denominator. This means that the protection structure had encouraged the operation of plants which would have generated

Table 10

Effective Protection and Implicit Tariff Rates by Subsector: 1983 and 1988
(In percent)

	1983					1988					Change
	EPR	T̄j	T̄i	Tj	Ti	EPR	T̄j	T̄i	Tj	Ti	(EPR)
Glass-based	60.06	28.69	3.00	43.44	15.88	32.61	25.84	3.00	40.25	13.30	-45.70
Metal-based	89.97	40.61	20.00	56.09	35.00	82.18	30.34	20.00	52.63	32.00	-8.66
Paper-based	118.00	58.14	46.67	76.25	65.00	24.85	39.53	45.56	54.00	60.12	-78.94
Plastic-based	33.51	33.19	33.00	50.00	49.63	5.41	17.96	26.00	43.00	38.60	-83.86
Industry	58.91	-	-	-	-	24.52	-	-	-	-	-

T̄j = average implicit tariff on exportable and importable output
T̄i = average implicit tariff on exportable and importable inputs
Tj = average implicit tariff on importable output
Ti = average implicit tariff on importable inputs

The industry EPR is a weighted average of the plant EPRs (see Chapter on Methodology for the procedure used in computing industry values).
Thus, there was no need to compute industry implicit tariffs which would have little meaning, since they would cover highly heterogeneous subsectors.

Source of basic data : "Census of Manufacturing Establishments," Tariff and Customs Code of the Philippines. Tariff Commission.

Table 11

Effective Protection Rates of the Packaging Industry and Some End-Using Industries: 1983 and 1988

Industries	1983	1988
Packaging	58.91	24.52
Poultry Dressed	48.88	89.01
Meat Processing	773.35	97.53
Fresh Milk	6.79	33.63
Powdered Milk	21.39	8.75
Butter and Cheese	38.08	46.83
Ice Cream	60.46	60.53
Garments	-3.70	-21.20
Appliances	70.15	41.69
Semi-conductor	69.30	33.66

Source of basic data: "Census of Manufacturing Establishments," *Tariff and Customs Code of the Philippines*. Tariff Commission.

negative international value added without tariffs and other forms of protection.

At the subsector level, the paper-based group received the greatest protection while the plastic-based group received the least (Table 10). This pattern is supported by plant-level data: 95 percent of paper-based plants registered EPRs higher than the manufacturing sector average, while 99 percent of the plastic-based plants had EPRs lower than this average. The high EPRs of the glass- and metal-based subsectors are also consistent with the large proportion of plants in these subsectors which registered EPRs higher than the manufacturing sector average.

Protection at the industry level declined by almost 60 percent in 1988. The industry EPR of 24.52 percent (Table 10) was much lower than the manufacturing sector average of 35.5 percent that year. Almost 60 percent of the packaging plants had positive EPRs less than the manufacturing average, as opposed to only 52 percent in 1983 (Table 12). Only 21 percent received protection higher than that enjoyed by the average manufacturing plant, compared to 44 percent

Table 12

Distribution of Packaging Plants by EPR Level: 1983 and 1988

1983			1988		
EPR Level* (%)	Number of Plants	Percentage Share	EPR Level** (%)	Number of Plants	Percentage Share
< 0.00	7	4.0	< 0.00	48	19.7
0.01 - 38.00	92	52.0	0.01 - 35.50	144	59.0
38.01 - 76.00	40	23.0	35.51 - 71.00	39	16.0
> 76.00	37	21.0	> 71.00	13	5.3
Total	176	100.0	Total	244	100.0

* Except for the class of negative EPRs, upper class boundaries are multiples of the average EPR for the manufacturing sector in 1983, which was 38.0 percent.

** The average EPR for the maufacturing sector in 1988 was 35.50 percent.

Source of basic data: Census of Manufacturing Establishments.

in 1983. The rest, which comprised the minority of 19 percent, registered negative EPRs. A closer look at plant-level data reveals that 43 of the 48 plants with negative EPRs received negative protection, as opposed to none in 1983.

At the industry level, then, there was a general decline in protection, with EPRs moving toward the lower levels.

Subsector EPRs also showed marked reductions in protection. The plastic-based subsector experienced the most significant reduction, thus remaining the least protected with an EPR of only 5 percent (Table 10). The paper-based group, formerly the most protected, as well as the glass-based subsector, also experienced significant reductions in protection. By contrast, the metal-based subsector, which became the most protected, registered the least decline in protection.

Ninety-five percent of the plants in the industry which received negative protection were from the plastic-based subsector (Table 12). These accounted for 33 percent of the subsector total. This explains the plastic-based subsector's low EPR.

