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**Working Paper**

## Effects of the Uniform 5% Tariff on Manufacturing

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## Effects of the Uniform Five Percent Tariff on Manufacturing

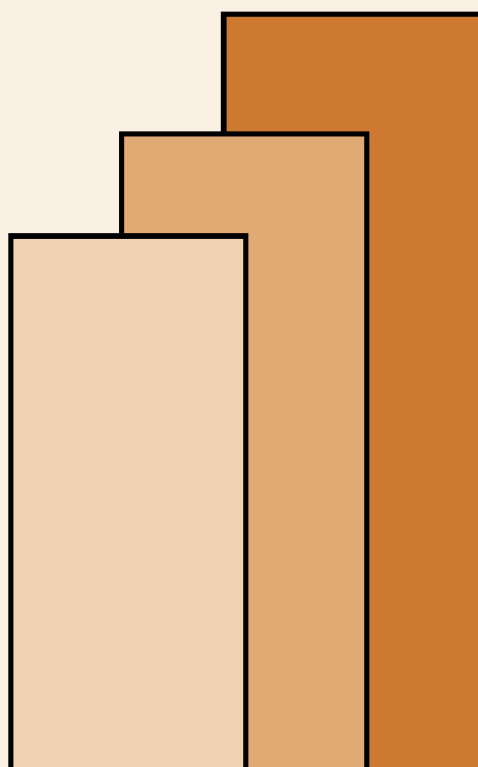
*Virginia S. Pineda*

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PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES  
PROJECT NO. 95-04  
TARIFF FRAMEWORK FOR MORE EFFICIENT,  
GLOBALLY COMPETITIVE PHILIPPINE ECONOMY

## EFFECTS OF THE UNIFORM FIVE PERCENT TARIFF ON MANUFACTURING

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**FINAL REPORT  
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## I. INTRODUCTION

Through a differentiated tariff structure and import restrictions, the Philippines favored some industries relative to others. Such measures raise the price of imports in the domestic market. This enables local producers of import substitutes to compete at prices higher than under free trade, thus increasing their profitability. Industries with higher protection attract resources from less-protected sectors. The result is expansion of the former and contraction of the latter.

In the Philippine experience, protectionist policies caused inefficiencies in resource allocation. They promoted infant industries which remained uncompetitive with imports and penalized exports and other efficient industries. Hence, since the early 1980s, the government has been undertaking trade liberalization measures to make industries globally competitive. Trade liberalization benefits exports through lower input costs and reduction of peso overvaluation resulting from protectionist policies. For local market producers, it implies greater competition from imports. Competition promotes efficiency by forcing firms to find ways of cutting costs and improving product quality.

As a commitment to further trade liberalization, the government is set to implement a uniform 5 percent tariff by the year 2004. By providing equal protection to import-substituting industries, a uniform tariff policy removes distortions to resource allocation arising from government intervention. With a level playing field, resources could go to industries with real profitability. In the industrial restructuring process, there would be adjustment costs as well as gainers and losers. Firms which cannot compete would have to contract, close down or shift to other product lines or business. Output and employment could decline in certain sectors but expansion could also be expected in competitive industries.

This study aims to examine the effects of trade liberalization on the efficiency of manufacturing industries and assess their competitiveness under a uniform 5 percent tariff. It seeks to identify which industries are most likely to compete and which would be most vulnerable to import competition.

The next section discusses the methodology using the effective protection rate and domestic resource cost (DRC) frameworks. Section 3 describes the tariff reforms and import liberalization undertaken since the 1980s. This is followed by a review of the empirical findings for 1988 of the past study on the effects of trade liberalization and a presentation of the findings for 1992 of the current study. Section 5 examines the impact of the uniform 5 percent tariff on the effective protection of manufacturing industries and identifies competitive and vulnerable industries. Section 6 specifies some adjustment and competitiveness-enhancement measures. Finally, the last section summarizes the findings of the study.

## II. METHODOLOGY

The study analyzes the effects of past trade liberalization by looking at the changes in efficiency of industries from 1988 to 1992. It determines vulnerability of industries to import competition under a uniform 5 percent tariff based on their competitiveness and the extent of the reduction in protection. The paper used the Domestic Resource Cost (DRC) concept to indicate efficiency and competitiveness and the Effective Protection Rate (EPR) indicator to measure protection.

EPRs and DRCs were computed using 1992 Annual Survey of Establishments (ASE) data from the National Statistics Office (NSO). These were the most recent data available at the time of this study. For 1988, estimates by Tecson (1996) based on Census of Establishments data were utilized. The EPR and DRC indicators are described briefly below. Estimation details and social prices used are given in the Technical Appendix.

### A. EPR

Tariffs and import restrictions provide protection to local producers by increasing the prices of imports in the domestic market. These result in either or both higher prices and greater market shares of competing local goods relative to the free trade situation. From the point of view of the domestic manufacturer, higher output prices are incentives to production and raise value added. On the other hand, higher input prices are disincentives to production and decrease value added. The EPR takes into account the protection accorded to the output and inputs of an activity by measuring protection to value added. It is computed as the percentage excess of value added at domestic or protected prices (DVA) over value added at free trade or unprotected prices (FTVA):

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

$$\frac{DVA}{FTVA} - 1 * 100$$

DVA is the difference between the value of output and the cost of raw materials used, both at domestic prices net of sales taxes. FTVA is the difference between these values in border prices. Nontraded inputs are considered part of value added. In the absence of data on actual border prices (CIF for importables and FOB for exportables), these are derived by removing the applicable implicit tariffs (sales taxes and legal tariffs) from domestic prices. EPR is thus estimated by netting out the sales taxes and implicit tariffs from domestic values of output and raw materials:

$$EPR = \frac{P_{dj}/(1+s_j) - \sum [P_{di}/(1+s_i)]}{P_{dj}/(1+T_j) - \sum [P_{di}/(1+T_i)]} - 1 * 100$$

where

$P_{dj}$  = value of output  $j$  at domestic prices;

$P_{di}$  = value of input  $i$  at domestic prices;

$s_j$  = sales tax rate on  $j$ ;

$s_i$  = sales tax rate on  $i$ ;

$T_j$  = implicit tariff on  $j$ ; and

$T_i$  = implicit tariff on  $i$ .

The EPR measure provides an indication of the direction of resource allocation - i.e., from activities which have relatively low or negative effective protection rates to those which have relatively high effective protection rates.

### B. DRC

The DRC measures profitability from the point of view of society by valuing resources based on their foregone benefits/opportunity costs. It indicates the amount of domestic resources used per unit of net foreign exchange earned through export or saved through import substitution, as follows:

$$\frac{DC_j}{P_{bj} - FC_j}$$

where

$DC_j$  = domestic cost per unit of product  $j$  in shadow prices and in local currency;

$P_{bj}$  = value of output  $j$  at border prices and in foreign currency; and

$FC_j$  = foreign cost per unit of product  $j$  at border prices and in foreign currency.

Costs, which are classified into domestic and foreign, consist of raw materials, labor, capital costs (interest and depreciation charges) and other costs (e.g., utilities and royalties).

Since it measures domestic cost in local currency and net benefit in foreign currency, the DRC may be viewed as the activity's own exchange rate in the same way that the IRR (internal rate of return) is the activity's own rate of return to capital. Just as the IRR is compared with the social rate of interest which is the opportunity cost of capital, the DRC is compared with the social exchange rate (SER) which represents the average opportunity cost of domestic resources used in all activities producing tradable goods. Based on the estimates by Medalla and others (1990 and 1995), the SER, which indicates how society truly values foreign exchange, was higher than the official or market exchange rate by 25 percent in 1988 and by 20 percent in 1992.

A DRC greater than the SER (or  $DRC/SER > 1$ ) indicates lack of comparative cost advantage in the production of the tradable good. This also implies allocative inefficiency because if the tradable good is not produced, resources could be used in activities which yield

benefits at lower cost to society. In general, the higher the DRC/SER ratio, the more uncompetitive or inefficient an activity is in saving or earning foreign exchange.

Following Tecson's study (1996) whose results are compared with the present paper, an activity is considered efficient if its DRC/SER ratio is less than or equal to 1.20. The use of 1.20 instead of 1.0 as benchmark for efficiency is to provide allowance for data and measurement errors. The following criteria for efficiency classification were used:

DRC/SER Ratio	Efficiency Classification
0.0 - 1.20	efficient
1.21 - 1.50	mildly inefficient
1.51 - 2.00	inefficient
> 2.00	highly inefficient
< 0	negative foreign exchange earner or dissaver

### Limitations of the EPR and DRC measures

The most important limitation of the EPR and DRC measures is that they are of partial equilibrium nature. Hence, they do not take into account the dynamic repercussions of policies (such as substitution among inputs as well as among outputs, and changes in prices of goods and primary factors). Capturing these effects usually requires a general equilibrium level model of the Philippine economy which is beyond the scope of the study. Nevertheless, the firms' adjustments to trade liberalization (in terms of changes in output and input levels and prices) are already reflected in the EPR and DRC results for 1988 and 1992 since these were not simulated but were computed from actual production and cost figures for those years.

The EPR and DRC indicators are estimated subject to the following assumptions

- 1) pure competition;
- 2) zero elasticity of substitution among inputs;
- 3) constant returns to scale in production;
- 4) infinitely elastic foreign supplies of importables; and
- 5) infinitely elastic foreign demand for the country's exports

Some of the assumptions may not be deemed realistic. In the real world, many manufacturing industries are oligopolistic in nature, and input substitution and increasing (or decreasing) returns to scale do take place. The assumptions, however, are necessary to make the analysis manageable. But despite these limitations, the EPR and DRC indicators are still useful in providing measures of policy impact. They have already served as the main analytical tools of past studies (e.g., Bautista and Tecson (1979) and Tecson (1996)) on the impact of policies on manufacturing industries. With these studies as precedent, the present paper employs the EPR and DRC measures to analyze the effects of policies using the most recent data available.

### III. REVIEW OF PAST TRADE LIBERALIZATION SINCE THE 1980s

#### A. *Tariff Reforms*<sup>1</sup>

##### 1. TRP-I (1981-1985)

The government implemented the first major reform towards rationalization of the protection structure in the 1980s through the Tariff Reform Program (TRP) and the Import Liberalization Program (ILP). It also realigned the indirect tax between imports and local products in 1985.

TRP-I aimed to lower very high tariffs and to even off the dispersion of the levels of assistance among and within industry sectors. It was administered in stages over a five-year period to cushion the adjustment pressure on industries.

Under TRP-I, tariffs of 70 percent and 100 percent were eliminated. The maximum tariff was reduced to 50 percent. Table 1 shows the distribution of tariff rates before and after the TRP-I. Prior to TRP-I, 27 percent of tariff lines have 70 percent and 100 percent tariff, 16 percent with 40-50 percent tariff, 57 percent with 10-30 percent tariff, and 3 tariff lines with free or five percent duty. After TRP-I, 31 percent of tariff lines have 40-50 percent tariff, 68 percent with 10-30 percent tariff and 17 tariff lines with zero or 5 percent duty.

TRP-I diminished tariff escalation. Rates on finished goods which were mostly 70 to 100 percent declined to a range of 30-50 percent. For intermediate goods, tariffs fell mostly within 20 to 30 percent after TRP-I compared to 10-50 percent previously. On raw materials, most of the 10 percent rates remained while higher rates were generally reduced.

As a result of the Tariff Reform Program, EPR levels and variation were reduced. EPR for all importables narrowed down from a range of 22 to 299 percent to a range of 18 to 144 percent after the TRP. However, the EPR structure remained the same in relative terms after TRP-I. The exportable and primary and agricultural sectors were still penalized as reflected in their negative EPRs for 1985: -4 percent and -1 percent, respectively.

##### 2. TRP-II (Executive Order No. 470, 1991-1995)

E.O. 470, issued in July 1991, contained the second most significant tariff changes after the 1981-1985 TRP. Table 2 presents the tariff distribution under E.O. 470. The most notable changes from 1991 to 1995 included the elimination of the 40 percent tariff, the decline in the number of lines with 50 percent tariff from 1,172 to 208, and the doubling of the number of lines with 30 percent tariff from 973 to 1,962 lines. Under E.O. 470, tariffs clustered at the 10, 20, and 30 percent levels.

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<sup>1</sup>Estimates of EPR levels and dispersion under TRP-I are based on the study by Medalla (1986) while those under TRP-II are from Tan (1994). Tariff restructuring after 1995, as provided under EOs 264, 313 and 328, are discussed in "Effects of the Uniform 5 Percent Using the Chung Lee Model" by E. Tan under this same project.

**Table 1**  
**FREQUENCY DISTRIBUTION OF TARIFF LINES**  
**PRE- AND POST- TRP-I**

Tariff Rates (%)	Number of Tariff Lines		Percent Share in Total Tariff Lines	
	Pre-TRP-I	Post-TRP-I (1985)	Pre-TRP-I	Post-TRP-I (1985)
Specific	2	2	0.15	0.14
Free	1	3	0.08	0.21
5	2	14	0.15	1.00
10	319	334	24.52	23.81
20	204	335	15.68	23.88
30	218	284	16.76	20.24
40	5	100	0.38	7.13
50	203	331	15.60	23.59
60	0	0	0.00	0.00
70	119	0	9.15	0.00
75	0	0	0.00	0.00
80	0	0	0.00	0.00
90	0	0	0.00	0.00
100	228	0	17.52	0.00
<b>Total tariff lines</b>	<b>1,301</b>	<b>1,403</b>	<b>100.00</b>	<b>100.00</b>

Source: Medalla (1986)

**Table 2**  
**FREQUENCY DISTRIBUTION OF TARIFF RATES**  
**UNDER EO 470**

Tariff Rate (%)	Number of tariff lines					Percent of Total Tariff Lines				
	1991	1992	1993	1994	1995	1991	1992	1993	1994	1995
0	45	43	43	43	43	0.81	0.77	0.77	0.77	0.77
3	277	277	304	304	285	4.98	4.98	5.47	5.47	5.13
5	11	11	16	16	16	0.20	0.20	0.29	0.29	0.29
10	1,590	1,972	1,949	1,958	1,958	28.61	35.48	35.07	35.23	35.23
15	3	3	6	32	26	0.05	0.05	0.11	0.58	0.47
20	972	744	887	918	1,041	17.49	13.39	15.96	16.52	18.73
25	30	30	103	133	19	0.54	0.54	1.85	2.39	0.34
30	973	843	1,041	1,004	1,962	17.51	15.17	18.73	18.06	35.30
35	0	102	47	620	0	0.00	1.84	0.85	11.16	0.00
40	480	385	662	31	0	8.64	6.93	11.91	0.56	0.00
45	0	622	0	0	0	0.00	11.19	0.00	0.00	0.00
50	1,177	526	500	499	208	21.18	9.46	9.00	8.98	3.74
Total Tariff Lines	5,558	5,558	5,558	5,558	5,558	100.00	100.00	100.00	100.00	100.00

Source: Tan (1994)



E.O. 470 was slightly modified with the issuance of E.O. 8 in July 1992. E.O. 8 provided tariffication for 153 commodities and tariff realignment for 48 commodities. This is in anticipation of the lifting of quantitative restrictions. It granted 60-100 percent tariff rates time-bound for five years beginning August 1992. E.O. 8 has very minimal impact on overall EPR as it affected only 201 of the total 5,606 tariff lines.

As a result of EO 470, EPR levels and dispersion were reduced. Average EPR for manufacturing dropped from 45.5 percent in 1990 to 37.3 percent in 1995. Likewise, standard deviation declined from 41.0 percent to 29.3 percent for the same period. For the entire economy, average EPR fell from 29.4 percent in 1990 to 24.1 percent in 1995. Dispersal rate also decreased from 42.2 percent to 32.4 percent.

The tariff reforms under E.O. 470 minimized but not eliminated the biases against exportables and the primary sector. Average EPRs for 1995 were estimated at -1.4 percent for exportables (all sectors), 2.4 percent for the agriculture, fishing, and forestry group, and 6 percent for mining. These were much lower than the average EPR for manufacturing at 37.3 percent. (EPRs were estimated with duty drawback and using book rates and input-output data.)

### *B. Import Liberalization*

Import liberalization involves the lifting of import restrictions or regulations. Imports are restricted by requiring prior approval/licensing from government agencies, such as the Central Bank and the Board of Investments.

As of 1980, 1,820 items were subject to import restrictions. These constituted 32 percent of the total Philippine Standard Commodity Classification (PSCC) lines. Based on CB Circulars, 927 items were liberalized from 1981 to 1983. However, import restrictions were imposed again due to the balance of payments crisis triggered by the Aquino assassination in August 1983. By end-1985, the number of restricted items was 1,802 lines - almost the same as that of 1980.

In 1986, the newly-installed Aquino administration resumed the ILP. By end-1988, the restricted items dropped to 609 commodities, representing 10.8 percent of total PSCC lines. These were categorized into Lists A, B, and C. Fifteen percent of the restricted items were under List A (for immediate liberalization), 68 percent in List B (for review), and 17 percent in List C (for continued regulation for health, safety, and national security reasons). As of 1994, only 250 items or 4.4 percent of total PSCC lines remained regulated.

