ment, and restricted access to credit. On the other hand, exports have benefited from the reduction of the 10 percent export tax.

The government has also had a growing influence on factor markets. Minimum wage regulations have been enacted for a limited set of industries in certain regions, and more are promised. The government has further encouraged the use of capital-intensive technologies by subsidizing credit and providing customs duty exemptions, tax holidays, and other incentives to new investment. On the other hand, it has acted to protect small-scale firms by exempting from sales and excise taxes weaving, knitting, and cigarette products originating from factories using nonmechanized technologies. Nevertheless, most observers agree that the recent new investment in manufacturing is very capital-intensive relative to existing plants.[13] This is particularly true for the increasingly large public sector (including PERTAMINA) investments. After examining public sector investments, McCawley and Manning (1976, p. 27) conclude that "it would be difficult to prepare a more capital intensive set of projects. Thus, despite the official emphasis that is given to the need to create jobs, in practice the goal of employment creation has received low priority." In brief, current trade strategy seems to be moving away from a liberalized foreign sector and the express goal of employment creation.

5.3 Effective Protection in Indonesian Manufacturing

5.3.1 Procedures

The 1971 input-output table for Indonesia provides much of the basic data necessary for the ERP estimates.[14] The table includes 32 agriculture, livestock, forestry, and fishing activities, and 12 mining, 82 manufacturing, and 45 service or other activities. Four of the 171 activities had no domestic production in 1971, so there were 167 producing industries. For this study 2 activities were disaggregated to bring the total number of producing activities to 169, of which 83 were in manufacturing. The bulk of cottage and small-scale agricultural processing such as hand pounding of rice and peasant sugar refining were treated as manufacturing value-added activities and included with similar processes occurring in larger-scale production units.

To estimate nominal protection, I relied heavily upon vectors of customs duty and import sales tax collections and the c.i.f. value of imports included in the input-output table. These provide appropriate measures as long as tariffs are the only trade restriction and domestic taxes are not a factor. However, price comparisons were used to measure nominal protection in activities where imports were prohibited.[15] In addition, goods whose import is performed solely by or for government agencies

have also had their nominal protection estimated in this manner. In 1971 these government-imported commodities were rice, cloves,[16] wheat flour, fertilizer, pesticides and inputs into pesticide production, and sugar.

Besides tariffs, I had to consider a variety of other protective devices in making my ERP calculations. These included an import sales tax, a withholding tax on corporate income, special exchange rates, export taxes, and, finally, the existence of illegal transactions. Each is discussed below.

Imported commodities are exempt from the domestic sales tax, and thus the import sales tax is not entirely protective. Collected at the same time as the customs duty and using the same tariff nomenclature, the import sales tax differs from the customs duty by both its rate of levy (and collection) and its base, which is the c.i.f. price of the import plus the customs duty and a 5 percent markup to cover presumptive storage, transport, and other costs. The domestic sales tax is not harmonized with the import sales tax. Only rarely does the domestic sales tax completely offset its import counterpart. The computation of the extent of the offset is complicated by a change in the tax schedule that went into effect in July and August of 1971.

Another complication in computing ERPs arises because of the MPO tax, a withholding tax on corporation income.[17] It is paid to the government, at an ad valorem rate by the MPO collector on behalf of the purchaser, who can credit this amount against his corporation income tax liability. On domestic sales, the MPO rate was 2 percent in 1971, with the seller usually acting as MPO collector. For imported goods, the MPO rate was 3 percent except for commodities imported with a merchant's letter of credit (L/C), for which the rate was 6 percent. The tax was not collected on exports. In the 1971–72 fiscal year, imports with a merchant's L/C were 20 percent of all imports and 37 percent of all imports excluding those financed by foreign aid and direct investment. For imports, banks usually act as collector, probably making evasion more difficult than for domestic sales. About one-half of all MPO revenue is collected from imports.

While the MPO increases the price of a commodity to a firm by its rate of collection, it may not affect a firm's decision-making if the levy is merely treated as an advance payment on its profits tax. In that case the only protective effect of the discriminatory MPO rate on imports would be the relatively minor cost of additional tax prepayment.