Across the subsectors, the number of plants with positive EPRs less than the manufacturing sector average increased. Although many of the plants still had EPRs higher than the manufacturing average, few had EPRs more than twice this average.

The EPR indicates the relative incentives given to different subsectors and plants. It focuses on the relative position of subsectors and plants in the EPR scale since "protection is a relative concept" (Tan 1979). However, tradeable goods, as a whole, may be penalized relative to non-tradeables by an overvalued currency, or can be protected by an undervalued currency. Thus, another measure of protection, the net effective protection rate (NEPR), was used to adjust for the extent of currency overvaluation.

For both 1983 and 1988, computed NEPR values for the industry and each of the subsectors were lower than the EPR values by around 21 percent. Thus, currency overvaluation penalized tradeables relative to non-tradeables in both years.

In sum, there was an overall decline in protection in the packaging industry from 1983 to 1988. This downward trend in protection levels is evident at the industry, subsector, and plant levels.

The TRP has considerably rationalized the protection structure in the packaging industry. But because there are many natural barriers to importing, the degree of rationalization achieved so far appears to be insufficient to make the industry world-competitive.

ALLOCATIVE EFFICIENCY/CHOICE OF TECHNIQUE

The study utilized the concept of DRC in measuring allocative efficiency at the industry and subsector levels and efficiency in terms of choice of technique at the plant level.

In 1983, the packaging industry registered a DRC value of 28.70, which is equivalent to an allocatively inefficient DRC-SER ratio of 2.07 (Table 13). Only 32 establishments, or 18 percent of the industry total, proved efficient in terms of the right choice of technique in 1983 (Table 14). These, together with the mildly inefficient plants, constituted 33 percent of the industry total. The rest, which made up the majority of 67 percent, were either inefficient or dissaving on foreign exchange.

Twenty-four, or 75 percent, of the efficient plants in 1983 were small (Table 14). Medium- and large-scale plants both accounted for 12.5 percent of the total number of efficient plants. Although the small plants constituted the majority of efficient establishments in the industry, they also composed the majority of inefficient establishments (64 percent) and of those yielding negative net foreign exchange earning or saving (73 percent).

At the subsector level, all the subsectors, except for the metal-based group, were inefficient based on their DRC-SER ratios (Table 13). The metal-based subsector registered a DRC-SER ratio indicative of mild inefficiency.

A closer look at subsector-level data reveals that the plastic-based group had the biggest proportion of efficient plants to the subsector total, at 23 percent, in 1983. The share of efficient plants to the metal-, glass-, and paper-based subsector totals were 15 percent, 12.5 percent, and 12 percent, respectively.

Table 13

Domestic Resource Cost at Shadow Prices by Subsector: 1983 and 1988

	1983		1988		% Change
	DRC	**DRC/SER***	**DRC**	**DRC/SER****	**(DRC / SER)**
Glass-based	31.63	2.28	27.62	1.05	-54.0
Metal-based	19.35	1.39	64.12	2.43	75.0
Paper-based	44.69	3.22	72.42	2.75	-15.0
Plastic-based	32.59	2.35	51.26	1.94	-17.0
Industry	28.70	2.07	50.08	1.90	-8.0

* DRC/SER ratios are interpreted as follows :
0.01 - 1.20 : Efficient
1.21 - 1.50 : Mildly inefficient
> 1.50 : Inefficient
SER (Shadow Exchange Rate) for 1983 was 13.89.
** SER = 26.37

Source of basic data : Census of Manufacturing Establishments.

Although the plastic-based group had the biggest proportion of efficient plants to the subsector total, it was still inefficient as a whole because the majority of its efficient plants were small.

The proportion of inefficient plants and negative foreign exchange earners or savers to the total number of plants in the paper-based subsector totaled 81 percent in 1983, followed by the glass-based group at 73 percent. The inefficient plants in the plastic- and metal-based subsectors constituted 63 percent and 59 percent of the subsector totals, respectively. Note that the metal-based subsector, which had the smallest proportion of inefficient plants to the subsector total, also had the lowest DRC-SER ratio.

A slight reduction in inefficiency appears to have taken place in 1988. Although the industry DRC value actually rose, the DRC-

Table 14

Distribution of Packaging Plants by Employment Size and Efficiency Level: 1983 and 1988**

Efficiency Level*	1983				1988			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Efficient	24	4	4	32	71	9	10	90
Mildly Inefficient	16	4	7	27	15	5	4	24
Inefficient	65	17	20	102	77	10	17	104
Dissaving***	11	1	3	15	20	5	1	26
Total	116	26	34	176	183	29	32	244

* Based on DRC/SER ratios:

Efficient	:	0.01 - 1.2
Mildly Inefficient	:	1.21 - 1.50
Inefficient	:	>1.50
Dissaving	:	< 0.00

** Size refers to the number of employed workers:

Small	:	5 - 99
Medium	:	100 - 199
Large	:	200 and above

*** Dissaving refers to negative net foreign exchange earning or saving.

Source of basic data : Census of Manufacturing Establishments.