Recent import liberalization measures included the removal of import restrictions on new motor vehicles and a number of used trucks and buses (Central Bank Circular 92, October 1995), lifting of quantitative restrictions on sensitive agricultural products, except rice (Republic Act 8178, March 1996), and liberalization of importation and exportation of petroleum products (Republic Act 8180, March 1996). As of September 1996, only 175 PSCC lines remained regulated.

## IV. EFFECTS OF TRADE LIBERALIZATION

### *A. Empirical findings, 1983-1988*

With trade liberalization, the number of items subject to import restrictions fell from 1,829 in 1983 to 609 in 1988. These constituted 33 percent and 11 percent, respectively, of the total PSCC lines. The average effective protection rate of the manufacturing sector, computed from NSO establishment data, declined from 42.8 percent in 1983 to 28.3 percent in 1988. Tecson (1996) analyzed the impact of trade reforms on the manufacturing sector using 1983 and 1988 NSO establishment data. Among her major findings are as follows:

1) **Trade liberalization promoted efficiency.** At the 3-digit PSIC level, 23 of the 31 industries performed favorably: three remained efficient, nine became efficient, and 11 reduced their inefficiency. The average DRC/SER ratio of the manufacturing sector declined from 1.7 in 1983 to 1.5 in 1988. This indicates a reduction in the sector's inefficiency.

2) **Resource allocation improved.** Efficient industries expanded and inefficient industries contracted. More than half of the output value of the manufacturing sector came from efficient industries in 1988 compared to only 40 percent in 1983.

3) **On size structure, small and medium establishments or SMEs<sup>2</sup> showed substantial declines in their inefficiency levels.** They even came close to being efficient while there was hardly any change in the large establishments' inefficiency level. SMEs after the trade reforms became an important source of efficiency within the manufacturing sector. The liberalized and more competitive environment after the reform encouraged the entry and growth of SMEs and induced them to use resources more efficiently than they had in the past.

5) **Efficient import substitution has taken place only in most segments of the consumer goods industries.** These expanded at the expense of the intermediate goods and capital goods industries. In general, industries which incur high costs in both 1983 and 1988 were found in the intermediate and capital goods sectors. This has adverse impact on downstream industries which source inputs from these sectors. In contrast to the Philippines, the manufacturing sectors of its fast growing ASEAN neighbors were characterized by a structural change in the direction of a growing intermediate and capital goods industries. The contraction of the country's intermediate and capital goods industries was largely responsible for the high degree of import dependence of its industries. For long-term development, policy attention should focus on improving the efficiency and competitiveness of intermediate and capital goods industries.

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<sup>2</sup>Establishments were classified by size as follows: small - with 10-99 employees; medium - with 100-199 employees; and large - with 200 or more employees.

## *B. Empirical findings, 1988-1992*

The continuing trade reforms resulted in the decrease of average effective protection for manufacturing from 28.3 percent in 1988 to 20.7 percent in 1992. Moreover, the items subject to import restriction for both manufacturing and agricultural sectors declined from 10.8 percent in 1988 to 2.9 percent in 1992.

### Import competition and export competitiveness

With the reduction in both tariff and non-tariff protection, we would expect greater import competition. Manufactured imports rose by 101 percent from 1988 to 1992, higher than the 77 percent change for total imports. Their share in total imports increased from 50 percent in 1988 to 57 percent in 1992. (See Table 3).

Trade liberalization has positive impact on exports which do not benefit from tariff protection. A decrease in protection to locally-sold goods implies reduction of penalty to exports. Manufactured exports went up by 66 percent in 1992, higher than the 39 percent change for total exports. Their share in total exports rose from 36 percent in 1988 to 44 percent in 1992. But still, imports increased much faster than exports.

### Efficiency of the manufacturing sector

The reduction in inefficiency observed in 1988 continued in 1992. This is indicated by the decline in the average DRC/SER ratio of the manufacturing sector, from 1.54 in 1988 to 1.21 in 1992.

At the 3-digit PSIC level, 20 out of 31 industries or about two-thirds performed favorably: seven either maintained or improved their efficiency, five turned from inefficient to efficient, and eight reduced their inefficiency. The specific industries are presented in Table 4.

Of the seven which maintained or improved their efficiency, five were export-oriented industries, namely, apparel, footwear, coal products, rubber products and electrical machinery. Industries which became efficient included beverages, printing/publishing, industrial chemicals, iron and steel, and nonferrous metal basic products.

Among those which reduced their inefficiency, textiles showed the greatest improvement as its DRC/SER ratio decreased by more than half. Other industries that became less inefficient consisted manufactures of leather products, wood products, paper products, cement, other non-metal mineral products, machinery except electrical, and professional equipment.

On the other hand, three industries, namely other food, non-metal furniture and fixtures, and other manufacturing, turned inefficient. Moreover, eight industries became more inefficient. These included tobacco, wood products, plastic products, glass products, pottery and china, fabricated metal products, transport equipment, and metal furniture and fixtures.

**Table 3**  
**MANUFACTURING SECTOR INDICATORS**  
**1988 AND 1992**

INDICATOR	1988	1992	% CHANGE 1992/1988
AVERAGE EPR	28.3%	20.7%	
NUMBER OF ITEMS SUBJECT TO IMPORT RESTRICTIONS*	609	164	
SHARE OF RESTRICTED ITEMS IN TOTAL PSCC LINES	10.8%	2.9%	
<b>IMPORTS (MILLION US\$, CIF)</b>			
MANUFACTURED GOODS **	4,386	8,825	101
TOTAL PHILIPPINE IMPORTS	8,731	15,465	77
MANUFACTURED IMPORTS/ TOTAL IMPORTS	50%	57%	
<b>EXPORTS (MILLION US\$, FOB)</b>			
MANUFACTURED GOODS**	2,572	4,280	66
TOTAL PHILIPPINE EXPORTS	7,074	9,824	39
MANUFACTURED EXPORTS/ TOTAL EXPORTS	36%	44%	
AVERAGE DRC/SER	1.54	1.21	

† Agriculture and Manufacturing Sectors

\*\* SITC 5-8 (Chemicals, Basic Manufactures, Machines & Transport  
Equipment, and Misc. Manufactured Goods)

Sources of basic data: ADB Key Indicators, 1994;  
NSO Annual Survey of Establishments, 1992;  
Tecson (1996).

**Table 4**  
**CHANGES IN EFFICIENCY OF INDUSTRIES**  
**AT 3-DIGIT PSIC**  
**1988 AND 1992**

INDUSTRY	DRC/SER	
	1988	1992
<b>MAINTENANCE/IMPROVEMENT OF EFFICIENCY</b>		
Maintenance/greater efficiency		
311 Food	1.06	1.20
322 Apparel	0.95	0.99
324 Footwear	1.13	1.02
352 Other chemicals	1.16	0.95
354 Coal products	0.59	0.57
355 Rubber products	0.91	0.94
383 Electrical machinery	1.10	1.16
Shifts from inefficiency to efficiency		
313 Beverages	1.21	1.14
342 Printing, publishing	1.91	1.04
351 Industrial chemicals	3.08	1.14
371 Iron & steel	2.27	1.19
372 Nonferrous metal basic products	1.75	1.09
Reduction of inefficiency		
321 Textiles	3.55	1.64
323 Leather products	1.58	1.44
341 Paper products	1.86	1.34
353 Petroleum refining	1.76	1.22
363 Cement	3.09	1.68
369 Other nonmetal mineral products	1.77	1.55
382 Machinery except electrical	1.40	1.23
385 Professional equipment	2.72	1.48
<b>DETERIORATION</b>		
Shifts from efficiency to inefficiency		
312 Other food	1.04	1.26
332 Furn. & fixt., exc. metal	0.94	1.24
390 Other manufacturing	1.17	1.34
Worsening of inefficiency		
314 Tobacco	1.22	1.32
331 Wood products	1.35	1.41
356 Plastic products	1.23	1.62
361 Pottery & china	1.29	1.59
362 Glass products	1.61	1.78
381 Fabricated metal products	1.78	1.79
384 Transport equipment	1.40	1.55
386 Furniture & fixtures, metal	2.68	3.91

SER was estimated at P26.37 in 1988 and P30.61 in 1992.

Sources of basic data: NSO Annual Survey of Establishments, 1992; Tecson (1996).

At the 5-digit PSIC level, 94 industries were efficient, 64 were mildly inefficient, 58 were inefficient, and 54 were highly inefficient. Each efficiency classification covered a wide range of industries (Appendix 1). Table 5-A shows the 25 most efficient industries. Among these were the manufactures of matches, electrical communications equipment, drugs and medicines, tires and tubes, and primary cells and batteries. In contrast, Table 5-B presents the 25 most inefficient industries. The list includes the manufactures of handtools, structural steel and materials, flat glass, fiber and filament, and machine implements for crop production.

Comparison between the 1988 and 1992 DRC/SER ratios of industries with data for both years indicated that 131 industries or 57 percent performed favorably. Of these, 42 either remained or became more efficient, 36 shifted from inefficient to efficient, and 53 became less inefficient. Unfortunately, 100 industries or 43 percent of the total showed deterioration: 49 industries turned from efficient to inefficient and 51 worsened their inefficiency. As gathered from industry studies, major impediments to attaining efficiency are limited market and technological constraints. Table 6 presents the top 5 industries (those with the most significant changes in DRC/SER ratios) in each category. The complete list is shown in Appendix 2.

Among those which registered the greatest improvement in efficiency were the manufactures of matches, electrical lamps and fluorescent tubes, and inorganic acids. Industries which became efficient included electrical communications equipment, parts and supplies for radio and television, and fertilizers. The greatest reductions in inefficiency were posted by industrial bags and integrated pulp and paperboard which were dissavers (negative DRC/SER ratio) in 1988. Substantial improvement was also recorded by fiber and filament, shipbuilding, and surgical, dental, and orthopedic equipment.

Industries which showed greatest deterioration included the manufactures of fiber batting and padding, iron and basic industries (n.e.c.), explosives and fireworks, hand tools, structural steel and materials, and boats and motorboats.

### Resource allocation

There is improvement in allocative efficiency if resources move from inefficient to efficient sectors. Table 7 shows that the proportion of efficient establishments in total number of establishments increased from 43 percent in 1988 to 49 percent in 1992 and their share in production value rose from 52 percent to 61 percent for the same years. This indicates better resource allocation. However, the 1992 shares of inefficient establishments remained substantial: 51 percent of the total number of establishments and 39 percent of production.

### Sectoral efficiency

One of the findings for 1988 was that high-cost industries were mostly in the capital goods and intermediate goods sectors. Since these are input sources, their inefficiencies penalize the using downstream industries. In 1992, there was significant improvement in the efficiency of the capital goods and intermediate goods sectors. Eleven of the 15 industries in the intermediate goods sector and five out of seven industries in the capital goods sector maintained or improved their efficiency or reduced their inefficiency. On the average, the DRC/SER ratio of the intermediate goods sector declined significantly from 1.87 in 1988 to 1.23 in 1992 while that of the capital goods sector fell from 1.48 in 1988 to 1.23 in 1992 (Table 8).

**Table 5-A  
25 MOST EFFICIENT INDUSTRIES  
AT 5-DIGIT PSIC**

PSIC	DESCRIPTION	DRC/SER 1992
35293	Matches	0.30
38521	Photographic equipment & accessories	0.53
38492	Hand-drawn vehicles	0.54
35400	Miscellaneous products of petroleum & coal	0.57
32139	Made-up textile goods, n.e.c.	0.62
34140	Articles of paperboard	0.67
38323	Electrical communications eqpt.	0.70
39021	Pianos	0.71
32492	Manufacture of footwear parts	0.73
35115	Organic acids & acid compounds	0.76
34210	Printing of newspapers & periodicals	0.77
38312	Electric generating sets	0.78
38391	Electrical lamps & fluorescent tubes	0.78
38299	Machines & equipment, n.e.c.	0.79
35220	Drugs & medicines	0.80
35511	Tires & tubes	0.80
38350	Electrical accumulators	0.81
38340	Primary cells & batteries	0.83
35291	Waxes & polishing preparations	0.83
31330	Malt liquors & malt	0.84
32292	Hats, gloves, handkerchiefs, belts	0.85
38292	Mech. power transmission equipment	0.86
32153	Articles made of native materials	0.86
38322	Gramophone records	0.86
32117	Hand weaving	0.87

**Table 5-B  
25 MOST INEFFICIENT INDUSTRIES  
AT 5-DIGIT PSIC**

PSIC	DESCRIPTION	DRC/SER 1992
38112	Hand tools	13.31
38239	Manufacture of metal and woodworking machinery	11.81
38121	Structural steel and materials	6.56
32170	Fiber batting, padding, etc.	5.66
38114	Blacksmithing & welding shops	5.32
35294	Explosives, fireworks	5.06
38129	Structural metal products, n.e.c.	4.91
37190	Iron & steel basic industries, n.e.c.	4.61
32159	Cordage, rope, twine, nec.	4.45
32499	Manufacture of other footwear except rubber, plastic	4.19
38601	Household furniture	4.12
36201	Flat glass	4.07
36995	Asbestos products	4.01
34292	Bookbinding & related work	3.80
31171	Crude veg. oil, cake & meal except coconut oil	3.72
38411	Boats & motorboats	3.56
31312	Distilled ethyl alcohol, except from sulphite res. of pulp mfg.	3.48
32112	Fiber & filament	3.45
36102	Coarse clay products	3.41
38222	Machine implements for crop production	3.32
34291	Electrotyping, stereotyping, photoengraving	3.21
38219	Engines & turbines except transport, nec	3.17
37249	Non-ferrous foundries, n.e.c.	3.01
31111	Slaughtering	2.96
38221	Farm tractors	2.92



**Table 6**  
**CHANGES IN EFFICIENCY**  
**AND TOP 5 INDUSTRIES**  
**AT 5-DIGIT PSIC**

PSIC	INDUSTRY	DRC/SER 1988	DRC/SER 1992
<b>A. IMPROVEMENT OR MAINTENANCE OF EFFICIENCY</b>			
38492	Hand-drawn vehicles	1.20	0.54
35293	Matches	0.67	0.30
38391	Electrical lamps & flourescent tubes	1.12	0.78
32153	Articles made of native materials	1.13	0.86
35111	Inorganic acids, alkalies	1.14	0.90
<b>B. SHIFTS FROM INEFFICIENCY TO EFFICIENCY</b>			
38323	Electrical communications eqpt.	-5.40	0.70
38325	Parts & supplies for radio, T.V.	8.69	1.08
35120	Fertilizers	5.69	0.90
37123	Galvanized steel tinplates	3.12	0.88
32139	Made-up textile goods, n.e.c.	2.37	0.62
<b>C. REDUCTION IN INEFFICIENCY</b>			
34111	Integrated pulp, paper, paperboard	-10.30	1.64
32131	Industrial bags	-5.41	1.49
32112	Fiber & filament	100.11	3.45
38414	Shipbuilding, including passenger vessels	11.03	1.91
38516	Surgical, dental, orthopedic equipment	7.66	1.32
<b>D. SHIFTS FROM EFFICIENCY TO INEFFICIENCY</b>			
32170	Fiber batting, padding, etc.	0.79	5.66
37190	Iron & steel basic industries, n.e.c.	0.55	4.61
35294	Explosives, fireworks	1.14	5.06
32159	Cordage, rope, twine, nec.	1.15	4.45
36995	Asbestos products	1.18	4.01
<b>E. WORSENING OF INEFFICIENCY</b>			
38112	Hand tools	1.52	13.31
38121	Structural steel and materials	2.31	6.56
38129	Structural metal products, n.e.c.	1.53	4.91
38411	Boats & motorboats	1.26	3.56
36102	Coarse clay products	1.27	3.41



**Table 7**  
**RESOURCE ALLOCATION AND EFFICIENCY**  
**1988 AND 1992**

DRC/SER Range	Efficiency Classification	Share in Number of Establishments (%)		Share in Production Value (%)	
		1988	1992	1988	1992
0<DRC/SER<1.0 1.0<DRC/SER<1.2	Highly efficient	30.25	33.22	39.51	43.95
	Efficient	12.90	15.37	12.51	16.62
		43.15	48.59	52.02	60.57
1.2<DRC/SER<1.5 1.5<DRC/SER<2.0	Mildly Inefficient	14.83	15.80	10.25	12.86
	Inefficient	13.00	12.69	14.68	8.36
DRC/SER>2.0 DRC/SER<0	Highly Inefficient	26.61	21.87	21.77	18.07
	Dissaver	2.41	1.06	1.28	0.14
		56.85	51.42	47.98	39.43

Sources of basic data: NSO Annual Survey of Establishments, 1992; Tecson (1996).