However, because of the presumptive nature of the base of the corporation income tax, the firm may choose not to claim an MPO tax credit.[18] For tax collection purposes, profits are presumptively determined as a margin on sales, which in turn are a presumptive markup on cost. The total MPO credit claimed by the firm presumably indicates the firm's

cost and thus, up the chain of margins, the firm's presumed profit. It may be to a firm's advantage to underreport MPO tax credits and thus reduce presumptive profit. Therefore the MPO tax is considered a sales tax and, for sectors subject to MPO tax, nominal protection in the estimates presented here includes a 1 percent MPO protective effect. This is a low estimate because the 4 percent protective effect of MPO on imports with merchants' L/C has been ignored. This is somewhat offset by exemptions on MPO payment given firms under tax holiday and other special cases.

Special exchange rates took two forms in 1971: fixed subsidized rates of exchange to import weaving yarns under the PL-480 program and raw cotton; and special rates of exchange for the import of restricted lists of commodities from certain origins with aid foreign exchange (*Devisa Kredit*). On average during 1971, these special exchange rates represented a subsidy of 46.7 percent for raw cotton and 68.0 percent for PL-480 weaving yarns.[19] These are taken into account in the ERP estimates below.

Incentives for the use of aid foreign exchange beginning January 1971 included a reduced prefinancing requirement for aid exchange imports from most origins and an interest rate discount for credit. Concurrent with the official devaluation of 23 August 1971, a system of rebates to the official exchange rate of Rp 415 varying by country of origin was instituted for the import of goods with aid foreign exchange.[20] Although nearly 24 percent of all imports in 1971 were paid for with aid foreign exchange (excluding imports under food and project aid), it was ignored in calculating ERPs for two reasons. First, it was not possible to determine the rate of subsidization by sector, and, second, the aid exchange rebates probably only offset the additional cost of their use.

In 1971 exporters were required to surrender 10 percent of their export proceeds as an export tax. Exempted were the export of "finished goods and handicrafts" as defined by commodity lists. The lists do not seem entirely consistent; for example, tea was considered a finished good, while coffee, rubber, vegetable oils, and almost all other NRB and processed NRB goods were not. In addition, rubber, coffee, copra, and pepper exports were subject to a cess and rehabilitation levy on a per kilogram basis. These levies were substantially reduced in mid-1971. In addition, copra was also subject to regional levies, and coffee needed International Coffee Agreement stamps in order to be exported to International Coffee Organization (ICO) member nations. Finally, certain exports were prohibited with protective intent, namely, lower grades of rubber and chinchona bark, the raw material of quinine. All the above have been incorporated into the protection estimates.

Under Indonesia's Sales Tax Act, export shipments are exempt from paying the domestic sales tax. In addition, the minister of finance can

exempt from sales tax commodities that by nature are destined for export, although they may be utilized locally in intermediate stages. Nevertheless, according to Cnossen (1973, p. 31) these provisions are not observed in practice. Therefore, in the ERP computations it is assumed that domestic sales taxes are levied on exports.

Illegal transactions, traditionally an important facet of Indonesian foreign trade, are potentially the most troublesome source of error in calculating protection rates. Two aspects of illegal import transactions may be important: importers may pay less than the listed tariff rate on the true value of the import, or they may pay the listed tariff on an underinvoiced import value.

Richard Cooper (1974) has verified the quantitative importance of the first aspect (paying less than the stated tariff rate) through a comparison of actual tariff collections and the listed legal tariffs. Not all of the difference between theoretical and actual tariff collections can be attributed to illegal transactions. There are a number of legal tariff exemptions, including imports for direct investment by both foreign and domestic firms, imports for aid projects, and numerous special exemptions by the Ministries of Finance and Trade.[21] Nevertheless, exempt imports explain only a small part of the difference between theoretical and actual tariff collections.

Even if importers pay the listed tariff, there may still be evasion of tariffs if the commodity is underinvoiced. Recall that actual tariff collections are the starting point for most of the nominal protection calculations. Thus underinvoicing can create a real problem because tariff collections are divided by the listed (underinvoiced) c.i.f. values of imports to obtain tariff rates and therefore protection is overestimated. However, the computed estimates will be reliable if all imports are correctly valued at customs and if illegal transactions occur only via the underpayment of trade taxes. That is, the actual tariff collections, although underpaid (less than implied by the listed tariff) would measure protection on the actual c.i.f. price.