SER ratio, which is the indicator of allocative efficiency and comparative advantage, declined by 8 percent its 1983 value (Table 13). Thirty-seven percent of the plants in the industry were efficient, ·· compared to only 18 percent in 1983 (Table 14). These efficient and mildly inefficient plants made up 47 percent of the industry total, higher than the 1983 figure of only 33 percent. The inefficient plants and the net foreign exchange dissavers constituted only 53 percent of the industry total, down from their 1983 share of 67 percent.

Except for the metal-based subsector, the DRC-SER ratios of the three other subsectors dropped from their 1983 levels (Table 13). However, only the glass-based subsector proved efficient in 1988. It also posted the biggest gain in allocative efficiency — or reduction in inefficiency — in the entire industry. The metal-based group seemed to have fared the worst between the two reference points. It had the highest DRC-SER ratio in 1988 from the lowest ratio in 1983.

Although 67 percent of the plants in the glass-based subsector were inefficient, this subsector as a whole registered an efficient DRC-SER ratio because its two efficient plants were very large. These two plants accounted for 71 percent of total subsector output in 1988, thus 'compensating' for the inefficiencies of the other smaller plants. The plastic-based subsector, on the other hand, turned out to be mildly inefficient despite the fact that 48 percent of its plants were efficient. These efficient and mildly inefficient plants were fairly small.

The high DRCs of the metal- and paper-based subsectors in 1988 are consistent with the high proportion of inefficient plants and foreign exchange dissavers, relative to the efficient ones, in these two subsectors.

As in 1983, the majority of the efficient plants belonged to the small-scale category (Table 14). Moreover, the share of small efficient plants in the total number of plants in the industry rose from 14 to 29 percent between the two years. Note that the majority of new establishments in 1988 belonged to the small-scale category (Table 3). Since the proportion of small efficient plants to the industry total rose from 1983 to 1988, these small new entrants were probably efficient.

The TLP may have indeed improved the atmosphere of competition in the local packaging industry, allowing entry mainly to

efficient plants and inducing already existing plants to reduce inefficiency. As discussed in the section on Import Liberalization, the easier access to raw materials resulting from the deregulation of packaging raw material importation might have enabled small plants to enter the industry. In view of the threat of competition resulting from lower tariff rates on finished goods, however, these plants were forced to adopt efficient practices, contributing to the rise in the level of efficiency in the industry in 1988. The absence of data on the pattern of entry and exit prevents us from concluding that the plants which remained also became less inefficient, although such a scenario is indeed plausible.

As for the medium- and large-scale establishments, the proportion of efficient plants to the category totals also increased (Table 14). Recall that the share of large plants in total industry CVA increased between 1983 and 1988 (Table 4). This would imply that resource allocation did improve, since more resources appear to have been channeled into efficient plants.

Cross-tabulations of DRC/SER and EPR levels were made to 'correlate' the degree of protection with the level of efficiency. From Table 15 we see that in 1983, 24 percent of the inefficient plants received very high protection, while 65 percent of those which received high protection were inefficient. Fifty-seven percent of those which received negative protection were inefficient, while 3 percent of the inefficient plants received negative protection. The very small proportion of efficient plants may be attributed to the high levels of protection received by the industry that year.

In 1988, 42 percent of the plants which received negative protection were efficient while 56 percent were either inefficient or dissaving on foreign exchange. Twenty-two percent of the efficient plants received negative protection. Only two plants which received extremely high protection were efficient.

At the subsector level, the metal-based group, which experienced the least reduction in protection in 1988 (Table 10), became more inefficient, registering the highest DRC-SER ratio that year (Table 13). The other three subsectors, which all had lower EPRs in 1988, also had lower DRC-SER ratios.

Table 15

Distribution of Packaging Plants by DRC and EPR Levels: 1983 and 1988

DRC*	1983					DRC*	1988				
	EPR**						EPR**				
	< 0.00	0.01-38	38.01-76	>76	Total		< 0	0.01-35.5	35.51-71	>71	Total
0.01 - 16.00	0	21	7	4	32	0.01 - 39.90	20	54	14	2	90
16.01 - 20.00	2	13	5	7	27	31.91 - 39.87	1	16	4	3	24
>20.00	4	55	19	24	102	>39.87	21	60	17	6	104
<0	1	3	9	2	15	<0	6	14	4	2	26
Total	**7**	**92**	**40**	**37**	**176**	**Total**	**48**	**144**	**39**	**13**	**244**

* Except for the class of negative DRCs, class boundaries represent the equivalent of DRC/SER ratios used to classify efficiency levels:

DRC / SER	Efficiency Level
0.01 - 1.20	Efficient
1.21 - 1.50	Mildly inefficient
> 1.50	Inefficient
< 0	Dissaving

** Except for the class of negative EPRs, upper class boundaries are multiples of the average EPR for the manufacturing sector : 38.00 percent in 1983; 35.50 percent in 1988.