**Table 8**  
**DRC/SER RATIOS**  
**OF MANUFACTURING INDUSTRIES**  
**BY END-USE CLASSIFICATION**  
**1988 AND 1992**

PSIC	CLASSIFICATION	DRC/SER	
		1988	1992
	<b>CONSUMER GOODS</b>		
311	Food	1.06	1.20
312	Other food	1.04	1.26
313	Beverages	1.21	1.14
314	Tobacco	1.22	1.32
322	Apparel	0.95	0.99
324	Footwear	1.13	1.02
332	Furn. & fixt., exc. metal	0.94	1.24
386	Furniture & fixtures, metal	2.68	3.91
	<b>AVERAGE</b>	<b>1.06</b>	<b>1.18</b>
	<b>INTERMEDIATE GOODS</b>		
321	Textiles	3.55	1.64
323	Leather products	1.58	1.44
331	Wood products	1.35	1.41
341	Paper products	1.86	1.34
342	Printing, publishing	1.91	1.04
351	Industrial chemicals	3.08	1.14
352	Other chemicals	1.16	0.95
353	Petroleum refining	1.76	1.22
354	Coal products	0.59	0.57
355	Rubber products	0.91	0.94
356	Plastic products	1.23	1.62
361	Pottery & china	1.29	1.59
362	Glass products	1.61	1.78
363	Cement	3.09	1.68
369	Other nonmetal mineral products	1.77	1.55
	<b>AVERAGE</b>	<b>1.87</b>	<b>1.23</b>
	<b>CAPITAL GOODS</b>		
371	Iron & steel	2.27	1.19
372	Nonferrous metal basic products	1.75	1.09
381	Fabricated metal products	1.78	1.79
382	Machinery except electrical	1.40	1.23
383	Electrical machinery	1.10	1.16
384	Transport equipment	1.40	1.55
385	Professional equipment	2.72	1.48
	<b>AVERAGE</b>	<b>1.48</b>	<b>1.23</b>
390	Other manufacturing	1.17	1.34

Sources of basic data: NSO Annual Survey of Establishments, 1992; Tecson (1996).

## Size Structure

The small and medium establishments have lower DRC/SER ratios than the large establishments in 1988. This was reversed in 1992. On the average, the DRC/SER ratio of large establishments was lower than those of small and medium establishments (Table 9). The substantial improvement in efficiency of the large establishments is consistent with the greater efficiency of the capital and intermediate goods sectors which consist of large establishments. In 13 industries, the larger firms are more efficient than the smaller and medium firms implying the importance of economies of scale. Among these industries are iron and steel, chemicals, machinery, beverages, rubber, plastic, and paper products.

## Efficiency at adjusted capacity utilization

In 1992, the country suffered from a severe power crisis and the Mt. Pinatubo eruption. These resulted in capacity underutilization of firms which reduced their efficiency. The study therefore did a simulation by adjusting to 85 percent the capacity utilization of establishments operating below this rate.

The worsening of inefficiency of SMEs in 1992 may be attributed to capacity underutilization. Table 10 compares the average DRC/SER ratios by size at actual and adjusted capacity utilization. Small establishments showed the greatest improvement as their average DRC/SER ratio fell from 1.38 (actual capacity utilization) to 1.13 (adjusted capacity utilization), which already indicated efficiency. Thus, the effects of the power crisis may have been more severe on SMEs. Ensuring continuous power supply is definitely a crucial factor in promoting efficiency, particularly of SMEs.

Higher capacity utilization improves the performance of industries. At the 3-digit PSIC level, the number of efficient industries increase from 12 (actual capacity utilization) to 18 (adjusted capacity utilization). The additional six efficient industries are wood products, non-metal furniture and fixtures, non-electrical machinery, tobacco, petroleum refining, and textiles.

At the 5-digit PSIC level, the number of efficient industries increase from 94 (actual capacity utilization) to 131 industries (adjusted capacity utilization), as shown in Table 11. Similarly, in terms of changes in efficiency classification, those which either maintain/improve their efficiency or become efficient/less inefficient rise from 131 industries to 161 industries (Table 12).

Industries which become efficient at adjusted capacity utilization are listed in Table 13. Among these are large-scale industries focused on the local market, such as integrated textiles, spinning, integrated pulp, paper and paperboard, and motor vehicles. For such industries, the narrowness of the market is a major constraint to attainment of full capacity and economies of scale.

**Table 9**  
**SIZE STRUCTURE AND EFFICIENCY OF MANUFACTURING INDUSTRIES**  
**AT 3-DIGIT PSIC CLASSIFICATION**  
**1988 AND 1992**

PSIC	DESCRIPTION	1988 DRC/SER				1992 DRC/SER			
		ALL	SMALL	MEDIUM	LARGE	ALL	SMALL	MEDIUM	LARGE
311	Food	1.07	1.25	0.98	1.03	1.20	1.43	1.04	1.25
312	Other Food	1.02	1.25	1.20	0.96	1.26	0.85	1.06	1.39
313	Beverages	1.21	0.79	0.98	1.24	1.14	2.06	2.97	1.12
314	Tobacco	1.22	1.20	1.04	1.23	1.32	1.64	0.96	1.33
321	Textiles	3.55	2.00	7.40	3.53	1.64	1.31	1.44	1.76
322	Apparel	1.04	0.91	0.92	1.18	0.99	0.91	0.85	1.02
323	Leather products	1.58	2.53	2.61	0.93	1.44	1.52	1.77	1.38
324	Footwear	1.13	1.08	1.31	0.87	1.02	1.11	0.78	1.03
331	Wood products	1.35	1.15	1.18	1.49	1.41	1.48	1.64	1.27
332	Furn. & fixt., exc. metal	0.94	1.11	0.81	0.89	1.24	1.12	1.41	1.25
341	Paper products	1.86	1.90	2.87	1.76	1.34	2.20	1.52	1.18
342	Printing, publishing	1.91	1.81	1.37	2.45	1.04	1.87	1.13	0.76
351	Industrial chemicals	3.08	1.36	1.14	4.10	1.14	1.40	1.55	0.93
352	Other chemicals	1.16	1.07	1.13	1.20	0.95	1.42	0.98	0.91
353	Petroleum refining	1.76	-	-	1.76	1.22	-	-	1.22
354	Coal products	0.59	0.57	-	-	0.57	0.52	1.01	-
355	Rubber products	0.91	0.78	1.43	0.89	0.94	2.01	1.19	0.85
356	Plastic products	1.23	0.99	2.61	0.89	1.62	1.78	1.68	1.52
361	Pottery & china	1.29	1.40	1.39	1.28	1.59	2.53	2.31	1.50
362	Glass products	1.61	2.16	4.28	1.55	1.78	1.77	0.73	1.84
363	Cement	3.09	-7.28	-	2.96	1.68	-	-	1.68
369	Other nonmetal mineral products	1.77	2.08	1.09	1.81	1.55	1.87	1.63	1.42
371	Iron & steel	2.27	1.45	1.96	3.08	1.19	1.65	1.48	1.00
372	Nonferrous metal basic products	1.75	1.08	1.00	1.76	1.09	1.69	0.56	1.10
381	Fabricated metal products	1.78	1.67	1.81	1.83	1.79	2.36	1.56	1.66
382	Machinery except electrical	1.40	1.37	2.25	1.30	1.23	1.74	2.12	1.00
383	Electrical machinery	3.94	1.16	1.97	4.40	1.16	1.04	1.41	1.16
384	Transport equipment	1.40	1.24	1.25	1.44	1.55	1.33	1.73	1.55
385	Professional equipment	2.72	1.12	-8.37	1.11	1.48	1.26	0.97	1.54
386	Furniture & fixtures, metal	2.68	4.14	1.25	-	3.91	1.68	5.10	-
390	Other manufacturing machinery	1.17	1.53	1.17	1.02	1.34	1.65	1.24	1.27
	ALL	1.54	1.29	1.29	1.64	1.21	1.38	1.24	1.18

Small: 10-99 employees; Medium: 100-199 employees; Large: 200 or more employees.

Sources of basic data: NSO Annual Survey of Establishments, 1992; Tecson (1996).

**Table 10**  
**AVERAGE DRC/SER RATIOS BY SIZE**  
**AT ACTUAL AND ADJUSTED CAPACITY UTILIZATION**  
**1992**

Size	DRC/SER	
	Actual Capacity Utilization	Adjusted Capacity Utilization
Small	1.38	1.13
Medium	1.24	1.06
Large	1.18	1.06
All	1.21	1.07

**Table 11**  
**EFFICIENCY CLASSIFICATION AND NUMBER OF INDUSTRIES**  
**AT ACTUAL AND ADJUSTED CAPACITY UTILIZATION**  
**(5-DIGIT PSIC)**  
**1992**

Efficiency Classification	Actual Capacity Utilization		Adjusted Capacity Utilization	
	No. of Industries	Percent Share	No. of Industries	Percent Share
Efficient	94	35	131	49
Mildly Inefficient	64	24	60	22
Inefficient	58	21	46	17
Highly Inefficient	54	20	33	12
<b>Total</b>	<b>270</b>	<b>100</b>	<b>270</b>	<b>100</b>

**Table 12**  
**CHANGES IN EFFICIENCY AND NUMBER OF INDUSTRIES**  
**AT ACTUAL AND ADJUSTED CAPACITY UTILIZATION**  
**(5-DIGIT PSIC)**  
**1988-1992**

Changes in Efficiency	Actual Capacity Utilization		Adjusted Capacity Utilization	
	No. of Industries	Percent Share	No. of Industries	Percent Share
<b>IMPROVEMENT</b>				
Maintenance/Improvement of Efficiency	42	18	51	22
Shift from Inefficient to Efficient	36	16	59	26
Reduction of Inefficiency	53	23	51	22
<b>Subtotal</b>	<b>131</b>	<b>57</b>	<b>161</b>	<b>70</b>
<b>DETERIORATION</b>				
Shift from Efficient to Inefficient	49	21	40	17
Worsening of Inefficiency	51	22	30	13
<b>Subtotal</b>	<b>100</b>	<b>43</b>	<b>70</b>	<b>30</b>
<b>Total</b>	<b>231</b>	<b>100</b>	<b>231</b>	<b>100</b>

Adjustment is done by raising to 85 percent the capacity utilization of those operating below this level. Output and variable costs are increased accordingly.

**Table 13**  
**INDUSTRIES WHICH BECOME EFFICIENT**  
**AT ADJUSTED CAPACITY UTILIZATION (5-DIGIT PSIC)**  
**1992**

PSIC	DESCRIPTION	DRC/SER	
		Actual Capacity Utilization	Adjusted Capacity Utilization
31179	Vegetable & animal oils & fats, nec.	1.28	1.13
31190	Flour milling except cassava	1.63	1.08
31311	Distilled & refined alcoholic liquors	1.28	1.02
31410	Cigarettes	1.34	1.17
31440	Cured tobacco leaves	1.21	1.06
32111	Integrated textiles	1.69	1.10
32113	Spinning	1.64	1.01
32114	Texturizing mills	1.94	0.93
32118	Laces, narrow fabrics, etc.	1.38	0.95
32121	Knitted fabrics	1.49	0.97
32152	Nets, excl. mosquito nets	1.36	1.19
32211	Custom tailoring	1.23	1.19
32310	Tanning and leather finishing	1.27	1.07
33111	Rough lumber	1.23	0.97
33120	Veneer & plywood	1.64	1.11
33140	Wood drying & preserving plants	1.29	1.05
33150	Millwork plants	1.47	0.94
33192	Charcoal outside forest	1.22	1.18
34111	Integrated pulp, paper, paperboard	1.64	1.03
35113	Industrial gases	1.72	1.03
35211	Paints	1.47	1.17
35299	Other chemical products, nec.	1.66	1.19
35300	Petroleum refineries	1.22	1.12
36101	Vitreous china tableware	1.26	1.17
36910	Structural clay products	1.26	1.19
37122	Iron & steel pipes & tubes	1.34	1.18
38139	Mfr. of metal containers,n.e.c.	1.23	1.20
38160	Manufacture of non-electric lighting & heating fixtures	1.32	1.09
38259	Office machines, nec	1.24	1.17
38331	Household electrical cooking equipment	1.28	1.19
38362	Current-carrying wiring devices	1.30	1.16
38392	Electrical signalling equipment	1.26	1.20
38430	Motor vehicles	1.54	0.84
38522	Optical instruments & lenses	1.37	0.70
39031	Sporting gloves & mitts	1.27	1.17
39060	Toys & dolls	1.37	1.20
39093	Manufacture of brooms, brushes & fans	1.34	1.20

## Determinants of Efficiency

In 1988, the regression results indicated that capital intensity and labor productivity were significant explanatory variables for intersectoral differences in DRC/SER ratios. Capital intensity had negative influence while labor productivity had positive impact on efficiency. EPR was not a significant determinant of efficiency in 1988, unlike in 1983. This may be explained by the simultaneous decline in both DRC/SER ratios and EPRs and the narrowing down of their inter-industry differentials after the reforms (Tecson, 1996).

For the present study, a regression was also done based on the following equation (using values at actual capacity utilization and at 3-digit PSIC):

$$\text{DRC/SER} = f(\text{EPR, capital intensity, labor productivity})$$

where

capital intensity = replacement value of capital/employment; and  
 labor productivity = output/employment.

The regression results showed positive signs for EPR and capital intensity and negative sign for labor productivity (Table 14). High effective protection and capital intensity can therefore be associated with high DRC/SER ratios. Moreover, high labor productivity has positive impact on efficiency since industries with such characteristics tend to have low DRC/SER ratios.

**Table 14**  
**REGRESSION RESULTS**

Independent Variables	Coefficient	t-values
EPR	1.24*	2.63
Capital Intensity	7.41E-08**	2.11
Labor Productivity	-2.80E-06**	-2.11

$R^2 = 0.31$

F Value = 4.13

Level of significance:      \* 1%  
                                      \*\* 5%

To test whether or not the improvement in efficiency can be ascribed to the EPR reduction, the changes in DRC/SER were regressed against the changes in EPR. The following results indicated that similar to 1988, efficiency levels were responsive to changes in effective protection:

	EPR Coefficient	t-value	Level of Significance
1988	1.36	5.8	0.1%
1992	0.68	2.4	2.5%



## V. MANUFACTURING INDUSTRIES AND THE UNIFORM 5 PERCENT TARIFF

### A. Protection

EPRs for manufacturing industries were computed for year 2004 when the 5 percent uniform tariff will be implemented. They are not equal to 5 percent because the industries' output has export component and tariffs do not apply to exports (Table 15). Industries which have high exports generally have low EPRs. Other industries which have low EPRs are VAT-exempt sectors, such as printing and publishing, industrial chemicals, and food.

Since tariffs affect exports and import substitutes differently, production is broken down into these components and EPRs were estimated accordingly. The results are compared with those for 1996 to show the extent of EPR reduction (Table 16). Exports do not benefit from tariff protection. They are even penalized by tariffs which raise the cost of both imported and domestic inputs. Such penalty is reflected in negative EPRs of exports. With the tariff reduction to 5 percent, the penalty to exports is reduced as their EPRs move closer to zero. On the average, EPR for exports increase from -2.94 percent in 1996 to -2.42 percent in 2004.

In the case of locally-sold goods, EPR declines to 5 percent except for sectors which consist of VAT-exempt industries, namely, food, other food, printing/publishing, and industrial chemicals (fertilizers, pesticides). Establishments in VAT-exempt industries do not pay tax on output but they cannot claim tax credit for the VAT paid on inputs. This decreases value added resulting in lower EPRs.

For two industries, non-electrical machinery and cement, EPRs increase from 4.73 and 0.64 percent, respectively, to 5 percent.

### B. Competitiveness and Vulnerability

As the country moves toward the 5 percent uniform tariff, greater import competition is anticipated. Majority of manufacturing industries (57 percent of the total number of industries at the 5-digit PSIC and 65 percent at the 3-digit PSIC level) have responded to greater competition by improving their efficiency or reducing their inefficiency. Despite the power crisis in 1992, the proportion of establishments falling under the efficient category ( $DRC/SER \leq 1.2$ ) increased from 43 percent in 1988 to 49 percent in 1992 and their output rose from 52 percent to 61 percent for the same years. These are indications that many manufacturing industries would have the capability to face greater competition, considering even further that the country's current economic condition and power situation are better than that of 1992. Nevertheless, there are also industries which may not be able to compete. Output and employment could thus fall in some sectors but there could also be expansion in more competitive industries. This is part of the industrial restructuring process.

Although DRC simulation for year 2004 cannot be done due to lack of a model<sup>3</sup>, improvement of efficiency and better resource allocation can be expected. Based on a survey

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<sup>3</sup> The effects of the uniform 5 percent tariff and other tariff levels on output, income, exports and imports are taken up in "Effects of the Uniform Five Percent Tariff using the Chung Lee Model" by E. Tan under this same project.

**Table 15**  
**EFFECTIVE PROTECTION RATES**  
**AT UNIFORM 5 PERCENT TARIFF**

PSIC	INDUSTRY	EPR (%)
311	Food	0.67
312	Other food	-0.24
313	Beverages	4.83
314	Tobacco	4.80
321	Textiles	1.28
322	Apparel	0.70
323	Leather products	3.36
324	Footwear	-0.93
331	Wood products	0.71
332	Furn. & fixt., exc. metal	0.45
341	Paper products	4.18
342	Printing, publishing	-1.61
351	Industrial chemicals	0.56
352	Other chemicals	4.51
353	Petroleum refining	4.29
354	Coal products	1.16
355	Rubber products	2.91
356	Plastic products	3.33
361	Pottery & china	2.34
362	Glass products	4.75
363	Cement	5.00
369	Other nonmetal mineral products	4.15
371	Iron & steel	3.24
372	Nonferrous metal basic products	-2.71
381	Fabricated metal products	4.01
382	Machinery except electrical	1.59
383	Electrical machinery	0.32
384	Transport equipment	1.24
385	Professional equipment	4.02
386	Furniture & fixtures, metal	3.50
390	Other manufacturing	1.64
	AVERAGE	2.22

Source of basic data: NSO Annual Survey of Establishments, 1992.