Using data on foreign and domestic prices for a number of imported commodities for the years 1969 and 1971, Cooper econometrically estimated the relationship between observed domestic prices and scheduled tariff rates. Employing his results and the observed relationship between actual tariff collections and scheduled tariff rates, I performed an analysis to determine if the use of tariff collection data and declared import values results in a systematic underestimate (or overestimate) of actual domestic prices. There was no evidence that nominal rates of protection calculated with tariff collections data would be systematically biased, only that the error of the estimates may be large.[22]

Finally, adjustments had to be made in activities where intermediate inputs were commodities in the same sector as the final output but with

differing nominal rates of protection. This was particularly important in assembly industries, where commodities in a completely knocked down (CKD) condition enter with a tariff discount.

5.3.2 The Structure of Protection

Estimates of nominal and effective protection for Indonesian manufacturing activities for the year 1971 are given in the Appendix (along with their input-output code numbers and names). Aggregates for tradable categories are presented in table 5.11, and values for major exportables and importables are given in table 5.12.

Classification of Activities

Forty-six activities were classified as home goods. Most of these were service activities, but also included are sugarcane (I-0 code no. 11), coffee (16), tea (17), dairy products (23), poultry products (26), stone quarrying (40), and repairing of motor vehicles (118). A few service activities in which trade was substantial were not considered home goods. Paddy (1) and cassava (3), which enter trade in small amounts, might marginally be considered home goods but were classified as natural resource based (NRB) tradables in the following analysis.[23]

All agriculture, forestry, livestock, fishing, mining, and quarrying activities not considered home goods were classified as NRB tradables, as was nonferrous metal refining (103).

Table 5.11 **Distribution of Effective Protection in Indonesian Manufacturing, 1971**

HOS Manufacturing Tradable Group	Effective Rates of Protection
1. Exportables	−11%
2. Importables (excluding negative IVA activities)	46
Activities with lowest protection	−13
Excluding processed NRBs	26
Activities with medium protection	55
Excluding processed NRBs	132
Activities with highest protection	279
Excluding processed NRBs	473
3. All importables (including negative IVA activities)	66
4. Noncompeting importables	15
5. All importable sectors (3 and 4)	65
All HOS tradable sectors (1, 3, and 4)	33

Source: Appendix table 5.A.1.

Note: Calculated as $\left(\frac{\Sigma DVA_i}{\Sigma IVA_i} - 1\right) \times 100$, where i indexes the activities in a tradable group.

Table 5.12 Characteristics of Major HOS Exportables and Importables, 1971

Industry	Nominal Protection	Effective Protection	T_i		with DCs Trade[a]
Exportables					
Canned and preserved fish and seafoods	0%	1%	—	.00	98%
Coconut oil and cooking oil	−10	68	—	.06	100
Vegetable oils, animal oils, and fats	−10	−12	—	.83	98
Dried cassava and tapioca flour	−10	−19	—	.22	100
Coffee grinding	−15	−19	—	.60	95
Tea processing	0	0	—	.66	99
Processed tobacco	−10	−27	—	.13	98
Tanneries and leather finishing	0	− 4	—	1.08	93
Sawmills	0	1	—	.00	95
Smoking and remilling of rubber	−11	−11	−104.8[b]		96
Importables					
Canned and preserved meat	5	50		.00	80
Rice milling and polishing	−13	−15		.05	69
Sugar refining	30	154		.08	15
Soybean products	0	25		.03	62
Cigarettes	82	556		.00	96
Spinning industries	− 8	134		.40	49
Weaving industries	44	Neg. IVA		.19	75
Wearing apparel	55	199		.02	79
Printing, publishing	25	42		.30	97
Soap	41	701		.03	78
Motor vehicles	110	526		.52	99

Source: Appendix table 5.A.1, 5.A.2.

Note: Activities with production in excess of 25,000 million rupiahs.

[a]Trade refers to exports for exportables and imports for importables.

[b]Owing to a fall in inventories, export exceeded production, and therefore the calculated value for T is positive. A sector is exportable if $T_i < 0$ or $T > 1$; the latter values can occur only if inventories are reduced.