Source of basic data: Census of Manufacturing Establishments.

Thus, high protection levels seem to be associated with low efficiency levels. Low protection levels may have forced the plants concerned to become less inefficient to survive.

It was discussed in Chapter 2 under the section on Imports of Packaging Goods that the tariff reductions after the first round of the TRP (1981-1985) seemed insufficient to induce significant increases in imports of packaging goods. Import penetration rates even declined for some subsectors between 1983 and 1988. Yet the level of allocative efficiency in the industry appears to have improved. This seems to support the *import discipline hypothesis:* What matters is not *actual* competition from imports but the *threat* of competition which forces incumbents to become more efficient and allows entry mainly to efficient plants. Incumbents may have been lobbying for higher tariffs because they perceive a threat from imports.

These results are encouraging; the objective of trade liberalization is not to swamp the local market with imported products and, consequently, to stifle local industries, but only to create an atmosphere of competition conducive to improvements in efficiency and world competitiveness.

Since the mere threat of competition from imports has induced an over-all reduction in inefficiency, there seem to be no structural barriers to importing in the industry, even if there are structural barriers to entry in production in some subsectors (Chapter 2, Structure). Structural barriers to importing are present when big domestic producers themselves are the main importers. Policy-related barriers to importing remain, however, in the form of high tariff rates and tedious Customs procedures.

Overall, then, DRC levels between 1983 and 1988 significantly declined, denoting allocative efficiency gains which moved the packaging industry to a position of improved comparative advantage. This may be partly ascribed to the more competitive conditions created by the TLP.

COMPETITIVE ADVANTAGE

International competitiveness refers to the ability of the sector, industry, or plant to compete in domestic markets with importers and in external markets with other exporters (including domestic producers in the destination market) (Tecson 1992). To measure competitive advantage, the study utilized the ratio of the domestic resource cost in market prices to the official exchange rate, *DRCM/ OER*. *M* denotes DRC in *market* (as opposed to shadow) prices and *OER* refers to the *official* (instead of shadow) exchange rate. Computed DRCM-OER values are presented in Table 16.

Based on their DRCM-OER ratios, none of the subsectors showed competitive advantage in 1983 (a high DRCM-OER ratio implies non-viability of competing in the export market). Although these ratios declined in 1988, the drop was insufficient to move the subsectors into a position of competitive advantage. The glass-based subsector, which posted significant gains in comparative advantage between 1983 and 1988, still remained uncompetitive in 1988. This suggests that the domestic tax system as well as the structure of wages are major sources of distortion.

TECHNICAL EFFICIENCY

A plant is considered *technically efficient* if it *produces the maximum quantity of output attainable from a given bundle of inputs.* The study measured technical efficiency using Farrell's (1957) "frontier" or "best practice" method. According to Hill and Kalirajan (1991), a technical efficiency coefficient (TEC) of 75 percent would qualify a plant or industry as technically efficient.

In 1983, TECs computed at the level of the subsector show that only the paper-based subsector was technically efficient (Table 17). The glass-based group was only two percentage points less than the margin. The metal-based group was the most inefficient.

Although subsector TECs were generally below the efficient range, there were nevertheless efficient plants within each subsector

Table 16

Domestic Resource Cost at Market Prices by Subsector: 1983 and 1988

	1983		1988		% Change (DRCM/ OER)
	DRCM	DRCM/OER*	DRCM	DRCM/OER**	
Glass-based	45.22	4.06	28.93	1.37	-66.0
Metal-based	23.57	2.12	69.08	3.27	54.0
Paper-based	72.24	6.50	80.41	3.82	-41.0
Plastic-based	55.0	4.95	55.60	2.64	-47.0
Industry	**40.93**	**3.57**	**51.41**	**2.44**	**-34.0**

* DRC/OER ratios are interpreted as follows :
   0.01 - 1.20 : Efficient
   1.21 - 1.50 : Mildly Inefficient
   > 1.50   : Inefficient
   OER (Official Exchange Rate) for 1983 was 11.1127
** OER = 21.0947

Source of basic data : Census of Manufacturing Establishments.