Table 16  
EPR OF EXPORTS AND IMPORTABLES  
(3-DIGIT PSIC)  
1996 AND 2004

PSIC	DESCRIPTION	DRC/SER 1992	EPR		EPR		PERCENT SHARE IN		
			EXPORTS 1996	2004	IMPORTABLES 1996	2004	OUTPUT 1988	CVA 1988	LABOR 1988
EFFICIENT INDUSTRIES									
311	Food	1.20	-7.30	-7.24	18.19	4.34	12.84	9.40	7.61
313	Beverages	1.14	-8.38	-1.81	31.67	5.00	6.86	11.66	3.53
322	Apparel	0.99	-1.57	-0.62	13.97	5.00	4.14	5.80	16.59
324	Footwear	1.02	-3.23	-1.45	10.91	5.00	0.18	0.19	1.12
342	Printing, publishing	1.04	-10.40	-6.81	8.92	-1.32	1.13	1.26	2.37
351	Industrial chemicals	1.14	-3.45	-2.73	0.18	1.55	3.93	4.06	1.27
352	Other chemicals	0.95	-3.52	-1.74	20.41	5.00	8.32	9.22	3.47
354	Coal products	0.57	-2.55	-1.86	2.43	5.00	0.14	0.10	0.06
355	Rubber products	0.94	-2.88	-1.35	28.70	5.00	2.29	2.34	3.06
371	Iron & steel	1.19	-3.85	-2.38	7.61	5.00	5.38	3.82	1.81
372	Nonferrous metal basic products	1.09	-0.26	-8.18	3.33	5.00	3.25	2.26	0.31
383	Electrical machinery	1.16	-1.34	-0.97	27.71	5.00	6.98	5.65	6.35
HIGH-COST INDUSTRIES									
381	Fabricated metal products	1.79	-4.28	-3.05	60.57	5.00	1.62	1.43	2.54
384	Transport equipment	1.55	-2.58	-1.58	54.16	5.00	2.42	1.88	1.64
312	Other food	1.26	-16.98	-11.29	52.32	-7.69	9.85	9.64	11.19
386	Furniture & fixtures, metal	3.91	-6.92	-2.88	44.13	5.00	0.03	0.04	0.13
314	Tobacco	1.32	-5.49	-1.50	33.15	5.00	4.41	6.36	1.68
323	Leather products	1.44	-2.95	-1.06	28.63	5.00	0.14	0.16	0.60
353	Petroleum refining	1.22	-0.79	-0.79	26.25	5.00	12.11	6.03	0.28
331	Wood products	1.41	-5.73	-4.44	26.18	5.00	2.98	2.81	6.59
362	Glass products	1.78	-4.79	-1.69	26.09	5.00	0.82	1.33	0.67
356	Plastic products	1.62	-2.21	-1.17	24.17	5.00	1.82	1.68	2.06
369	Other nonmetal mineral products	1.55	-1.72	-0.94	24.32	5.00	0.54	0.72	1.31
341	Paper products	1.34	-5.30	-2.33	23.26	5.00	2.79	2.69	1.80
361	Pottery & china	1.59	-2.47	-1.32	23.18	5.00	0.21	0.35	0.59
385	Professional equipment	1.48	-1.06	-0.61	21.45	5.00	0.10	0.17	0.42
332	Furn. & fixt., exc. metal	1.24	-6.52	-3.23	18.39	5.00	1.05	1.24	4.82
321	Textiles	1.64	-2.69	-2.25	13.53	5.00	0.53	4.53	10.44
390	Other manufacturing	1.34	-2.94	-1.68	12.13	5.00	0.72	0.96	2.85
382	Machinery except electrical	1.23	-1.90	-1.76	4.73	5.00	0.90	0.77	2.17
363	Cement	1.68	-3.37	-2.24	0.64	5.00	1.52	1.44	0.69
AGGREGATE		1.21	-2.94	-2.42	22.44	3.94	100.00	100.00	100.00

Sources of basic data: NSO Census of Establishments, 1988; NSO Annual Survey of Establishments, 1992.

under the Development Incentives Assessment (DIA) project, the firms indicated that in response to trade liberalization, they will find ways of cutting down costs and improving product quality. Such measures will definitely improve efficiency. Moreover, the contraction or closure of uncompetitive firms would release resources that can be used by low-cost or more competitive firms, thus resulting in better resource allocation.

Industries most likely to compete under a 5 percent uniform tariff are those with comparative advantage. Comparative advantage refers to efficiency in saving or earning foreign exchange and is usually indicated by a DRC/SER ratio less than or equal to 1.0. However, in this study, following Tecson (1996), industries with a DRC/SER ratio less than or equal to 1.2 were also considered as having comparative advantage. As noted previously, this is to take into account data or measurement errors. With trade distortions that result in peso overvaluation, not all efficient industries would have competitive advantage - the capability to actually compete on their own in the world market. Competitive advantage is denoted by a DRC/OER less than or equal to 1.0. Assuming that trade distortions are compensated by incentives, industries which have comparative advantage also have competitive advantage.

At the 3-digit PSIC level, 12 out of 31 industries are considered as competitive based on their DRC/SER ratios. These are listed in Table 16. The top five industries are coal products, rubber products, other chemicals, apparel, and footwear.

In case of high-cost industries, the higher the EPRs prior to the implementation of the uniform tariff, the greater would be the adjustment pressure. The five most vulnerable industries, those with the greatest EPR reduction, include fabricated metal products, transport equipment, other food, metal furniture and fixtures, and tobacco. Among these, other food has the highest value added and employment shares, followed by tobacco in terms of value added share and fabricated metal products in terms of employment share.

At the 5-digit PSIC level, industries with comparative advantage ( $DRC/SER \leq 2$ ) may be further categorized based on their DRC/SER and DRC/OER ratios, as follows:

	DRC/SER	DRC/OER	No. of Industries	% Share in Total Mfg. Value Added
Highly Efficient/Highly Competitive	0.0-0.83	0.0-1.00	19	10
Highly Efficient/Marginally Competitive	0.84-1.00	1.01-1.20	33	18
Marginally Efficient/ Marginally Competitive	1.01-1.20	1.21-1.44	42	26
<b>Total</b>			<b>94</b>	<b>54</b>

Although 94 industries with 54 percent share in 1992 total manufacturing value added have comparative advantage, only 19 industries with 10 percent value added share have competitive advantage (with  $DRC/OER \leq 1.0$ ). Again, if we assume that trade distortions are compensated by incentives, all the industries which have comparative advantage can be considered as competitive. These are listed in Table 17.

About 52 industries with 28 percent value added share are highly efficient ( $DRC/SER < 1$ ). Those with DRC/SER ratios greater than 1.0 but less than or equal to 1.2 (admitted as efficient to provide allowance for data or measurement errors) may be classified as marginally

**Table 17**  
**5-DIGIT INDUSTRIES**  
**WITH COMPARATIVE ADVANTAGE**  
**1992**

**A. HIGHLY EFFICIENT/HIGHLY COMPETITIVE INDUSTRIES**  
**(0.0 < DRC/SER <= 0.83 & 0.0 < DRC/OER <= 1.0)**

PSIC	Description
32139	Made-up textile goods, n.e.c.
32492	Manufacture of footwear parts
34140	Articles of paperboard
34210	Printing of newspapers & periodicals
35115	Organic acids & acid compounds
35220	Drugs & medicines
35291	Waxes & polishing preparations
35293	Matches
35400	Miscellaneous products of petroleum & coal
35511	Tires & tubes
38299	Machines & equipment, n.e.c.
38312	Electric generating sets
38323	Electrical communications eqpt.
38340	Primary cells & batteries
38350	Electrical accumulators
38391	Electrical lamps & fluorescent tubes
38492	Hand-drawn vehicles
38521	Photographic equipment & accessories
39021	Pianos

**B. HIGHLY EFFICIENT/MARGINALLY COMPETITIVE INDUSTRIES**  
**(0.83 < DRC/SER <= 1.0 & 1.0 < DRC/OER <= 1.2)**

PSIC	Description
31139	Other dairy prods. except. milk, n.e.c.
31149	Canning & preserving fruits & vegetables, n.e.c.
31160	Crude coconut oil incl. cake & meal
31223	Rice noodles
31282	Fish meal feed
31330	Malt liquors & malt
31430	Manufacture of chewing & smoking tobacco
32117	Hand weaving
32153	Articles made of native materials
32222	Women's and girls' garments
32292	Hats, gloves, handkerchiefs, belts
33161	Wooden containers
33193	Wooden footwear & accessories
33195	Wooden coffins
34220	Printing & publishing of books
35111	Inorganic acids, alkalies
35120	Fertilizers
35512	Retreading plants
35602	Plastic footwear
37121	Rolling mills
37123	Galvanized steel tinplates
37230	Non-ferrous rolled products
38236	Manufacture of metal-treating machinery
38252	Electronic data-processing equipment
38292	Mech. power transmission equipment
38294	Small arms & accessories
38298	Domestic and agricultural refrigerators
38322	Gramophone records
38324	Radio & TV transmitting, signalling etc. eqpt.
38339	Electrical appliances & housewares
38514	Fluid & liquid-measuring & control equipment
39011	Jewelry
39091	Manufacture of umbrellas & canes

Table 17 (continued)

**C. MARGINALLY EFFICIENT/MARGINALLY COMPETITIVE INDUSTRIES  
(1.0 <DRC/SER <= 1.2 & 1.2 <DRC/OER <= 1.44)**

PSIC	Description
31143	Fruits and vegetable sauces
31159	Packing, preserving, canning of fish, n.e.c.
31244	Popcorn and poprice
31281	Prepared feeds for animals
31293	Flavoring extracts and food coloring
32119	Spinning, weaving, texturizing, n.e.c.
32122	Hosiery, knitted under/outerwear
32141	Carpets & rugs
32160	Artificial leather, etc.
32410	Leather shoes
32491	Slippers & sandals
33162	Cane containers & small cane wares
33220	Rattan furniture
34113	Paper mills
34190	Manufacture of pulp, paper and paperboard articles
35140	Pesticides, insecticides
35231	Soaps & synthetic detergents
35296	Adhesives and glues
35520	Rubber footwear
38151	Wire nails
38313	Transformers
38325	Parts & supplies for radio, T.V.
38329	Radiographic, fluoroscopic and other x-ray eqpt etc.
38419	Shipbuilding and repair, n.e.c.
39032	Sporting balls, excl. rubber & plastic
31121	Processing of fluid milk & cream
31122	Powdered, condensed, evap. milk
31151	Canning of fish & other marine prods.
31172	Refined coconut & veg. oil
32221	Men's and boys' garments
32229	Ready-made clothing
32230	Embroidery
33170	Wood carvings
35131	Synthetic resins
37220	Non-ferrous smelting and refining
38123	Sheet metal component for boilers
38141	Metal stamping, pressing & spinning mills
38191	Metal sanitary ware & plumbing
38314	Switch gears & protective equipment
38361	Insulated wires & cables
39012	Silverware and plated ware
39070	Stationers', artists' supplies

efficient. In case of further overvaluation of the peso, some of the marginally efficient industries would become uncompetitive, as shown in the next section.

In terms of vulnerability, Table 18 presents 25 high-cost industries which have the greatest EPR reduction: from 36 to 134 percentage points. Among these are manufacture of motorcycles and motor vehicles, milled sugarcane, tin containers, flat glass, paints, and meat processing. A complete list of high-cost industries with their corresponding EPR reductions are shown in Appendix 3.

Considering that there are vulnerable industries and also remaining distortions that raise the cost of local firms relative to their foreign competitors, the government has to implement measures to facilitate the adjustment process and help improve the competitiveness of firms. These are presented in the next section.

## **VI. ADJUSTMENT AND COMPETITIVENESS-ENHANCEMENT MEASURES**

### *A. Avoidance of Currency Appreciation or Overvaluation<sup>4</sup>*

A real appreciation of the domestic currency intensifies the price-reducing effects of tariffs because it makes imports artificially cheap. It discourages exports by making them more expensive in foreign currency and by decreasing export receipts in domestic currency. Its impact on the trade balance is therefore negative. In contrast, a real depreciation of the domestic currency has positive impact on the trade balance. It benefits exporters and makes them more competitive in the international market. Moreover, it makes imports more expensive. This mitigates the price-reducing effects of tariffs and helps local producers to compete. Thus, currency depreciation is usually recommended as a complementary measure to trade liberalization.

#### Lessons from Other Countries

Empirical studies, such as that by Michaely (1987), Corbo and De Melo (1987), and Edwards (1992), indicate that currency overvaluation poses the greatest danger to reform and sustained recovery effort. The experience of other countries shows that persistent penalty to exports and subsidy to imports lead to BOP crisis and disrupt recovery and adjustment to reforms (Fabella, 1994). Examples of these are Chile and Mexico.

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<sup>4</sup> Real exchange rate (RER) overvaluation refers to the downward deviation of the real exchange rate from its "equilibrium" value, the latter being associated with a completely open trade regime (i.e., the implicit tariff and export tax rates are zero) and a balanced current account. Nominal exchange rate adjustment is typically needed to bring about a real exchange rate depreciation that can reduce a high degree of RER overvaluation (Medalla and others, 1995).

**Table 18**  
**25 MOST VULNERABLE INDUSTRIES**  
**AT 5-DIGIT PSIC**

PSIC	Description	DRC/SER 1992	EPR (%)		Decline in EPR (Percentage Points)
			1996	2004	
38461	Mfr. and assembly of motorcycles	2.02	138.51	4.10	134.41
31231	Milled sugarcane	1.27	83.37	-15.30	98.66
33230	Box beds and mattresses	1.49	89.31	4.04	85.27
38131	Tin containers	1.53	87.87	2.92	84.95
36920	Structural concrete products	2.15	81.82	5.00	76.82
36201	Flat glass	4.07	71.81	3.52	68.29
38430	Motor vehicles	1.54	70.49	4.52	65.96
38321	Radio & TV receiving sets	2.47	59.69	-1.40	61.09
38129	Structural metal products, n.e.c.	4.91	52.82	3.24	49.58
35599	Other rubber products, n.e.c.	1.56	50.36	3.29	47.07
35211	Paints	1.47	51.86	4.84	47.02
33130	Hardboard & particleboard	1.95	45.76	-1.04	46.79
38111	Cutlery	2.88	50.34	4.65	45.69
31222	Biscuits	1.36	48.11	4.50	43.61
31114	Meat processing, preserving and canning	1.83	46.23	5.00	41.24
34291	Electrotyping, stereotyping, photoengraving	3.21	44.91	3.92	40.99
31241	Chocolate bars, cocoa products	1.76	42.78	2.18	40.60
38112	Hand tools	13.31	44.90	4.72	40.18
38139	Mfr. of metal containers, n.e.c.	1.23	43.59	3.98	39.61
38159	Fabricated wire products, n.e.c.	2.10	43.74	4.60	39.14
31221	Breads, cakes, pastries	1.61	43.38	4.62	38.76
31299	Food products, n.e.c.	1.58	43.39	4.64	38.75
38199	Other fabricated metal products, n.e.c.	1.57	39.92	2.73	37.19
34292	Bookbinding & related work	3.80	40.39	4.04	36.34
34120	Containers & boxes of paper & paperboard	2.00	41.12	4.93	36.20



## Chile<sup>5</sup>

Chile implemented trade liberalization from 1974 to 1979. It eliminated all quantitative removed all quotas and official approvals required to initiate an import operation in early 1974. Tariffs which ranged from zero to 750 percent in 1973 were reduced gradually to a uniform rate of 10 percent (except for automobiles) by June 1979. (During the mid-1980s, temporary tariff hikes were implemented in view of the economic crisis. However, these were again decreased to 15 percent by 1988 and to a uniform 11 percent in the early 1990s.)

Chile's exchange rate became increasingly overvalued since the late 1970s as it adopted a fixed exchange rate policy. This policy, in combination with the deregulation of domestic financial institutions, and removal of controls on international capital transactions, unleashed a flood of foreign borrowing/short-term capital inflows. The trade deficit rose steadily, financed by capital inflows.

The progressive peso overvaluation caused a sharp reduction in the relative price of tradables, thus eroding the competitiveness of exports and import substitutes. This reversed the signal, given at the beginning of the reforms, to the export-oriented firms. In a case study of firms, much misplaced investment was reported. There were firms that invested in new equipment for export production but had to abandon their investment in mid-course or even shut down. The real exchange rate appreciation made them uncompetitive. For the import-competing firms it was equivalent to a more intensive, trade liberalization that proved very difficult to surmount. Several large firms went bankrupt in the midst of growing doubts about the sustainability of the trade deficit, foreign borrowing, and the exchange rate. Capital inflow eventually dried up due to higher foreign interest rates and global recession. Chile's unemployment jumped from 11.2 percent in 1980 to 23.7 percent in 1982.