All activities classified as HOS tradables were manufacturing activities. These industries were further classified as either exportable, importable, or noncompeting, following the T statistic methodology described in chapter 1. Exportables had a negative T_i, importables had T_is between 0 and 0.8, and noncompeting had T_is greater than 0.8.

These values are calculated only for the year 1971. For those activities whose value of T was close to 0 or 0.8 or where there was a priori knowledge of significant trade fluctuations, reference was made to the trade data of succeeding and preceding years in making the ultimate classification. Thus the fertilizer (84), railroad equipment (115), and

aircraft (119) industries were classified differently than the 1971 T statistic would indicate.[24]

HOS tradables were further subdivided into those considered to process NRB goods and those that do not. The processed NRB subgroup as used here covers certain manufacturing activities that, with the input-output information available at the time of preparing this analysis, could not be clearly separated between the NRB stages necessary to turn a raw material into a tradable product and further HOS stages of processing. Coffee provides a good illustration on the side of Indonesia's exports. Although the coffee growing activity (I-0 code number 16) is properly categorized as NRB, the value added in the coffee roasting and grinding activity (58) embraces certain additional NRB states such as the sorting and drying needed to make the product tradable and further HOS processing beyond that point. A similar mixture of NRB and HOS stages is found in tapioca (53) and tea processing (59) among export industries and in rice milling (51) and sugar refining (56) among importable industries. These industries are accordingly classified as processed NRBs in the following analysis. Given the importance of the smoking and remilling of rubber (I-0 code 94) as an export industry, it should be noted that this industry is not here classified as a processed NRB but rather as "other HOS." The reason is that natural rubber can be exported in cruder form, processed just sufficiently to allow it to be traded, and as such would be considered an export from the rubber-tapping activity (10).[25]

In analyzing the structure of protection and factor proportions in various classes of HOS tradables, two activities were excluded ("petroleum refining" [91] and "other petroleum and coal products" [92]) because of a lack of data on factor requirements (except for the wages and salaries data of the input-output table). With their huge value added (almost 15 percent of total value added in HOS industries), any error in estimating their factor requirements would lead to a correspondingly large error in the aggregate results.[26]

The Distribution of ERPs over Commodity Categories

The distribution of average ERPs by commodity category is presented in table 5.11. Importable activities excluding those with negative international value added were ranked by ERPs. This ranking was then divided into three groups of equal domestic value added, and the groups were labeled as "lowest protection," "medium protection," and "highest protection" sectors.

Eight activities had negative value added at international prices, all of them HOS importables. Four of them were textile industries, including the large weaving sector. This is somewhat surprising, since other Asian

LDCs have efficient textile industries, often with large export volume. For the Indonesian weaving industry, nominal protection was not extraordinarily high (44.3 percent); it was largely the subsidy given cotton yarn imports that resulted in the finding of negative IVA. Of course there may be some components of this sector with positive IVA.

Negative ERPs were found to occur in fifteen of the manufacturing activities reported in table 5.A.1. Of these fifteen activities, eleven were HOS exportables, three were noncompeting importables, and one was a processed NRB HOS importable (rice milling). The large number of HOS exportables with negative protection indicates the lack of attention to exports, and the consequent disincentives for them, that characterized the Indonesian trade strategy in 1971.

Since eleven out of fifteen exportable industries had negative rates of protection, it is not surprising that, as a group, exportables had negative effective protection of −11 percent. The trade regime quite definitely favored importables, with their overall rate of protection of 66 percent. Indonesia, like many other countries in this study, did not provide high levels of protection to noncompeting importables, particularly if they produced capital goods. These industries had a relatively low 15 percent ERP.

The least-protected activities in the importable group had negative effective protection. This is due mainly to the negative protection afforded the large rice milling sector. When rice milling and the other processed NRB importables (sugar refining) were excluded, protection was positive. The protection afforded the most-protected industries in the importable group was six times that afforded all nonnegative IVA importable industries. These results indicate the wide range of incentives given to the various manufacturing sectors.

5.4 Factor Proportions in Indonesian Trade in Manufactures

5.4.1 The Measurement of Factor Inputs

For HOS importable and exportable activities, nine measures of factor use were employed: four types of labor, one measure of skills, and four measures of capital.