Table 17

Technical Efficiency Coefficients (TEC) by Subsector: 1983 and 1988 (%)

	1983	1988	Change
Glass-based	73.0	61.0	-16.0
Metal-based	31.0	58.0	87.0
Paper-based	78.0	56.0	-28.0
Plastic-based	50.0	39.0	-22.0

Note: A TEC • 75% indicates technical efficiency.

Source of basic data : Census of Manufacturing Establishments.

(Table 18). Sixteen percent of all the plants in the industry were efficient, with the glass- and paper-based subsectors having the biggest proportion of efficient plants to the subsector total.

Technical efficiency in the packaging industry appears to have declined between 1983 and 1988. None of the computed subsector TECs were within the efficient range in 1988. Even the metal-based subsector, which was the only gainer in terms of technical efficiency between 1983 and 1988, was not efficient. At the plant level, the proportion of efficient plants to the industry total dropped from 16 percent in 1983 to only 9 percent in 1988. Thus, despite the marked reductions in allocative inefficiency — or, equivalently, the significant gains in allocative efficiency — as reflected in the lower 1988 DRC-SER ratios, technical efficiency actually declined.[10]

A possible explanation for the contrasting movements of the DRC and TEC measures between 1983 and 1988 is that the TEC measure may be *less an indicator of deviations from "best practice" or world-standard technology than of deviations from the "average" technical efficiency level* of the plants in a given subsector or industry. It is possible, then, that the *average deviation widened* because

1) *the most efficient ones* (that is, those at the frontier) *improved their technical efficiency more* than the rest of the plants in the subsector, or

2) *the most efficient ones declined in share of output*, which influenced the subsectoral average TECs.

The real reason for the declining TECs cannot be ascertained from available data, however, since the statistical package used to estimate technical efficiency does not provide for a way of identifying specific plants and thus tracing their performance patterns between the two reference years.

10. The comparison between allocative and technical efficiency is possible because the data sets used in computing for DRC and TEC are the same. The number of plants for which DRCs and TECs were computed are roughly the same for 1983 and 1988 (Tables 28 and 31).

Table 18

Distribution of Packaging Plants by Subsector and TEC Level: 1983 and 1988

| | 1983 | | | | | 1988 | | | | |
| | TEC < 0.75 | | TEC • 0.75 | | | < 0.75 | | 0.75 | | |
	Number of Plants	% Share in Subsector Total	Number of Plants	% Share in Subsector Total	Total	Number of Plants	% Share in Subsector Total	Number of Plants	% Share in Subsector Total	Total
Glass-based	5	62.5	3	37.5	8	7	77.8	2	22.2	9
Metal-based	29	87.9	4	12.1	33	36	75.0	12	25.0	48
Paper-based	28	66.7	14	33.3	42	59	93.7	4	6.3	63
Plastic-based	85	92.4	7	7.6	92	120	96.8	4	3.2	124
Total	147	84.0	28	16.0	175	222	90.9	22	9.1	244

Note: A plant with a TEC • 0.75 is considered technically efficient.

In any case, the results highlight the importance of non-price barriers to technical efficiency such as: (1) access to supplier technology; (2) lack of standards; and (3) low demand because of the sluggish growth of end-using industries. Thus, policies other than the TLP seem necessary.

FACTOR USE AND PRODUCTIVITY

Except for the metal-based group, capital productivity increased in all the subsectors between 1983 and 1988 (Table 19). The glass-based subsector experienced the biggest gain in capital productivity. Labor productivity increased only in the glass- and plastic-based

Table 19

Measures of Factor Productivity by Subsector: 1983 and 1988 (at 1972 prices)

	Capital Productivity*		Labor Productivity**(P)	
	1983	1988	1983	1988
Glass-based	0.04	0.22	12,821	41,483
Metal-based	0.06	0.03	14,752	7,875
Paper-based	0.02	0.04	12,570	9,833
Plastic-based	0.04	0.05	10,743	248,875
Industry	0.04	0.07	124,06	167,836

* Value added per unit of capital
Capital was valued at replacement cost.
Value added was adjusted by the GDP deflator for the manufacturing se. 'or while the cost of capital was adjusted by the capital deflator

** Value added per worker
Value added was adjusted by the GDP deflator.

Source of basic data Census of Manufacturing Establishments.

subsectors, with the plastic-based subsector posting a significant increase.

Capital and labor per plant declined between 1983 and 1988 in all but the plastic-based subsector, where capital per plant actually rose (Table 20). Capital-labor ratios likewise declined, again except in the plastic-based subsector. The general decline in factor-plant ratios might be correlated with the entry of small plants and the possible rationalization of incumbents.