In emerging from the crisis, Chile adopted a different policy whose key feature was a large depreciation of the real exchange rate that initiated an export led expansion, financed by a tight fiscal policy to raise domestic saving. Its nominal exchange rate system was characterized by a crawling band starting in 1985. With a depreciated real exchange rate, Chile's trade balance was reversed from a deficit equal to 13 percent of GDP in 1981 to a surplus that peaked at 6.6 percent of GDP in 1986 and averaged 4 percent a year in the 1987-92 period. Unemployment had declined to below 5 percent of the labor force by 1992.

## Mexico

Mexico's trade liberalization started slowly in 1982 and accelerated in 1985. Before liberalization, Mexico has 16 tariff rates with maximum import duty of 100 percent. Simple and import-weighted average tariffs were 27 percent and 16.4 percent, respectively. All imports were subject to import licensing. As of 1992, Mexico has four tariff levels: zero, 5, 10, 15, and 20 percent. The tariff structure is relatively uniform, with a modal rate (most common tariff rate) of 10 percent. Simple and import-weighted average tariffs are 13.1 percent and 11.1 percent, respectively. Only 192 of the 11,828 tariff items or 1.6 percent are subject to import licensing (GATT, 1993).

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<sup>5</sup>This portion is based on the studies edited by Corbo and De Melo (1985) and Bosworth, Dornbusch, and Laban (1994).

Trade liberalization in Mexico did not result in massive bankruptcies and layoffs. The relatively smooth adjustment was attributed to the undervalued exchange rate and depressed real wages enjoyed by the firms for a two-year period following the trade liberalization in mid-1985 (Lustig, 1992).

At the end of the 1980s, however, the Mexican peso had appreciated in real terms against the dollar. The country's merchandise trade account has shifted to a deficit position since the early 1990s as export growth has not kept pace with that of imports. Similar to Chile, Mexico's peso overvaluation and overdependence on short-term flows of foreign money led to its economic crisis in December 1994. (The Economist, 21-27 January, 1995).

From these country experiences, the lesson for the Philippines is that it should avoid peso overvaluation or appreciation which causes trade deficits by penalizing exports and subsidizing imports. Inability to finance trade deficits from domestic sources could result in reliance on volatile capital inflows. This could cause further appreciation or overvaluation of domestic currency, uncompetitiveness of exports and import substitutes, and widening of the trade gap. When such condition becomes unsustainable, a crisis could develop similar to what happened to Chile and Mexico.

## 2. The Case of the Philippines

### a) Impact of Peso Overvaluation on Protection

The peso overvaluation is estimated at about 20 percent in 1992 (Medalla, 1995). This reduces protection to locally sold goods because it cheapens imports - less domestic currency is required to pay for them. It also penalizes exports as less domestic currency is received for foreign exchange earnings. To net out from the EPR the effect of the peso overvaluation defended by the protection system, net effective protection rate (NEPR) is computed as follows:

$$\text{Net EPR} = \frac{1 + \text{EPR rate}}{1 + \text{overvaluation rate}} - 1 * 100$$

At 3-digit PSIC, two industries are penalized in 1992 as indicated by their negative EPRs. When the 20 percent peso overvaluation is considered, the number of penalized industries increase to 16 industries as denoted by their negative NEPRs (Table 19).

For the year 2004, four industries have negative EPRs under a uniform 5 percent tariff. Assuming a 3 percent peso overvaluation, 17 industries would have negative NEPRs. With a 5 percent peso overvaluation, all the 31 industries would have negative NEPRs. Since a negative NEPR implies subsidy to imports and penalty to domestic industries, a peso overvaluation would make it more difficult for the latter to compete under a uniform 5 percent tariff.

**Table 19**  
**EPR AND NET EPR RATES (%)**  
**1992 AND 2004**

PSIC	INDUSTRY	1992		2004		
		EPR	Net EPR (20% Peso Overvaluation)	EPR	Net EPR (3% Peso Overvaluation) (5% Peso Overvaluation)	
311	Food	14.20	-4.83	0.67	-2.26	-4.12
312	Other food	62.81	35.67	-0.24	-3.14	-4.99
313	Beverages	48.84	24.03	4.83	1.77	-0.16
314	Tobacco	54.33	28.61	4.80	1.75	-0.19
321	Textiles	15.48	-3.77	1.28	-1.67	-3.54
322	Apparel	3.40	-13.83	0.70	-2.23	-4.09
323	Leather products	32.40	10.33	3.36	0.35	-1.57
324	Footwear	-3.64	-19.70	-0.93	-3.81	-5.65
331	Wood products	8.29	-9.76	0.71	-2.22	-4.08
332	Furn. & fixt., exc. metal	7.47	-10.44	0.45	-2.47	-4.33
341	Paper products	27.97	6.64	4.18	1.15	-0.78
342	Printing, publishing	10.41	-7.99	-1.61	-4.48	-6.30
351	Industrial chemicals	9.95	-8.38	0.56	-2.37	-4.23
352	Other chemicals	25.11	4.26	4.51	1.47	-0.46
353	Petroleum refining	17.76	-1.87	4.29	1.25	-0.68
354	Coal products	1.35	-15.54	1.16	-1.78	-3.65
355	Rubber products	21.73	1.44	2.91	-0.08	-1.99
356	Plastic products	30.46	8.72	3.33	0.32	-1.59
361	Pottery & china	20.38	0.32	2.34	-0.64	-2.53
362	Glass products	35.66	13.05	4.75	1.70	-0.24
363	Cement	-7.02	-22.52	5.00	1.94	-0.00
369	Other nonmetal mineral products	27.26	6.05	4.15	1.11	-0.81
371	Iron & steel	7.97	-10.03	3.24	0.23	-1.68
372	Nonferrous metal basic products	3.28	-13.93	-2.71	-5.55	-7.34
381	Fabricated metal products	50.75	25.62	4.01	0.98	-0.95
382	Machinery except electrical	5.17	-12.36	1.59	-1.37	-3.25
383	Electrical machinery	9.18	-9.02	0.32	-2.60	-4.46
384	Transport equipment	37.85	14.87	1.24	-1.71	-3.58
385	Professional equipment	23.78	3.15	4.02	0.99	-0.93
386	Furniture & fixtures, metal	52.74	27.28	3.50	0.49	-1.43
390	Other manufacturing	8.10	-9.92	1.64	-1.32	-3.20
	<b>AVERAGE</b>	<b>20.66</b>	<b>0.55</b>	<b>2.22</b>	<b>-0.76</b>	<b>-2.65</b>

Source of basic data: NSO Annual Survey of Establishments, 1992.

## b) Impact of Peso Appreciation on Competitiveness

In a study on the impact of peso appreciation on Philippine industries, Medalla (1995) estimated that more than 4 percent of the 24 percent (in terms of value added) with comparative advantage (based on  $DRC/SER < 1.0$ ) in 1988 would become uncompetitive assuming a 10 percent appreciation. Since it reduces the domestic price and profitability of tradables relative to nontradables, a prolonged real appreciation could have the following effects: (1) shift of resources from tradable to nontradable goods production; (2) concentration on few products for foreign exchange earnings and savings (those with considerable comparative advantage); and (3) promotion of industries with low value added, high import content and capital intensity. These have negative impact on output, employment, and the trade balance.

As discussed previously, even industries with comparative advantage would be uncompetitive as a result of peso overvaluation, unless they are compensated by incentives. With additional peso overvaluation or appreciation (due to non-trade distortions such as remittances, portfolio capital inflows, overborrowing), some industries would lose their competitiveness. Assuming a 10 percent appreciation, 17 industries with 8 percent value added share in 1992 will become uncompetitive (Table 20).

On the other hand, a real peso depreciation has also costs. It increases the debt burden and could be inflationary. Hence, some sectors, including the monetary authorities, are against devaluation, which could bring about a real peso depreciation. The labor sector has pointed out that the historical responses of the export sector to previous devaluations had been weak and inconclusive. They do not confirm the potency of devaluations to deliver the necessary 'kick' toward export take-off (TUCP, 1993). However, Fabella (1993) noted that most devaluations occurred when the economy was already in a BOP crisis with the foreign exchange reserves almost gone and after a long bout with inflation. They were carried out in the absence of structural reforms. Unfortunately, they were associated with the deflationary effects of stabilization policies. A last resort type of devaluation is not an indicator of a vigorous push toward export competitiveness. The credible signals of outward orientation are large devaluations made in the absence of a BOP crisis with high foreign exchange reserves and low inflation.

Since real peso depreciation and appreciation have both positive and negative impacts on different sectors, it would be useful to do a study quantifying their benefits and costs to determine which is most beneficial to the economy.

### *B. Other Measures*

In the restructuring process, there could be frictional unemployment as labor from contracting sectors may not be readily absorbed by expanding sectors. Better information system on job availability, training assistance, and availability of information, credit and technical assistance for livelihood or self-employment, could facilitate the adjustment process.

Measures to improve the firms' ability to compete have already been identified in various dialogues with the private sector as well as in many studies. The remaining task is implementation. These measures include the following:

**Table 20**  
**INDUSTRIES WHICH BECOME UNCOMPETITIVE**  
**AT 10 PERCENT PESO APPRECIATION**

<b>PSIC</b>	<b>Description</b>
31121	Processing of fluid milk & cream
31122	Powdered, condensed, evap. milk
31151	Canning of fish & other marine prods.
31172	Refined coconut & veg. oil
32221	Men's and boys' garments
32229	Ready-made clothing
32230	Embroidery
33170	Wood carvings
35131	Synthetic resins
37220	Non-ferrous smelting and refining
38123	Sheet metal component for boilers
38141	Metal stamping, pressing & spinning mills
38191	Metal sanitary ware & plumbing
38314	Switch gears & protective equipment
38361	Insulated wires & cables
39012	Silverware and plated ware
39070	Stationers', artists' supplies
<b>Share of Sectors in 1992 Total Mfg. Value Added</b>	
<b>8%</b>	

- 1) provision of adequate and efficient infrastructural support (such as power, transport, communications)
- 2) enhancement of productivity
  - promotion of research and development
  - productivity-linked wage adjustments
  - acceleration of labor skills and entrepreneurial development
  - promotion and dissemination of productivity improvement programs (e.g. quality circles)
  - strengthening of labor dispute settlement
- 3) improvement of institutional arrangements or procedures
  - access to information on markets and technology
  - automaticity of the duty drawback system and granting of equivalent tax credit for local inputs
  - access to credit
  - simplification of import, export, and other bureaucratic procedures

## **VII. SUMMARY AND CONCLUSION**

The paper aims to review the effects of trade liberalization on the manufacturing sector and assess the competitiveness of industries under a uniform 5 percent tariff.

The empirical findings for 1988 and 1992 showed that trade liberalization was associated with the reduction in inefficiency of the manufacturing sector and better resource allocation. The capital goods and intermediate goods sectors, in particular, posted significant decreases in inefficiency in 1992. However, the small and medium establishments became more inefficient. This can be attributed to capacity underutilization due to the power crisis in 1992 which affected the SMEs more severely relative to large establishments.

On competitiveness under the 5 percent uniform tariff, at the 3-digit PSIC level, 12 out of 31 industries are most likely to be able to compete. The five most competitive industries are coal products, rubber products, other chemicals, apparel, and footwear. On the other hand, the five most vulnerable industries, include fabricated metal products, transport equipment, other food, metal furniture and fixtures, and tobacco.

As the country moves toward a 5 percent uniform tariff, greater import competition, improvement of efficiency, and better resource allocation can be expected. Firms have indicated in a survey that in response to trade liberalization, they will adopt cost-cutting and quality-improvement measures. If firms cannot be price- and quality-competitive, they would have to contract or even close down. This would release resources that can be used by low-cost or more competitive firms, thus resulting in better resource allocation.

In the industrial restructuring process, output and employment could decline in some sectors and expand in others. To facilitate the adjustment process, training assistance and better information system on job availability should be provided.

A real peso depreciation is usually recommended as a complementary measure to trade liberalization. By making imports more expensive in domestic currency, it mitigates the price-reducing effects of tariffs. Moreover, it encourages exports by making them cheaper in foreign currency and by increasing export receipts in domestic currency. Hence, a real peso depreciation helps avert a balance of payments crisis. Nevertheless, it has also costs. It increases the debt burden and could be inflationary. It would be useful to quantify the costs and benefits of peso depreciation or appreciation in order to have concrete information on which is really beneficial to the economy.

Other measures that can improve the firms' ability to compete include the following: provision of adequate and efficient infrastructure; human resource development; productivity-linked wage adjustments; maintenance of industrial peace; promotion of research and development; improvement of access to information, credit, and technology; and simplification of export, import, and other procedures. These have been long identified in many studies and in various dialogues with the private sector. The remaining and more difficult task is working out their full implementation.

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APPENDIX 1  
EFFICIENCY CLASSIFICATION OF INDUSTRIES AT 5-DIGIT PSIC, 1992

EFFICIENT	MILDLY INEFFICIENT	INEFFICIENT	HIGHLY INEFFICIENT
<b>FOOD</b> 31121 Processing of fluid milk & cream 31122 Powdered, condensed, evap. milk 31139 Other dairy prods. except. milk, n.e.c. 31143 Fruits and vegetable sauces 31149 Canning & preserving fruits & vegetables, n.e.c. 31151 Canning of fish & other marine prods. 31159 Packing, preserving, canning of fish, n.e.c. 31160 Crude coconut oil incl. cake & meal 31172 Refined coconut & veg. oil	31131 Butter and cheese 31133 Milk based infants' formula 31141 Canning & preserving of fruits & juices 31155 Dried agar-agar 31179 Vegetable & animal oils & fats, nec.	31114 Meat processing, preserving and canning 31180 Milled rice & corn 31190 Flour milling except cassava	31111 Slaughtering 31142 Canned & preserved vegetables & juices 31152 Fish & other marine products 31154 Fish paste 31171 Crude veg. oil, cake & meal except coconut oil
<b>OTHER FOOD</b> 31223 Rice noodles 31244 Popcorn and poprice 31281 Prepared feeds for animals 31282 Fish meal feed 31293 Flavoring extracts and food coloring	31222 Biscuits 31231 Milled sugarcane 31242 Candies and chewing gum	31221 Breads, cakes, pastries 31225 Snack products 31241 Chocolate bars, cocoa products 31243 Peanut and other nut products 31249 Chocolate & sugar confectionary prods. 31270 Coffee roasting & processing 31291 Starch and its products 31299 Food products, n.e.c.	31219 Milled grain products, n.e.c.
<b>BEVERAGES</b> 31330 Malt liquors & malt	31311 Distilled & refined alcoholic liquors 31329 Wine manufacturing, n.e.s. 31340 Soft drinks & carbonated water		31312 Distilled ethyl alcohol, except from sulphite res. of pulp mfg.
<b>TOBACCO</b> 31430 Manufacture of chewing & smoking tobacco	31410 Cigarettes 31420 Cigars 31440 Cured tobacco leaves		
<b>TEXTILE</b> 32117 Hand weaving 32119 Spinning, weaving, texturizing, n.e.c. 32122 Hosiery, knitted under/outerwear 32139 Made-up textile goods, n.e.c. 32141 Carpets & rugs 32153 Articles made of native materials 32160 Artificial leather, etc.	32118 Laces, narrow fabrics, etc. 32121 Knitted fabrics 32131 Industrial bags 32152 Nets, excl. mosquito nets	32111 Integrated textiles 32113 Spinning 32114 Texturizing mills 32115 Weaving 32132 Mfr. of made-up textile goods 32151 Cordage, rope and twine	32112 Fiber & filament 32116 Finishing 32159 Cordage, rope, twine, nec. 32170 Fiber batting, padding, etc. 32199 Misc. textiles, nec
<b>APPAREL</b> 32221 Men's and boys' garments 32222 Women's and girls' garments 32229 Ready-made clothing 32230 Embroidery 32292 Hats, gloves, handkerchiefs, belts	32211 Custom tailoring	32212 Custom dressmaking 32291 Raincoats, except of rubber	
<b>LEATHER PRODUCTS</b>	32310 Tanning and leather finishing 32321 Luggages, handbags, wallets	32329 Products of leather & leather substitutes	
<b>FOOTWEAR</b> 32410 Leather shoes 32491 Slippers & sandals 32492 Manufacture of footwear parts			32499 Manufacture of other footwear except rubber, plastic
<b>WOOD PRODUCTS</b> 33161 Wooden containers 33162 Cane containers & small cane wares 33170 Wood carvings 33193 Wooden footwear & accessories 33195 Wooden coffins	33111 Rough lumber 33140 Wood drying & preserving plants 33150 Millwork plants 33192 Charcoal outside forest	33120 Veneer & plywood 33130 Hardboard & particleboard 33191 Miscellaneous wooden products	
<b>FURNITURE &amp; FIXTURES, EXC. METAL</b> 33220 Rattan furniture	33230 Box beds and mattresses 33250 Window and door screens	33210 Mfr. & repair of wood furniture 33210 Mfr. & repair of wood furniture	33240 Partitions, shelves, lockers
<b>PAPER PRODUCTS</b> 34113 Paper mills 34140 Articles of paperboard 34190 Manufacture of pulp, paper and paperboard articles	34130 Articles of paper	34111 Integrated pulp, paper, paperboard 34112 Pulp mills 34120 Containers & boxes of paper & paperboard	
<b>PRINTING &amp; PUBLISHING</b> 34210 Printing of newspapers & periodicals 34220 Printing & publishing of books			34230 Commercial & job printing 34291 Electrotyping, stereotyping, photoengraving 34292 Bookbinding & related work