Four surveys were drawn upon to estimate labor coefficients. The total labor requirements per million rupiahs of DVA in importable and export industries were calculated from a 1973 industrial survey carried out by the Biro Pusat Statistik of Indonesia covering large and medium-size firms.[27] These data were augmented by a 1973 sample survey of small firms (Biro Pusat Statistik 1974) in a limited number of industries and a new 1974–75 industrial census of household and cottage indus-

tries (Biro Pusat Statistik 1976–77). The data permitted measurement of labor requirements in terms of man-days and are believed superior to data derived from the input-output table.

Labor requirements were disaggregated into manager, other white-collar, male operative, and female operative man-days on the basis of a 1971 industrial survey (BPS, *Statistik Industri* 1971). The 1971 survey contained information on the number of employees of each of these four types by sector. The proportion of each type of employee in the total employees of each sector was then multiplied by the total labor requirements in man-days obtained from the 1973 data to yield the final man-days disaggregations. For this purpose it is assumed that man-days per employee did not differ across the various employee types and that the employee composition did not change from 1971 to 1973.[28]

The measure of skills used is based on estimates of the average wage per man-day calculated from the 1973 industrial survey of large- and medium-size firms. The wage for unskilled labor was taken to be the average wage of the five HOS tradable sectors reporting the lowest average wage—Rp 125 per man-day. Pure skill-days per million rupiahs of value added for sector i was then computed as the ratio of the wage in the ith industry to the unskilled labor wage times total man-days per million rupiahs of domestic value added. Other measures of skill intensity can be derived from the labor requirement disaggregation, for example, the ratio of white-collar to blue-collar man-days.

There are four capital requirement measures, two based on the horsepower of installed machinery and two on energy utilization. The horsepower measures are for prime movers and electric motors. Horsepower of prime movers—that is, machines that use nonelectrical sources of energy—may represent a less sophisticated type of capital. Such machinery is prevalent in food processing and other activities located in rural areas where electricity is unavailable. For example, prime-mover horsepower predominates in the large rice milling and tapioca sectors. The two energy-related measures of capital are electricity consumption in kilowatt-hours and the value of all energy consumed.

For noncompeting importables, factor requirements were taken from the 1973 United States *Annual Survey of Manufactures* (United States 1976). Labor requirements in man-days are the only measure of factor requirements available from United States data that are comparable to the Indonesian data. Because domestic factor proportions differ between the United States and Indonesia, using the United States data directly would underestimate labor requirements. Therefore the data are adjusted by the ratio of the labor input in a set of industries in Indonesia to the labor input in the same set of industries in the United States. Most of the industries chosen in calculating this correction factor are indus-

tries classified as noncompeting in which some domestic production nonetheless exists.

5.4.2 Factor Proportions: Direct Requirements

Table 5.13 presents data on direct factor requirements per unit of value added in HOS exportable and importable activities. Table 5.14 gives estimates for major exportables and importables (a complete listing is found in appendix table 5.A.2.) For aggregating the exportable industries, the value-added content of production is used as a weight; for the import-competing sectors, each sector is weighted by domestic value added of domestic production plus the domestic value-added content of imports.[29] The table also presents data with HOS processed NRB activities excluded.

The data in table 5.13 indicate that exportable industries use twice as much labor per unit of DVA as importables. Exportables use more of each type of labor, but ratios vary markedly over labor types. White-collar labor is a greater share of total labor requirements in importable industries than in exportable industries. Since white-collar labor typically embodies more human capital than operative labor, the indication is that importables are more skill-intensive. This is borne out by the skill-day requirement data.

All four measures of capital use indicate a greater capital requirement by importables than by exportables. Importables use nearly two and one-half times the horsepower, twice the energy expenditure, and one and one-half times the electricity consumption per unit of domestic value added as exportables.

These results are basically unchanged if processed NRB industries are excluded from the analysis. As might be expected with her relative abundance of unskilled labor, Indonesia's exportables are clearly more labor-intensive and less skill-intensive than her importable industries.