CONCENTRATION, BARRIERS TO ENTRY, AND MARKET POWER

As noted in Chapter 2, the study examines the structure of the packaging industry using the concepts of concentration, barriers to entry, and market power.

A distinction must be made between production and seller concentration. Technically, seller concentration is *production concentration if imports and exports are ignored* (Lee 1992). The measures of concentration used in the study — VACR-4 and the Herfindahl index — pertain to production concentration.

Production concentration is expected to increase in the advent of trade liberalization if inefficient Chamberlinian plants exit due to increased competitive pressure from imports. It may also decrease if new efficient plants enter the industry due to the easier access to raw materials, and the more competitive atmosphere, occasioned by trade reform. Thus, trade liberalization can influence the level of concentration in opposite directions. These two movements were observed in the packaging industry.

Production concentration increased in the glass- and plastic-based subsectors, whereas it declined in the metal- and paper-based subsectors in 1988 (Table 5). Parallel movements were observed in the case of price-cost margins, the indicator used to measure the degree of market power. This supports the findings of earlier studies on the positive relationship between concentration ratios and price-cost margins (Cowling 1976).

Table 20

Indicators of Factor Use by Subsector: 1983 and 1988

	Capital per Plant* (P 000, 1972 prices)		Workers per Plant (P 000, 1972 prices)		Capital-Labor Ratio*	
	1983	1988	1983	1988	1983	1988
Glass-based	202,205,669	81,241,373	584	421	345,798	192,972
Metal-based	36,525,822	27,476,062	145	111	251,392	247,532
Paper-based	35,845,655	14,916,753	69	67	506,567	222,638
Plastic-based	27,849,467	334,951,972	92	74	300,616	4,526,378
Industry	393,590,446	1,583,720,379	890	673	3,281,007	2,353,225

* Capital was valued at replacement cost and converted into 1972 prices by the capital deflator.

Source of basic data : Census of Manufacturing Establishments.

The higher concentration ratios and price-cost margins in the glass- and plastic-based subsectors after the trade reform may, at first, seem puzzling since in both subsectors, the number of plants also increased in 1988 (Table 3). However, it appears that *large plants expanded even as new small plants became operative* in these two subsectors. This seems to be particularly true for the glass-based subsector which is characterized by large economies of scale. Taking advantage of these scale economies, the large glass-based plants must have increased their market share and even more significantly increased their price-cost margins. As earlier noted, high price-cost margins may indicate the presence of entry barriers and a high degree of market power.

The higher concentration ratio and price-cost margin of the glass-based subsector in 1988 seem to imply that trade reform will not be able to rationalize the industrial structure if other factors inherent in the structure itself come in the way.

Although trade reform did not reduce the level of concentration and the degree of market power in the glass-based subsector, its positive effect on the allocative efficiency of this subsector was not undermined. It was, in fact, the biggest gainer in efficiency among all the subsectors. A closer look at plant-level data reveals that the significant reduction in this subsector's DRCs was due to the increased level of efficiency in its largest plants. Thus, even as trade reform augured well for the efficiency of the relatively more competitive segment of the industry composed of small plants — which, as earlier noted, appears to be the main contributor to the increases in efficiency in the entire industry — it also effected substantial efficiency gains in the less competitive segment.

Thus, concentration may not necessarily be harmful to an industry. It may result because the size of the domestic market is too small relative to the minimum efficient scale of technology employed in the industry (SGV 1992). In this case, economies of scale themselves imply that the efficient industry will *necessarily* be concentrated.

SURVEY RESULTS

Table 21 lists the computed EPRs and DRC-SER ratios of some survey respondents. These firms belonged to the paper- and plastic-based subsectors. DRCs and EPRs could not be computed for other survey respondents because even their financial statements provided inadequate data.

Firm-level EPRs in 1986 were all higher than the manufacturing sector average of 38 percent. In 1991, three of the firms appear to have received an even higher degree of protection. These belonged to the plastic-based subsector where tariff rates on some products rose in 1991, probably to compensate for the very low levels of protection received by the subsector prior to the 1991 TRP.

Based on DRC-SER ratios, one of the respondents (Firm D) was efficient — in terms of choice of technique — while three others (Firms B, E, and F) were mildly inefficient in 1986. The other two firms were inefficient, but not extremely so. In sum, the efficiency level of the respondent firms was high in 1986.