**APPENDIX 1**  
**EFFICIENCY CLASSIFICATION OF INDUSTRIES AT 5-DIGIT PSIC, 1992**

EFFICIENT	MILDLY INEFFICIENT	INEFFICIENT	HIGHLY INEFFICIENT
<b>INDUSTRIAL CHEMICALS</b> 35111 Inorganic acids, alkalis 35115 Organic acids & acid compounds 35120 Fertilizers 35131 Synthetic resins 35140 Pesticides, insecticides	35112 Inorganic salts & compounds 35114 Industrial alcohols 35119 Manufacture of basic industrial chemicals	35113 Industrial gases 35133 Industrial gases	35132 Man-made fibers exc. glass
<b>OTHER CHEMICALS</b> 35220 Drugs & medicines 35231 Soaps & synthetic detergents 35291 Waxes & polishing preparations 35293 Matches 35296 Adhesives and glues	35211 Paints 35233 Perfumes & cosmetics 35295 Inks	35299 Other chemical products, nec.	35292 Candles 35294 Explosives, fireworks
<b>PETROLEUM REFINERIES &amp; COAL PRODUCTS</b> 35400 Miscellaneous products of petroleum & coal	35300 Petroleum refineries		
<b>RUBBER PRODUCTS</b> 35511 Tires & tubes 35512 Retreading plants 35520 Rubber footwear	35591 Rubber garments	35592 Ind'l & molded rubber products 35599 Other rubber products, n.e.c.	
<b>PLASTIC PRODUCTS</b> 35602 Plastic footwear		35603 Plastic industrial supplies 35609 Other fabricated plastic prods., n.e.c.	
<b>POTTERY &amp; CHINA</b>	36101 Vitreous china tableware 36103 Vitreous china plumbing, fittings & fixtures	36109 Pottery, china, etc.	36102 Coarse clay products
<b>GLASS PRODUCTS</b>	36209 Glass and glass products, n.e.c.	36202 Glass containers	36201 Flat glass
<b>CEMENT &amp; NON-METAL MINERAL PRODS.</b>	36910 Structural clay products 36999 Non-metallic mineral products, n.e.c.	36300 Cement 36993 Statuary, art goods, etc.	36920 Structural concrete products 36991 Lime 36995 Asbestos products
<b>IRON &amp; STEEL</b> 37121 Rolling mills 37123 Galvanized steel tinplates	37122 Iron & steel pipes & tubes 37132 Cast steel		37110 Blast furnaces, steelmaking furnaces 37129 Steel works & rolling mills 37131 Cast iron manufacturing 37190 Iron & steel basic industries, n.e.c.
<b>NON-FERROUS METAL BASIC PRODUCTS</b> 37220 Non-ferrous smelting and refining 37230 Non-ferrous rolled products	37242 Copper & copper base alloy casting		37210 Gold & other precious metal refining 37249 Non-ferrous foundries, n.e.c.
<b>FABRICATED METAL PRODUCTS</b> 38123 Sheet metal component for boilers 38141 Metal stamping, pressing & spinning mills 38151 Wire nails 38191 Metal sanitary ware & plumbing	38113 General hardware 38139 Mfr. of metal containers, n.e.c. 38160 Manufacture of non-electric lighting & heating fixtures	38131 Tin containers 38199 Other fabricated metal products, n.e.c.	38111 Cutlery 38112 Hand tools 38114 Blacksmithing & welding shops 38121 Structural steel and materials 38122 Mfr. of other architectural & related metal works 38129 Structural metal products, n.e.c. 38142 Metal coating & engraving 38159 Fabricated wire products, n.e.c.

APPENDIX 1  
EFFICIENCY CLASSIFICATION OF INDUSTRIES AT 5-DIGIT PSIC, 1992

EFFICIENT	MILDLY INEFFICIENT	INEFFICIENT	HIGHLY INEFFICIENT
<b>MACHINERY EXCEPT ELECTRICAL</b> 38236 Manufacture of metal-treating machinery 38252 Electronic data-processing equipment 38292 Mech. power transmission equipment 38294 Small arms & accessories 38298 Domestic and agricultural refrigerators 38299 Machines & equipment, n.e.c.	38241 Food machinery 38259 Office machines, nec 38291 Pumps, compressors, & blowers	38229 Agricultural machinery & equipment, n.e.c. 38232 Metal-working machinery 38234 Dies, jigs, fixtures & molds 38256 Computing & accounting machines 38293 Sewing & embroidery machines 38297 Machine shops	38219 Engines & turbines except transport, nec 38221 Farm tractors 38222 Machine implements for crop production 38233 Machine tools & accessories 38239 Manufacture of metal and woodworking machinery
<b>ELECTRICAL MACHINERY</b> 38312 Electric generating sets 38313 Transformers 38314 Switch gears & protective equipment 38322 Gramophone records 38323 Electrical communications eqpt. 38324 Radio & TV transmitting, signalling etc. eqpt. 38325 Parts & supplies for radio, T.V. 38329 Radiographic, fluoroscopic and other x-ray eqpt etc. 38339 Electrical appliances & housewares 38340 Primary cells & batteries 38350 Electrical accumulators 38361 Insulated wires & cables 38391 Electrical lamps & fluorescent tubes	38331 Household electrical cooking equipment 38362 Current-carrying wiring devices 38392 Electrical signalling equipment	38315 Electrical industrial control devices 38316 Electrical welding 38319 Electrical indl. machinery, nec. 38332 Electric fan, vacuum cleaner, etc.	38321 Radio & TV receiving sets
<b>TRANSPORT EQUIPMENT</b> 38419 Shipbuilding and repair, n.e.c. 38492 Hand-drawn vehicles	38413 Large vessels 38450 Motor vehicle parts & components 38462 Bicycles & tricycles	38412 Manufacture of marine engines & parts 38414 Shipbuilding, including passenger vessels 38430 Motor vehicles 38463 Motorcycle engines & parts	38411 Boats & motorboats 38440 Rebuilding, alteration of motorboats 38461 Mfr. and assembly of motorcycles 38470 Aircraft
<b>PROFESSIONAL EQUIPMENT</b> 38514 Fluid & liquid-measuring & control equipment 38521 Photographic equipment & accessories	38516 Surgical, dental, orthopedic equipment 38522 Optical instruments & lenses	38530 Watches & clocks	38519 Professional & scientific measuring & controlling devices
<b>METAL FURNITURE &amp; FIXTURES</b>		38602 Public building furniture, metal	38601 Household furniture
<b>OTHER MANUFACTURING</b> 39011 Jewelry 39012 Silverware and plated ware 39021 Pianos 39032 Sporting balls, excl. rubber & plastic 39070 Stationers', artists' supplies 39091 Manufacture of umbrellas & canes	39031 Sporting gloves & mitts 39040 Surgical, dental, medical supplies 39060 Toys & dolls 39092 Buttons, except of plastic 39093 Manufacture of brooms, brushes & fans 39094 Needles, pins, fasteners 39099 Other manufactured products,	39039 Sporting & athletic goods, n.e.c.	39019 Jewelry & other related articles 39050 Ophthalmic goods, eyeglasses, spectacles 39096 Manufacture of signs & advtg. displays

**APPENDIX 2  
CHANGES IN EFFICIENCY ALLOCATION  
OF MANUFACTURING INDUSTRIES AT 5-DIGIT PSIC  
1992**

**A. IMPROVEMENT OR MAINTENANCE OF EFFICIENCY (42 INDUSTRIES)**

PSIC	INDUSTRY	DRC/SER 1988	DRC/SER 1992
31143	Fruits and vegetable sauces	0.87	1.05
31149	Canning & preserving fruits & vegetables, nec.	1.11	0.94
31151	Canning of fish & other marine prods.	0.90	1.14
31159	Packing, preserving, canning of fish, n.e.c.	0.80	1.05
31282	Fish meal feed	1.00	0.99
31293	Flavoring extracts and food coloring	1.02	1.05
32117	Hand weaving	1.00	0.87
32141	Carpets & rugs	0.82	1.08
32153	Articles made of native materials	1.13	0.86
32160	Artificial leather, etc.	1.03	1.07
32221	Men's and boys' garments	1.19	1.10
32222	Women's and girls' garments	0.82	0.94
32230	Embroidery	1.06	1.20
32410	Leather shoes	1.20	1.01
32491	Slippers & sandals	0.88	1.05
33161	Wooden containers	0.93	0.90
33162	Cane containers & small cane wares	0.94	1.06
33170	Wood carvings	1.12	1.13
33195	Wooden coffins	0.84	0.94
33220	Rattan furniture	0.86	1.08
34113	Paper mills	1.07	1.08
35111	Inorganic acids, alkalies	1.14	0.90
35115	Organic acids & acid compounds	0.78	0.76
35220	Drugs & medicines	1.01	0.80
35291	Waxes & polishing preparations	0.96	0.83
35293	Matches	0.67	0.30
35296	Adhesives and glues	0.90	1.08
35400	Miscellaneous products of petroleum & coal	0.59	0.57
35511	Tires & tubes	0.79	0.80
35520	Rubber footwear	0.86	1.04
35602	Plastic footwear	0.56	0.88
37230	Non-ferrous rolled products	1.15	0.97
38191	Metal sanitary ware & plumbing	1.11	1.13
38294	Small arms & accessories	0.57	0.98
38314	Switch gears & protective equipment	0.92	1.16
38339	Electrical appliances & housewares	0.66	0.94
38340	Primary cells & batteries	0.78	0.83
38361	Insulated wires & cables	1.18	1.15
38391	Electrical lamps & fluorescent tubes	1.12	0.78
38492	Hand-drawn vehicles	1.20	0.54
38514	Fluid & liquid-measuring & control equipment	1.18	0.97
39032	Sporting balls, excl. rubber & plastic	1.01	1.03

APPENDIX 2 (CONTINUED)

B. SHIFTS FROM INEFFICIENCY TO EFFICIENCY (36 INDUSTRIES)

PSIC	INDUSTRY	DRC/SER	DRC/SER
		1988	1992
31121	Processing of fluid milk & cream	1.48	1.11
31122	Powdered, condensed, evap. milk	2.76	1.12
31172	Refined coconut & veg. oil	1.43	1.20
31223	Rice noodles	1.66	0.95
31244	Popcorn and poprice	1.40	1.02
31281	Prepared feeds for animals	1.24	1.04
32119	Spinning, weaving, texturizing, n.e.c.	1.65	1.04
32122	Hosiery, knitted under/outerwear	2.32	1.02
32139	Made-up textile goods, n.e.c.	2.37	0.62
32229	Ready-made clothing	1.25	1.10
32292	Hats, gloves, handkerchiefs, belts	2.51	0.85
33193	Wooden footwear & accessories	1.83	0.91
34140	Articles of paperboard	1.44	0.67
34220	Printing & publishing of books	1.30	0.93
35120	Fertilizers	5.69	0.90
35131	Synthetic resins	2.62	1.15
35140	Pesticides, insecticides	1.37	1.09
35231	Soaps & synthetic detergents	1.50	1.04
37121	Rolling mills	1.71	0.96
37123	Galvanized steel tinplates	3.12	0.88
37220	Non-ferrous smelting and refining	1.77	1.14
38123	Sheet metal component for boilers	1.22	1.12
38151	Wire nails	1.95	1.09
38252	Electronic data-processing equipment	1.57	1.00
38292	Mech. power transmission equipment	1.59	0.86
38298	Domestic and agricultural refrigerators	1.41	0.97
38299	Machines & equipment, n.e.c.	1.48	0.79
38313	Transformers	1.38	1.09
38322	Gramophone records	1.85	0.86
38323	Electrical communications eqpt.	-5.40	0.70
38325	Parts & supplies for radio, T.V.	8.69	1.08
38350	Electrical accumulators	2.25	0.81
38419	Shipbuilding and repair, n.e.c.	2.25	1.09
39011	Jewelry	1.35	0.90
39021	Pianos	1.29	0.71
39070	Stationers', artists' supplies	2.34	1.14



APPENDIX 2 (CONTINUED)

C. REDUCTION IN INEFFICIENCY (53 INDUSTRIES)

PSIC	INDUSTRY	DRC/SER 1988	DRC/SER 1992
31142	Canned & preserved vegetables & juices	8.51	2.59
31180	Milled rice & corn	1.96	1.58
31219	Milled grain products, n.e.c.	3.33	2.61
31221	Breads, cakes, pastries	1.62	1.61
31222	Biscuits	1.51	1.36
31270	Coffee roasting & processing	2.11	1.57
31291	Starch and its products	2.00	1.53
31311	Distilled & refined alcoholic liquors	1.47	1.28
32111	Integrated textiles	2.16	1.69
32112	Fiber & filament	100.11	3.45
32113	Spinning	1.69	1.64
32121	Knitted fabrics	1.72	1.49
32131	Industrial bags	-5.41	1.49
32132	Mfr. of made-up textile goods	1.79	1.52
32152	Nets, excl. mosquito nets	2.77	1.36
32211	Custom tailoring	1.53	1.23
32310	Tanning and leather finishing	2.21	1.27
33111	Rough lumber	1.41	1.23
33191	Miscellaneous wooden products	1.95	1.51
34111	Integrated pulp, paper, paperboard	-10.30	1.64
34120	Containers & boxes of paper & paperboard	2.07	2.00
34130	Articles of paper	2.06	1.29
34291	Electrotyping, stereotyping, photoengraving	4.30	3.21
35113	Industrial gases	1.87	1.72
35211	Paints	1.53	1.47
35300	Petroleum refineries	1.76	1.22
35591	Rubber garments	4.07	1.32
35599	Other rubber products, n.e.c.	1.79	1.56
36101	Vitreous china tableware	1.65	1.26
36201	Flat glass	9.66	4.07
36209	Glass and glass products, n.e.c.	3.94	1.40
36300	Cement	3.09	1.68
36910	Structural clay products	1.36	1.26
36920	Structural concrete products	3.02	2.15
36993	Statuary, art goods, etc.	2.07	1.95
37110	Blast furnaces, steelmaking furnaces	2.85	2.40
37132	Cast steel	2.81	1.45
38113	General hardware	1.66	1.24
38131	Tin containers	2.21	1.53
38139	Mfr. of metal containers, n.e.c.	1.86	1.23
38159	Fabricated wire products, n.e.c.	2.86	2.10
38232	Metal-working machinery	3.30	1.93
38241	Food machinery	1.74	1.30
38291	Pumps, compressors, & blowers	4.61	1.34
38316	Electrical welding	6.59	1.97
38319	Electrical indl. machinery, nec.	2.24	1.51
38362	Current-carrying wiring devices	1.34	1.30
38414	Shipbuilding, including passenger vessels	11.03	1.91
38463	Motorcycle engines & parts	3.66	1.58
38516	Surgical, dental, orthopedic equipment	7.66	1.32
39039	Sporting & athletic goods, n.e.c.	5.76	1.97
39040	Surgical, dental, medical supplies	1.41	1.38
39094	Needles, pins, fasteners	1.43	1.36

APPENDIX 2 (CONTINUED)