5.4.3 Factor Requirements by Trade Origin and Destination

Trade flows were disaggregated among seven origin/destinations: Japan; Singapore and Hong Kong; other developed countries; member countries of the Association of South-East Asian Nations (ASEAN) except Singapore; South Korea and Taiwan; socialist countries; and other less developed countries. A serious problem centers on the role of Singapore and Hong Kong as an entrepôt for Indonesian exports. Although some of the Indonesian exports they receive are reprocessed, most are merely reexported, primarily to developed countries. By far the most important commodity to enter this trade is milled natural rubber. Thus, for purposes of aggregating the seven origin/destinations into two—developed countries and less developed countries—trade with

Table 5.13 **Summary Table: Direct Factor Requirements, Exportable and Import-Competing HOS Manufacturing Sectors (Requirements per Million Rupiahs of Value Added)**

Factor	Exportable Sectors per Unit of DVA		Import-Competing Sectors per Unit of DVA		Exportable Sectors per Unit of IVA		Import-Competing Sectors per Unit of IVA	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Total man-days	2,175	1,644	1,038	950	2,230	1,754	1,159	1,116
Manager man-days	55	33	50	35	57	29	54	50
Other white-collar man-days	214	152	150	144	273	228	201	207
Male operative man-days	1,118	843	636	536	1,292	1,016	750	698
Female operative man-days	787	617	203	235	608	481	154	161
Skill-days	1,175	1,263	1,451	1,576	1,809	1,929	2,983	3,314
Prime mover (horsepower)	4.77	6.30	9.67	6.07	4.46	3.14	13.91	13.43
Electric motor (horsepower)	2.46	2.33	7.99	10.50	2.53	1.52	23.39	27.22
Total horsepower	7.23	8.63	17.66	16.58	6.99	4.67	37.30	40.65
Electricity used (kwh)	2,386	2,448	3,886	5,130	4,367	6,133	12,639	14,724
Energy consumed (Rp 000)	44.59	45.45	91.42	96.90	29.97	20.96	214.45	237.00

Source: Author's computations as described in text.

Note: Col. a: All sectors in tradable classification; col. b: Processed NRB sectors excluded.

Table 5.14 **Direct Factor Requirements in Major HOS Importables and Exportables Labor (Man-Days/Million Rupiahs of DVA)**

Industry	Total	Man-agers	Skill-Days	Total Horsepower
Importables				
Canned and preserved meat	514	21	1,069	5.93
Rice milling and polishing	1,150	105	2,383	24.83
Sugar refining	1,571	37	2,438	8.08
Soybean products	3,253	88	3,695	8.59
Cigarettes	52	0	490	.35
Spinning industries	304	5	1,398	15.01
Weaving industries	870	14	1,802	10.13
Wearing apparel	1,990	63	5,508	1.75
Printing and publishing	102	3	266	95.58
Soap	468	16	2,134	1.85
Motor vehicles	440	25	2,893	7.26
Exportables				
Canned and preserved fish and seafood	1,335	41	1,324	4.78
Coconut oil and cooking oil	792	23	2,281	6.50
Vegetable oil, animal fats and oils	600	17	2,400	6.50
Dried cassava and tapioca flour	2,462	128	2,796	37.25
Coffee grinding	3,876	196	6,822	15.61
Tea processing	3,715	40	4,012	7.59
Processed tobacco	4,057	46	2,953	.77
Tanneries and leather finishing	940	38	2,218	22.32
Sawmills	1,023	38	3,396	28.13
Smoking and remilling of rubber	2,300	35	4,968	3.72

Source: See text.

Singapore and Hong Kong is considered trade with developed countries. The quantitative importance of considering export trade via Singapore and Hong Kong trade with developed countries is highlighted by the fact that, if they were considered an LDC destination, then only 3.7 percent of HOS exports (and 36.6 percent of HOS exports excluding rubber) to LDCs would be to destinations besides Singapore and Hong Kong. The value of all HOS exports to LDCs excluding Singapore and Hong Kong in 1971 was $16.75 million.[30]

Table 5.15 shows that labor requirements for exports to developed countries are virtually the same as labor requirements for exports to less developed countries. Exports to less developed countries also require 22 percent more skill-days and more capital (by two out of three measures) than exports to developed countries. If processed NRB industries are excluded, as also shown in table 5.15, exports to developed countries require less labor, skills, and capital (by every measure) than exports to less developed countries.