Table 21
Survey Results

Firm	DRC		DRC / SER*		EPR	
	1986	1991	1986	1991	1986	1991
A	43.54	85.09	1.62	2.58	85.18	91.78
B	33.54	42.53	1.25	1.29	78.58	62.62
C	53.99	34.22	2.01	1.04	91.98	104.63
D	19.64	25.43	0.73	0.77	57.60	67.51
E	33.80	18.56	1.26	0.56	58.25	6.16
F	36.34	43.51	1.35	1.32	79.67	64.47

* DRC / SER ratios are interpreted as follows:
  0.01 - 1.20 : Efficient
  1.21 - 1.50 : Mildly Inefficient
  > 1.50   : Inefficient
  SER (Shadow Exchange Rates) for 1986 was 26.8672 and 32.9743 for 1991.

Source of basic data: Financial Statements and Balance Sheets obtained from the Securities and Exchange Commission.

The firms appear to have significantly gained in efficiency and comparative advantage in 1991. Three firms were efficient (Firms C, D, and E), two were mildly inefficient (Firms B and F), and only one firm was inefficient (Firm A).

Firm E, which proved to be the most efficient among the firms, also received the least protection in 1991. Three other firms (Firms B, D, and F) with relatively lower DRC-SER ratios also had relatively lower EPRs. Firm C, which proved to be efficient but which appears to have been highly protected, is an example of a firm for which protection has become redundant. This firm probably received large economic rents. Thus, the level of efficiency appears to be negatively associated with the level of protection. These results are consistent with those obtained from Census data.

WORLD COMPETITIVENESS: COMPARISON WITH THE PACKAGING INDUSTRIES OF MALAYSIA AND THAILAND

Philexport (1993) reveals that the packaging industries of Malaysia and Thailand are a few years ahead of their Philippine counterpart. In the last four or five years, these countries have employed technologies that are still unknown in the Philippines. An important catalyst for the growth of the packaging industries of these countries may be the rapid growth of their food-exporting sectors, particularly that of Thailand (De Dios et al. 1993). As earlier mentioned, the growth of the packaging industry is closely tied to the growth of its end-using sectors.

In the metal-based subsector, the two countries have started producing beverage cans, unlike the Philippines. Moreover, all food and beverage cans in these two countries are welded, while many tin can manufacturers in the country still use the soldering process.

As for plastic-based products, our ASEAN neighbors have greater experience in the production of polyethylene terephthalate (PET) bottles, and also have the facility to blow-mold 210 liter plastic drums. There is also a wider range of flexible materials and laminates in these other countries, although the best laminates produced locally are comparable with these.

Paper-based packaging products produced in the two countries are considered of superior quality because of the insistence on the use of virgin kraft.

The packaging industries of our ASEAN neighbors also offer a greater diversity of food containers, make extensive use of barcoding, palletization, and shrink and stretch wrapping. In the glass-based subsector, however, the Philippines is way ahead of its ASEAN neighbors. As for price competitiveness, locally-produced metal containers are more expensive--59 percent above the margin for steel drums and beverage bottles and 5 percent for crowns. The wedges for tuna cans range from 14 to 50 percent.

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Summary, Conclusions, and Policy Recommendations

THE results of this study indicate that the TLP has rationalized the protection structure and, thus, reduced the level of allocative inefficiency in the packaging industry. Subsector- and plant-level EPRs generally declined between 1983 and 1988, with corresponding decreases DRC-SER ratios. The glass-based subsector appears to have been the biggest gainer in allocative efficiency; the metal-based subsector, the least gainer.

Improvements in allocative efficiency appear to have been due mainly to increases in the efficiency of small plants. The proportion of efficient small plants to the industry total increased in 1988. Since the majority of new establishments in 1988 were small, these small new entrants were most probably efficient. The easier access to raw materials afforded by the earlier deregulation of packaging raw material importation (relative to finished goods importation) probably encouraged and facilitated the entry of these small plants into the industry. The threat of competition resulting from lower tariff rates on finished goods, on the other hand, may have forced these plants to adopt efficient practices, thus leading to a rise in the level of efficiency in the industry in 1988.

Efficiency improvements among medium- and large-scale establishments were also observed. Since the share of large plants in the industry census value added (CVA) increased between 1983 and 1988, there indeed seems to have been an improvement in resource allocation: more resources appear to have been channelled into efficient plants.

There was also an improvement in competitive advantage after the TLP, as indicated by the lower DRCM-OER ratios. However, it

appears that gains in comparative advantage (again measured by the DRC-SER ratio) were greater than those in competitive advantage. The glass-based subsector, which posted significant gains in comparative advantage, and which became efficient after the TLP, remained uncompetitive in 1988. Since the measure used to indicate competitive advantage (DRCM/OER) did not consider tax- and wage-related as well as foreign exchange distortions, it seems that these three are indeed major sources of distortions.

The findings of the study seem to support the *import discipline hypothesis.* Although import penetration rates even declined for some subsectors between 1983 and 1988, allocative efficiency nonetheless gained ground. Without *actual* competition from imports, the mere *threat* of competition appears to have forced incumbents to become more efficient while allowing entry mainly to efficient plants.