D. SHIFTS FROM EFFICIENCY TO INEFFICIENCY (49 INDUSTRIES)

PSIC	INDUSTRY	DRC/SER 1988	DRC/SER 1992
31131	Butter and cheese	0.95	1.48
31133	Milk based infants' formula	1.01	1.34
31141	Canning & preserving of fruits & juices	0.74	1.30
31152	Fish & other marine products	1.00	2.30
31155	Dried agar-agar	0.82	1.21
31190	Flour milling except cassava	1.07	1.63
31225	Snack products	1.03	1.73
31231	Milled sugarcane	0.77	1.27
31241	Chocolate bars, cocoa products	1.08	1.76
31242	Candies and chewing gum	1.06	1.31
31243	Peanut and other nut products	0.95	1.88
31329	Wine manufacturing, n.e.s.	1.15	1.29
31340	Soft drinks & carbonated water	1.16	1.28
31420	Cigars	0.92	1.34
31440	Cured tobacco leaves	1.04	1.21
32159	Cordage, rope, twine, nec.	1.15	4.45
32170	Fiber batting, padding, etc.	0.79	5.66
33130	Hardboard & particleboard	0.68	1.95
33140	Wood drying & preserving plants	0.93	1.29
33192	Charcoal outside forest	0.95	1.22
33230	Box beds and mattresses	1.10	1.49
35112	Inorganic salts & compounds	1.10	1.30
35292	Candles	1.05	2.83
35294	Explosives, fireworks	1.14	5.06
35295	Inks	0.92	1.28
35299	Other chemical products, nec.	1.16	1.66
35603	Plastic industrial supplies	0.65	1.65
36103	Vitreous china plumbing, fittings & fixtures	1.19	1.36
36109	Pottery, china, etc.	1.15	1.80
36202	Glass containers	1.08	1.81
36995	Asbestos products	1.18	4.01
37190	Iron & steel basic industries, n.e.c.	0.55	4.61
37242	Copper & copper base alloy casting	0.98	1.41
37249	Non-ferrous foundries, n.e.c.	0.91	3.01
38234	Dies, jigs, fixtures & molds	1.07	1.85
38256	Computing & accounting machines	0.53	1.96
38293	Sewing & embroidery machines	1.16	1.69
38315	Electrical industrial control devices	1.17	1.54
38331	Household electrical cooking equipment	1.05	1.28
38392	Electrical signalling equipment	1.15	1.26
38450	Motor vehicle parts & components	0.92	1.43
38461	Mfr. and assembly of motorcycles	0.90	2.02
38462	Bicycles & tricycles	1.07	1.47
38470	Aircraft	0.85	2.53
38522	Optical instruments & lenses	0.93	1.37
38530	Watches & clocks	1.13	1.54
39019	Jewelry & other related articles	1.13	2.28
39092	Buttons, except of plastic	1.08	1.36
39099	Other manufactured products, n.e.c.	0.83	1.35



APPENDIX 2 (CONTINUED)

E. WORSENING OF INEFFICIENCY (51 INDUSTRIES)

PSIC	INDUSTRY	DRC/SER 1988	DRC/SER 1992
31111	Slaughtering	1.53	2.96
31114	Meat processing, preserving and canning	1.55	1.83
31154	Fish paste	1.75	2.73
31299	Food products, n.e.c.	1.23	1.58
31410	Cigarettes	1.23	1.34
32115	Weaving	1.88	1.90
32116	Finishing	1.58	2.81
32118	Laces, narrow fabrics, etc.	1.36	1.38
32151	Cordage, rope and twine	1.50	1.59
32212	Custom dressmaking	1.32	1.69
32291	Raincoats, except of rubber	1.52	1.96
32321	Luggages, handbags, wallets	1.46	1.49
32329	Products of leather & leather substitutes	1.49	1.82
33120	Veneer & plywood	1.51	1.64
33150	Millwork plants	1.35	1.47
33210	Mfr. & repair of wood furniture	1.42	1.53
33240	Partitions, shelves, lockers	1.37	2.72
33250	Windows & door screens	1.39	1.79
34112	Pulp mills	1.62	1.83
34230	Commercial & job printing	1.99	2.14
35132	Man-made fibers exc. glass	1.46	2.54
35233	Perfumes & cosmetics	1.43	1.48
35592	Ind'l & molded rubber products	1.49	1.60
35609	Other fabricated plastic prods., n.e.c.	1.33	1.62
36102	Coarse clay products	1.27	3.41
36991	Lime	1.32	2.83
36999	Non-metallic mineral products, n.e.c.	1.32	1.46
37122	Iron & steel pipes & tubes	1.26	1.34
37131	Cast iron manufacturing	1.82	2.21
38111	Cutlery	1.63	2.88
38112	Hand tools	1.52	13.31
38121	Structural steel and materials	2.31	6.56
38122	Mfr. of other architectural & related metal works	1.75	2.75
38129	Structural metal products, n.e.c.	1.53	4.91
38142	Metal coating & engraving	1.43	2.27
38199	Other fabricated metal products, n.e.c	1.54	1.57
38221	Farm tractors	1.37	2.92
38222	Machine implements for crop production	2.10	3.32
38229	Agricultural machinery & equipment, n.e.c.	1.83	1.85
38233	Machine tools & accessories	1.94	2.75
38297	Machine shops	1.27	1.54
38321	Radio & TV receiving sets	1.64	2.47
38332	Electric fan, vacuum cleaner, etc.	1.25	1.59
38411	Boats & motorboats	1.26	3.56
38413	Large vessels	1.30	1.35
38430	Motor vehicles	1.29	1.54
38440	Rebuilding, alteration of motorboats	1.79	2.61
38601	Household furniture	3.56	4.12
38602	Public building furniture, metal	1.97	1.99
39050	Ophthalmic goods, eyeglasses, spectacles	1.57	2.10
39060	Toys & dolls	1.32	1.37

APPENDIX 3  
HIGH-COST INDUSTRIES AND EPR CHANGES  
(5-DIGIT PSIC)

PSIC	Description	DRC/SER 1992	EPR (%)		Decline in EPR (Percentage Points)
			1996	2004	
38461	Mfr. and assembly of motorcycles	2.02	138.51	4.10	134.41
31231	Milled sugarcane	1.27	83.37	-15.30	98.66
33230	Box beds and mattresses	1.49	89.31	4.04	85.27
38131	Tin containers	1.53	87.87	2.92	84.95
36920	Structural concrete products	2.15	81.82	5.00	76.82
36201	Flat glass	4.07	71.81	3.52	68.29
38430	Motor vehicles	1.54	70.49	4.52	65.96
38321	Radio & TV receiving sets	2.47	59.69	-1.40	61.09
38129	Structural metal products, n.e.c.	4.91	52.82	3.24	49.58
35599	Other rubber products, n.e.c.	1.56	50.36	3.29	47.07
35211	Paints	1.47	51.86	4.84	47.02
33130	Hardboard & particleboard	1.95	45.76	-1.04	46.79
38111	Cutlery	2.88	50.34	4.65	45.69
31222	Biscuits	1.36	48.11	4.50	43.61
31114	Meat processing, preserving and canning	1.83	46.23	5.00	41.24
34291	Electrotyping, stereotyping, photoengraving	3.21	44.91	3.92	40.99
31241	Chocolate bars, cocoa products	1.76	42.78	2.18	40.60
38112	Hand tools	13.31	44.90	4.72	40.18
38139	Mfr. of metal containers, n.e.c.	1.23	43.59	3.98	39.61
38159	Fabricated wire products, n.e.c.	2.10	43.74	4.60	39.14
31221	Breads, cakes, pastries	1.61	43.38	4.62	38.76
31299	Food products, n.e.c.	1.58	43.39	4.64	38.75
38199	Other fabricated metal products, n.e.c.	1.57	39.92	2.73	37.19
34292	Bookbinding & related work	3.80	40.39	4.04	36.34
34120	Containers & boxes of paper & paperboard	2.00	41.12	4.93	36.20
38462	Bicycles & tricycles	1.47	40.59	4.71	35.88
32151	Cordage, rope and twine	1.59	37.15	2.15	35.00
33240	Partitions, shelves, lockers	2.72	39.62	4.65	34.97
31225	Snack products	1.73	39.19	4.65	34.54
34230	Commercial & job printing	2.14	37.98	4.12	33.86
38142	Metal coating & engraving	2.27	38.44	4.88	33.56
38114	Blacksmithing & welding shops	5.32	37.48	4.77	32.72
31312	Distilled ethyl alcohol, except from sulphite res. of pulp mfg.	3.48	37.11	4.65	32.46
31131	Butter and cheese	1.48	36.21	4.96	31.26
38601	Household furniture	4.12	34.70	3.48	31.22
31270	Coffee roasting & processing	1.57	35.55	4.82	30.73
32159	Cordage, rope, twine, nec.	4.45	32.39	2.56	29.84
38122	Mfr. of other architectural & related metal works	2.75	33.71	3.88	29.83
33111	Rough lumber	1.23	32.91	3.31	29.60
38332	Electric fan, vacuum cleaner, etc.	1.59	32.46	3.52	28.94
31249	Chocolate & sugar confectionary prods.	1.83	32.12	3.25	28.87
31242	Candies and chewing gum	1.31	31.51	2.88	28.64
32329	Products of leather & leather substitutes	1.82	29.84	1.72	28.12
31243	Peanut and other nut products	1.88	31.36	3.35	28.02
38602	Public building furniture, metal	1.99	31.55	3.70	27.85
31311	Distilled & refined alcoholic liquors	1.28	32.19	4.65	27.54
31410	Cigarettes	1.34	32.39	4.88	27.51
38463	Motorcycle engines & parts	1.58	32.18	4.76	27.42
38121	Structural steel and materials	6.56	30.83	3.97	26.86
38392	Electrical signalling equipment	1.26	29.96	3.57	26.39
38113	General hardware	1.24	30.78	4.81	25.97
31340	Soft drinks & carbonated water	1.28	30.59	4.98	25.61
33250	Windows & door screens	1.79	30.07	4.77	25.31
31440	Cured tobacco leaves	1.21	28.83	3.84	24.99
35233	Perfumes & cosmetics	1.48	29.13	4.56	24.57
31180	Milled rice & corn	1.58	19.68	-4.77	24.45
31133	Milk based infants' formula	1.34	28.88	4.80	24.08
35592	Ind'l & molded rubber products	1.60	28.11	4.11	24.01
38440	Rebuilding, alteration of motorboats	2.61	28.66	5.00	23.66
38331	Household electrical cooking equipment	1.28	26.82	3.90	22.91
31329	Wine manufacturing, n.e.s.	1.29	25.90	4.11	21.79
39050	Ophthalmic goods, eyeglasses, spectacles	2.10	26.21	5.00	21.21

## APPENDIX 3 (CONTINUED)

PSIC	Description	DRC/SER 1992	EPR (%)		Decline in EPR (Percentage Points)
			1996	2004	
36202	Glass containers	1.81	25.84	4.74	21.10
32152	Nets, excl. mosquito nets	1.36	24.19	3.12	21.07
35591	Rubber garments	1.32	24.56	4.25	20.31
38362	Current-carrying wiring devices	1.30	24.87	4.81	20.06
34130	Articles of paper	1.29	22.53	2.62	19.91
36995	Asbestos products	4.01	21.83	3.18	18.65
35300	Petroleum refineries	1.22	22.92	4.29	18.63
32321	Luggages, handbags, wallets	1.49	20.81	3.16	17.65
31171	Crude veg. oil, cake & meal except coconut oil	3.72	21.39	3.82	17.57
39040	Surgical, dental, medical supplies	1.38	21.79	4.50	17.29
31111	Slaughtering	2.96	22.00	5.00	17.00
38530	Watches & clocks	1.54	21.08	4.78	16.30
31190	Flour milling except cassava	1.63	20.56	4.28	16.27
36991	Lime	2.83	18.85	3.04	15.81
34112	Pulp mills	1.83	17.86	3.77	14.09
35609	Other fabricated plastic prods., n.e.c.	1.62	17.18	3.30	13.87
36993	Statuary, art goods, etc.	1.95	17.31	3.45	13.86
36999	Non-metallic mineral products, n.e.c.	1.46	16.95	3.45	13.50
32310	Tanning and leather finishing	1.27	17.37	3.91	13.46
31219	Milled grain products, n.e.c.	2.61	17.63	4.52	13.11
32211	Custom tailoring	1.23	15.96	3.17	12.79
35603	Plastic industrial supplies	1.65	16.06	3.46	12.61
33210	Mfr. & repair of wood furniture	1.53	14.54	2.16	12.38
31179	Vegetable & animal oils & fats, nec.	1.28	16.49	4.25	12.23
36102	Coarse clay products	3.41	13.71	2.42	11.28
32212	Custom dressmaking	1.69	14.84	3.56	11.28
36101	Vitreous china tableware	1.26	13.19	2.15	11.05
34111	Integrated pulp, paper, paperboard	1.64	15.13	4.24	10.89
31291	Starch and its products	1.53	15.06	4.99	10.07
36910	Structural clay products	1.26	14.71	4.73	9.98
32115	Weaving	1.90	11.65	1.73	9.92
38450	Motor vehicle parts & components	1.43	10.12	0.31	9.81
36109	Pottery, china, etc.	1.80	11.82	2.45	9.37
32118	Laces, narrow fabrics, etc.	1.38	11.34	2.14	9.20
36103	Vitreous china plumbing, fittings & fixtures	1.36	11.74	2.84	8.90
38316	Electrical welding	1.97	10.65	1.99	8.66
32114	Texturizing mills	1.94	10.81	2.15	8.66
32116	Finishing	2.81	10.97	2.71	8.26
31152	Fish & other marine products	2.30	-5.08	-3.07	8.15
38315	Electrical industrial control devices	1.54	10.24	2.22	8.02
36209	Glass and glass products, n.e.c.	1.40	12.82	4.92	7.90
32131	Industrial bags	1.49	8.17	0.56	7.61
38319	Electrical incl. machinery, nec.	1.51	10.20	2.90	7.29
32132	Mfr. of made-up textile goods	1.52	8.01	0.89	7.12
31142	Canned & preserved vegetables & juices	2.59	8.46	1.35	7.11
33120	Veneer & plywood	1.64	7.55	0.94	6.60
32121	Knitted fabrics	1.49	7.06	0.65	6.42
38160	Manufacture of non-electric lighting & heating fixtures	1.32	9.17	2.82	6.35
39031	Sporting gloves & mitts	1.27	9.34	3.70	5.64
31141	Canning & preserving of fruits & juices	1.30	6.66	1.40	5.27
39039	Sporting & athletic goods, n.e.c.	1.97	8.31	3.47	4.85
31155	Dried agar-agar	1.21	-2.59	-1.55	4.14
33150	Millwork plants	1.47	-2.79	-1.15	3.94
38516	Surgical, dental, orthopedic equipment	1.32	8.46	4.61	3.86
37242	Copper & copper base alloy casting	1.41	3.95	0.19	3.76
33140	Wood drying & preserving plants	1.29	7.09	3.45	3.64
38519	Professional & scientific measuring & controlling devices	2.37	7.89	4.33	3.56
32111	Integrated textiles	1.69	5.41	2.17	3.24
35133	Industrial gases	1.70	6.16	3.27	2.89
38221	Farm tractors	2.92	7.41	4.65	2.76
38229	Agricultural machinery & equipment, n.e.c.	1.85	7.30	4.57	2.73
38222	Machine implements for crop production	3.32	7.18	4.57	2.61
35132	Man-made fibers exc. glass	2.54	6.28	3.73	2.55
32112	Fiber & filament	3.45	-1.39	1.15	2.54

APPENDIX 3 (CONTINUED)

PSIC	Description	DRC/SER 1992	EPR (%)		Decline in EPR (Percentage Points)
			1996	2004	
33192	Charcoal outside forest	1.22	0.99	-1.53	2.52
35114	Industrial alcohols	1.37	-0.55	1.94	2.50
38522	Optical instruments & lenses	1.37	-1.51	-0.90	2.41
37129	Steel works & rolling mills	2.75	5.96	3.71	2.25
39060	Toys & dolls	1.37	3.93	1.69	2.23
35292	Candles	2.83	3.66	1.47	2.19
31154	Fish paste	2.73	-1.69	0.48	2.17
32113	Spinning	1.64	4.66	2.50	2.16
33191	Miscellaneous wooden products	1.51	1.35	-0.77	2.12
37110	Blast furnaces, steelmaking furnaces	2.40	5.52	3.49	2.03
35295	Inks	1.28	3.69	1.69	2.00
35299	Other chemical products, nec.	1.66	4.13	2.16	1.97
37249	Non-ferrous foundries, n.e.c.	3.01	4.75	2.95	1.80
38291	Pumps, compressors, & blowers	1.34	6.67	4.88	1.79
37122	Iron & steel pipes & tubes	1.34	4.75	2.95	1.79
39019	Jewelry & other related articles	2.28	-0.82	0.56	1.38
31420	Cigars	1.34	3.07	1.72	1.35
39096	Manufacture of signs & advtg. displays	2.12	2.89	1.72	1.16
38413	Large vessels	1.35	5.95	4.97	0.98
38414	Shipbuilding, including passenger vessels	1.91	5.93	4.97	0.96
38411	Boats & motorboats	3.56	5.88	4.94	0.94
39094	Needles, pins, fasteners	1.36	1.59	0.69	0.91
37190	Iron & steel basic industries, n.e.c.	4.61	4.42	3.72	0.70
37131	Cast iron manufacturing	2.21	3.77	3.20	0.57
37132	Cast steel	1.45	4.04	3.50	0.54
39099	Other manufactured products, n.e.c.	1.35	1.34	0.83	0.51
39093	Manufacture of brooms, brushes & fans	1.34	1.03	0.56	0.47
35294	Explosives, fireworks	5.06	2.25	1.81	0.45
39092	Buttons, except of plastic	1.36	0.36	0.06	0.30
32291	Raincoats, except of rubber	1.96	0.95	0.68	0.27
32499	Manufacture of other footwear except rubber, plastic	4.19	0.46	0.22	0.24
38233	Machine tools & accessories	2.75	-0.09	0.15	0.24
38412	Manufacture of marine engines & parts	1.65	5.04	4.94	0.10
35113	Industrial gases	1.72	3.00	3.06	-0.07
38297	Machine shops	1.54	1.92	2.00	-0.08
32170	Fiber batting, padding, etc.	5.66	4.80	4.95	-0.15
32199	Misc. textiles, nec	2.69	4.73	4.92	-0.19
38241	Food machinery	1.30	0.06	0.29	-0.22
38234	Dies, jigs, fixtures & molds	1.85	0.59	0.89	-0.30
38239	Manufacture of metal and woodworking machinery	11.81	0.77	1.16	-0.39
38293	Sewing & embroidery machines	1.69	0.82	1.24	-0.42
38232	Metal-working machinery	1.93	0.76	1.21	-0.45
35112	Inorganic salts & compounds	1.30	1.09	1.61	-0.53
38219	Engines & turbines except transport, nec	3.17	2.18	2.77	-0.59
35119	Manufacture of basic industrial chemicals	1.22	0.12	0.73	-0.60
38259	Office machines, nec	1.24	0.92	1.63	-0.71
37210	Gold & other precious metal refining	2.09	-0.00	1.11	-1.11
38256	Computing & accounting machines	1.96	0.90	2.04	-1.15
38470	Aircraft	2.53	2.20	3.70	-1.50
36300	Cement	1.68	0.64	5.00	-4.36

## TECHNICAL APPENDIX

The paper followed basically the PIDS-DIA project's estimation procedures for EPR and DRC, as described in Medalla, et al (1996) and presented below.