Computed DRC/SER and EPR values of some survey respondents for 1986 and 1991 seem consistent with these conclusions, which are based on Census data.

These results are encouraging; the objective of trade liberalization is not to swamp the local market with imported products and, consequently, to stifle local industries, but only to create an atmosphere of competition conducive to improvements in efficiency and competitiveness.

Since the mere threat of competition fr m imports appears to have induced an overall improvement in allocative efficiency, there seem to be no structural barriers to importing in the industry, even if there are structural barriers to entry in production in the glass-based subsector.

Technical efficiency appears to have declined in 1988. There was a general — though insignificant — drop in TECs across the subsectors. However, some plants did show technical efficiency improvements.

A possible explanation for the contrasting movements of the DRC-SER and TEC measures between 1983 and 1988 is that the latter may be *less an indicator of deviations from efficient or "best-practice" technology than of deviations from the "average" technical efficiency* of the plants in a given subsector. It is possible, then, that the *average deviation widened* because

1) *the most efficient ones* (that is, those at the frontier) *improved their technical efficiency more than the rest of the plants in the subsector;* or

2) *the most efficient ones declined in output,* which influenced the subsectoral average TECs.

The real reason cannot be ascertained, however, due to data constraints.

In any case, the results highlight the importance of non-price barriers to technical efficiency, such as:

1) inadequate or difficult access to supplier technology;

2) lack of standards and the means of enforcing existing standards; and

3) low demand because of the sluggish growth of end-using industries.

Thus, policies other than the TLP seem to be necessary.

The TLP seems to have had varying effects on the industrial structure of the different subsectors. Production concentration increased in the glass- and plastic-based subsectors and declined in the metal- and paper-based subsectors in 1988. Parallel movements were observed in the case of price-cost margins, the indicator used to measure the degree of market power and the presence of entry barriers. This supports the findings of earlier studies on the positive relationship between concentration and price-cost margins.

Although the number of plants increased in all subsectors in 1988, the glass- and plastic-based groups became more concentrated, probably because in these subsectors *the expansion of large plants outstripped the entry of small plants* (which comprised the majority of new entrants). This seems to be particularly true for the glass-based subsector which is characterized by large economies of scale. Taking advantage of these scale economies, the large glass-based plants must have increased their market share and also significantly increased their price-cost margins.

The fact that trade reform did not reduce the level of concentration in the glass-based subsector, however, does not undermine its apparently positive effect on the allocative efficiency of

this subsector, which in fact, was the biggest gainer in efficiency among all the subsectors. Plant-level data reveal that the allocative efficiency gains of this subsector were due to large plants. Thus, even as trade reform appears to have augured well for the efficiency of the relatively more competitive segment of the industry composed of small plants which, appear to be mainly responsible for the allocative efficiency improvements in the entire industry it also seems to have effected substantial efficiency gains in the less competitive segment.

Thus, concentration need not be harmful to an industry. If it is due to economies of scale — as in the case of the glass-based subsector — it can even serve to enhance the beneficial effects of trade reform on efficiency.

Hence, the positive impact of the TLP on the performance and competitiveness of the Philippine packaging industry cannot be overemphasized. While recognizing that efficiency and productivity gains cannot be wholly ascribed to the TLP, the study, thus, recommends a follow-up tariff reform program which would further reduce the rates on both packaging goods and raw materials to minimal levels. The insignificant rise in imports implies that current rates are still too high, considering the natural and policy-related barriers to importing.

Lowered rates in packaging products will enable end-users to become more competitive in export markets, thus increasing the demand for packaging. Increased demand, a major force in technological innovation and quality improvements, will in turn benefit the packaging industry.

In view of the non-price factors affecting the level of technical efficiency cited above, non-tariff related measures also seem necessary. The establishment of a National Packaging Center, which may function as a repository of packaging standards and technology-related information, would be an important step in this direction. But first, the real economic contribution of the Center would have to be established through cost-benefit analysis. If the project is proven feasible, industry people can tap local-private or foreign financial institutions for its implementation to ease the pressure on government funds.

The conclusions reached in the study are based mostly on patterns observed at the subsector level, which were generalized for the industry. Since the packaging industry includes heterogeneous subsectors, more precise conclusions and recommendations can be made with an in-depth study of the individual subsectors, focusing on firm-level characteristics. A more comprehensive assessment of the impact of the TLP may also be made using more recent data covering the 1991 TRP. The study does not adequately capture the effects of the reforms since it relies mainly on data for a limited time frame (1983-1988), which coincided with the period of implementation.

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