### *EFFECTIVE PROTECTION RATE (EPR)*

In estimating EPR, output is decomposed into locally-sold goods (importables) and exports. The border prices of importables are derived by removing the implicit tariffs (sales taxes and legal tariffs) from domestic prices. For exports, no adjustment is made since sales taxes are not imposed and tariffs are not applicable. The actual formula used for EPR estimation is as follows:

$$EPR = \frac{\frac{Pdj^L}{1+s_j} + Pdj^x - \sum_i \frac{Pdi}{1+s_i}}{\frac{Pdj^L}{1+T_j} + Pdj^x - \sum_i \frac{Pdi}{1+T_i}} - 1$$

where  $Pdj^L$  is the domestic value of output  $j$  for local consumption;  $Pdj^x$ , the value of exports;  $Pdi$ , the domestic value of input  $i$  used;  $s_j$  and  $s_i$  the sales tax rates on  $j$  and  $i$ ; and  $T_j$  and  $T_i$  the implicit tariffs on  $j$  and  $i$ , respectively. For exports,  $s_j$  and  $T_j$  are equal to zero since sales taxes are not imposed and tariffs are not applicable.

Output value ( $Pdj$ ) is not directly available from establishment data. It is derived by adding to the total revenue ( $TR$ ) the change in inventories of finished goods ( $FG$ ) and work-in- process ( $WIP$ ) which is considered as part of output:

$$Pdj = TR + (FG_{end} - FG_{beg}) + (WIP_{end} - WIP_{beg})$$

where the subscripts **beg** and **end** refer to beginning and ending inventories, respectively.

$Pdj$  is decomposed into exports and local consumption, as follows:

$$\begin{aligned} Pdj^x &= x * Pdj \\ Pdj^L &= (1-x)Pdj \end{aligned}$$

where  $x$  refers to the export ratio. The value of  $x$  for the relevant subsector is derived from the share of exports in its total production as reported in the Input-Output table (I-O) table.

The implicit tariff ( $T$ ), in principle, is the proportionate difference between the domestic value ( $Pd$ ) and border value ( $Pb$ ) of a homogeneous commodity or set of commodities (Medalla and Power, 1979), i.e.,  $T = Pd/Pb - 1$ . In the absence of price comparisons, implicit tariffs are based

on the legal tariff (t) and sales tax (s) rates on the assumption that these cause the wedge between Pd and Pb:

$$\begin{aligned} P_d &= P_b(1+t)(1+s) \\ P_d/P_b &= (1+t)(1+s) \\ 1+T &= (1+t)(1+s) \end{aligned}$$

For 1992, average tariffs (t) were based on the estimates of the project "Refinements in EPR Methodology" by AYC Consultants, Inc. These were computed for 169 non-service sectors of the 1988 Input-Output Table which consisted of 230 production sectors. To derive the average tariffs at the 5-digit PSIC level, the AYC project's I-O - PSIC Correspondence Table was used. For 1996, the average tariffs were estimated following the said project's procedures, as described below.

- 1) average nominal tariff rates per I-O sector were calculated using production and imports as weights, i.e.,

$$t_a = \frac{\sum(Q_i + M_i) t_i}{\sum(Q_i + M_i)}$$

where

- t<sub>a</sub> = average nominal tariff rate for any given sector;
- Q<sub>i</sub> = value of production of commodity i from the 1988 Census of Establishments;
- M<sub>i</sub> = value of imports of commodity i from the 1988 Philippine Foreign Trade Statistics;
- t<sub>i</sub> = nominal tariff rate on commodity i for 1996 from the Tariff and Customs Code.

- 2) the estimated t<sub>a</sub>'s were used to compute the average tariffs of importable and mixed (consisting of both importables and exportables) sectors of the I-O table as classified in the AYC project:

- a) For importable sectors

$$t_j = \frac{t_a * wQ_b + t_a * M_b}{wQ_b + M_b}$$

b) For mixed sectors

$$t_j = \frac{t_a * wQ_{m_b} + t_a * M_b + (-t_x)*(wQ_{x_b} - X_b)}{wQ_{m_b} + M_b + (wQ_{x_b} - X_b)}$$

where

- $t_j$  = average tariff of sector  $j$ ;
- $w$  = weight of output based on the  $j$ th sector's demand elasticity;
- $Q_b$  = value of production of sector  $j$  in 1988 I-O table at border prices;
- $Q_{m_b}$  = importable portion of domestic production of sector  $j$  at border prices;
- $Q_{x_b}$  = exportable portion of domestic production of sector  $j$  at border prices;
- $M_b$  = value of imports of sector  $j$  in 1988 I-O table at border prices;
- $X_b$  = value of exports of sector  $j$  in 1988 I-O table at border prices.

Data on  $w$  and border values of the above variables were sourced from the AYC project. The average tariffs at the 5-digit PSIC level were derived by matching the I-O Codes with the PSIC Codes using the AYC project's I-O - PSIC Correspondence table.

For year 2004, a uniform five percent tariff was used for each PSIC.

### ***DOMESTIC RESOURCE COST (DRC)***

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The DRC equation may be expressed as follows:

$$\text{DRC} = \frac{\text{DC}}{\text{Pbj}^* - \text{FCb}^*}$$

where

- DC = domestic costs in shadow prices and in local currency;
- Pbj\* = value of output in border prices and in foreign currency; and
- FCb\* = foreign costs in border prices and in foreign currency.

Output value in border prices is as estimated in the EPR measure, i.e.,  $\text{Pd}_j^L/(1+T_j)$  and  $\text{Pd}_j^*$ . The value in domestic currency is deflated by the official exchange rate to convert it to foreign currency. Costs may be classified as follows:

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

#### Depreciation and interest costs on fixed capital

Fixed capital includes buildings, machines, transportation equipment, and other fixed assets such as furniture, fixtures, and office equipment. Depreciation cost (**Dk**) is obtained by dividing the replacement value by the economic life of the asset which is assumed to be 50% longer than the accounting life (**n**). Data on accounting life, which varies for each type of asset and subsector, are sourced from the firms or from Bulletin F of the US treasury, a depreciation rate table used in accounting. Interest cost on fixed capital (**Ik**) is derived by applying the shadow interest rate (**r**) to the replacement value of the asset (**Rk**).

$$\begin{aligned} \text{Dk} &= \text{Rk}/(\text{n} * .5) \\ \text{Ik} &= \text{Rk} * \text{r} \end{aligned}$$

If the actual replacement values are not provided, which is the case for census data, they are estimated from other available information. When only the depreciation charge (**DC**) and book value (**BV**) are reported for the asset, replacement cost is obtained by adjusting the estimated acquisition cost (**AC**) for price and productivity increases. The price inflators used for buildings/structures and for all other types of fixed assets are the construction price index and the machinery and transport wholesale price index, respectively. These are sourced from the Philippine Statistical Yearbook and the National Income Accounts of the National Statistical Coordination Board (NSCB). The productivity growth rate (**p**) is taken to be 3% per year, following the Tariff Commission-PIDS industry studies. The estimated current market values are adjusted downward by this factor on the assumption that capital assets of a newer vintage embody higher productivity. This



also accounts for the aging process of the assets which also affects their productivity (Power, 1979). Letting  $P_{cy}$  be the price index for the current year,  $P_{ay}$  the price index for the year when the asset was acquired, and  $a$  the average computed age of the asset, the basic formula for replacement cost is

$$\begin{aligned} R_k &= [AC * P_{cy}/P_{ay}]/(1 + p)^a \\ a &= (AC - BV)/DC \\ AC &= n * DC \end{aligned}$$

This procedure, however, is not applicable in any of the following cases which were encountered in the estimation: (1) the computed average age is negative; (2) only the depreciation charge is reported; and (3) data on depreciation charge is missing.

In either of the first two cases, capital costs for the asset are based mainly on the reported depreciation:

$$\begin{aligned} I_k &= n * DC * r \\ D_k &= DC \end{aligned}$$

If the reported depreciation is for machines ( $D_{ma}$ ), its replacement value ( $R_{ma}$ ) is also derived, in addition to the capital costs, i.e.,

$$R_{ma} = n_{ma} * D_{ma} * 1.5$$

where  $n_{ma}$  is the accounting life of machines. The reason is that the replacement value of machines is used as a basis for estimating the replacement cost of other assets when their depreciation data is missing.

In the third case, if the missing depreciation charge is for machines, the observation is deleted from the DRC data set since there would be no basis for estimating the capital and replacement costs. If it is for buildings and structures, the replacement value of these assets is imputed from that of machines on the assumption that plant size varies directly with the stock of production equipment. The ratio of buildings to machines is first computed based on the aggregate replacement values of observations with complete data, i.e.,  $(\Sigma R_{bu}/\Sigma R_{ma})$ . This is then applied to the replacement cost for machines ( $R_{ma}$ ) of the observation with missing data to obtain the replacement value of its buildings and structures ( $R_{bu}$ ):

$$R_{bu} = \Sigma R_{bu}/\Sigma R_{ma} * R_{ma}$$

If the missing depreciation charge is for other fixed assets, its replacement cost is computed following the same method for buildings and structures. However, when depreciation of transport equipment is not reported, its replacement cost is no longer estimated since there is no observed direct relationship between transport equipment and machines.

Depreciation cost is allocated into domestic and foreign components based on the origin of the equipment. For interest cost, the basis for allocation is the source of finance. We assume that financial capital is sourced mostly locally while the physical capital (equipment), except for buildings, is mainly imported. The following allocation ratios are used:

	Depreciation cost		Interest cost	
	Domestic	Foreign	Domestic	Foreign
Buildings	1.00	0	1.00	0
Machines	0	1.00	.85	15
Transport equipment	.20	.80	.85	15
Other fixed assets	.15	.85	1.00	0

#### Interest cost on working capital

Working capital consists of the inventories of raw materials (RM), work-in-process (WIP), and finished goods (FG). Work-in-process inventory is considered part of finished goods inventory. The interest costs on working capital applicable to output ( $I_{wj}$ ) and inputs ( $I_{wi}$ ) are obtained by applying the shadow interest rate to the average of the beginning (beg) and ending (end) inventories of finished goods and raw materials, as follows:

$$I_{wj} = \frac{(FG_{beg} + FG_{end}) + (WIP_{beg} + WIP_{end})}{2} * r$$

$$I_{wi} = \frac{(RM_{beg} + RM_{end})}{2} *$$

Interest cost on working capital is assumed 15% domestic and 85% foreign.

#### Material inputs and supplies

Material inputs include both major and minor raw materials. Supplies constitute packaging materials, office supplies, fuel, gasoline, electricity, water and other utilities. The reported value for each item is broken up into its domestic and foreign components. For material inputs, allocation ratios, which vary per subsector, are taken from the survey of firms. For supplies, the following ratios are used:

	Domestic	Foreign
Packaging materials	.10	.90
Office supplies	.15	.85
Water, electricity, & other nontradable utilities	1.00	0
Lubricants, diesel, fuel & other purely importable utilities	0	1.00

The domestic component of material inputs and supplies ( $Mi^d$ ), except for utilities, is assumed to consist of 50% non-traded inputs ( $Mi_{nt}^d$ ) and 50% locally-sourced tradable inputs ( $Mi_t^d$ ). For the former, their market values are taken to reflect their opportunity costs. For the latter, their shadow prices in domestic currency is equal to their border prices adjusted for foreign exchange undervaluation, i.e.  $Mi_t^d/(1+Ti) * (SER/OER)$ . The social cost of foreign component is its value in border prices,  $(Mi^f/(1+Ti))$ .

### Labor cost

Labor is classified into skilled and unskilled. For the former, the market wage is taken to reflect its opportunity cost. For the latter, we use the shadow wage rate ( $SWRu$ ) applicable for the period, as specified previously.

In the Census of Establishments, no information is provided on the number of unskilled ( $N_u$ ) and skilled ( $N_s$ ) workers. These are assumed to be 60% and 40% respectively of total employment for each subsector. Family labor reported is considered as skilled. Its social cost is obtained by multiplying the average compensation of employed skilled workers by the number of unpaid family workers ( $N_f$ ). Thus, we have

$$\begin{aligned} SW_u &= SWRu * N_u * 275 \\ SWS &= TW - (MWR * N_u * 275) \\ SW_f &= (SW_s/N_s) * N_f \\ SWT &= SW_u + SW_s + SW_f \end{aligned}$$

where  $SW_u$ ,  $SW_s$ , and  $SW_f$  are the social labor costs for unskilled labor, skilled employees, and family workers, respectively;  $SWT$ , the total social cost of labor; 275, the estimated number of working days per year;  $TW$ , the total wages/compensation (basic salaries and wages, and overtime pay) for the year; and  $MWR$ , the minimum daily wage rate. Labor costs are assumed wholly domestic in the absence of information on foreign labor.

### Other Costs

For census data, other costs, considered as domestic, include industrial and non-industrial services done by other enterprises and subsidies received by the establishments. Information on other foreign costs is not available. Due to lack of data, land rent is not included in the DRC estimation.

### Price adjustments

Domestic capital costs and nontraded inputs are adjusted to be net of sales taxes which are not costs from the social viewpoint but only resource transfers from producers to the government.

Output and foreign costs are valued in border prices (which are taken to be their shadow prices) and in foreign currency by deflating their peso values by  $(1+T)*OER$  where  $T$  is the relevant implicit tariff and  $OER$  is the official exchange rate. This assumes that tariffs cause the difference between domestic and border prices.

b) For mixed sectors:

$$t_j = \frac{t_a * wQ_{m_b} + t_a * M_b + (-t_x)*(wQ_{x_b} - X_b)}{wQ_{m_b} + M_b + (wQ_{x_b} - X_b)}$$

where

- $t_j$  = average tariff of sector  $j$ ;
- $w$  = weight of output based on the  $j$ th sector's demand elasticity;
- $Q_b$  = value of production of sector  $j$  in 1988 I-O table at border prices;
- $Q_{m_b}$  = importable portion of domestic production of sector  $j$  at border prices;
- $Q_{x_b}$  = exportable portion of domestic production of sector  $j$  at border prices;
- $M_b$  = value of imports of sector  $j$  in 1988 I-O table at border prices;
- $X_b$  = value of exports of sector  $j$  in 1988 I-O table at border prices.

Data on  $w$  and border values of the above variables were sourced from the AYC project. The average tariffs at the 5-digit PSIC level were derived by matching the I-O Codes with the PSIC Codes using the AYC project's I-O - PSIC Correspondence table.

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## The DRC equation

Combining all the components discussed above, the DRC is estimated based on the following equation:

$$DRC = \frac{\frac{Dk^d}{1+s_k} + \frac{Ik^d}{1+s_k} + \frac{I_{wj}^d}{1+s_j} + \frac{I_{wi}^d}{1+s_i} + \left( \frac{Mi_t^d}{1+Ti} \frac{SER}{OER} \right) + \frac{Mi_{nt}^d}{1+s_i} + SWT + OC^d}{\left[ \left( \frac{Pd_j^L}{1+Tj} + Pd_j^x \right) - \left( \frac{Dk^f}{1+Tk} + \frac{Ik^f}{1+Tk} + \frac{I_{wj}^f}{1+Tj} + \frac{I_{wi}^f}{1+Ti} + \frac{Mi^f}{1+Ti} + OC^f \right) \right]} * \frac{1}{OER}$$

where **D** is the depreciation cost; **I**, the interest cost; **Mi**, the cost of material inputs and supplies; **SWT**, the total social labor cost; **OC**, other costs; **Pdj<sup>L</sup>**, the value of output for local market; and **Pdj<sup>x</sup>**, the value of exports. The superscripts **d** and **f** refer to domestic and foreign components, respectively. The subscripts **k** pertain to fixed capital, **w** to working capital, **j** to output, **i** to inputs, **t** to tradable component, and **nt** to nontraded component.

A positive DRC/SER ratio less than or equal to 1.2 is taken to indicate comparative advantage or allocative efficiency. The excess of 20 percent over the commonly used benchmark of 1.0 is an allowance for measurement errors.

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