Table 5.15 **Direct Factor Requirements per Unit of DVA by Trade Destination or Origin (per Million Rupiahs of Domestic Value Added)**

Trade Origin or Destination	Total Man-Days		Skill-Days		Horsepower		Electricity (Kwh)		Energy (Rp 000)	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
					Exportable HOS Manufacturing Industries					
Developed countries	2,176	1,630	1,166	1,256	7.14	8.52	2,384	2,434	45.11	45.22
Japan	1,398	1,359	434	400	4.05	3.85	2,432	2,434	44.72	44.93
Singapore and Hong Kong	2,259	2,085	1,460	1,723	5.35	9.33	5,822	4,261	49.63	42.41
Other DCs	2,327	1,541	1,250	1,316	8.31	9.45	1,448	1,796	43.97	46.28
Less developed countries	2,149	2,105	1,421	1,472	9.72	12.42	2,427	2,892	30.73	52.90
ASEAN except Singapore	3,233	2,501	726	913	5.65	10.59	1,475	1,705	48.90	60.75
South Korea and Taiwan	3,197	1,368	484	2,073	5.45	24.53	681	1,402	26.18	73.99
Socialist countries	2,492	2,139	2,558	2,478	7.88	5.96	7,310	9,168	15.08	15.84
Other LDCs	1,392	2,305	1,449	629	12.77	3.88	1,338	758	26.86	40.98
					Import-Competing HOS Manufacturing Industries					
Developed countries	994	946	1,523	1,603	18.76	17.54	4,264	5,211	89.61	94.10
Japan	793	716	1,454	1,502	16.36	14.54	4,176	4,983	98.89	105.17
Singapore and Hong Kong	1,164	1,162	1,538	1,541	11.69	11.71	7,650	7,680	68.81	68.66
Other DCs	1,066	1,017	1,562	1,706	22.64	22.41	3,200	4,246	90.55	97.66
Less developed countries	1,177	921	1,202	1,413	14.24	11.18	2,617	4,842	89.30	95.82
ASEAN except Singapore	1,124	1,028	1,294	1,505	21.95	13.01	1,359	4,364	85.61	136.84
South Korea and Taiwan	889	741	1,225	1,303	10.34	10.83	5,951	6,899	122.82	127.90
Socialist countries	1,281	945	1,117	1,406	8.95	9.96	2,278	3,061	87.23	72.98
Other LDCs	1,201	1,038	1,253	1,535	18.05	14.21	3,142	8,283	76.48	71.88

Source: Author's computations as described in text.

Note: (a) All sectors in tradable classification; (b) processed NRB industries excluded.

For importable industries, imports from less developed countries are estimated to require over 18 percent more labor than imports from developed countries and less capital by every measure; both the skill-day data and the share of white-collar in total labor supplied indicate a greater abundance of skills required in imports from developed countries than in imports from less developed countries. The estimated capital/labor ratios for products competing with imports from developed countries are 1.56, 1.93, and 1.19 times those for products competing with imports from less developed countries, according to the horsepower, electricity, and energy proxies, respectively.

When processed NRB industries are excluded, the factor requirement estimates are mixed for importables competing against various sources. Imports from developed countries now require more labor as well as more skill and capital (by two of three measures) than imports from less developed countries. If Singapore and Hong Kong are considered LDCs, however, labor requirements of imports from that group will again exceed those of imports from DCs (1,062 versus 889).

The HOS model of trade with many commodities and countries predicts that noncompeting imports would utilize more of a country's scarce resource and less of its abundant resource than competing imports or other tradables. Table 5.16 clearly supports this contention. Noncompeting imports would require only about one-fifth the labor per unit of DVA that is required in importable sectors. Furthermore, noncompeting imports from DCs embody slightly less labor per unit of DVA than imports from LDCs.[31]

Table 5.16 **Direct Labor Requirements in Noncompeting HOS Activities by Import Origin**

Origin	Man-Days per Unit of DVA	Man-Days per Unit of IVA
Total	208	229
Developed countries	207	229
Japan	211	233
Singapore and Hong Kong	209	223
Other DCs	200	226
Less developed countries[a]	214	230
ASEAN except Singapore	207	221
South Korea and Taiwan	220	239
Socialist countries	209	222
Other LDCs	203	221

Source: Author's computations as described in text.

[a]Including socialist countries.

5.4.4 Direct Plus Indirect Home Goods Requirements

For computing direct and home goods indirect factor requirements for Indonesian HOS tradable classifications, total man-day labor requirements are the only measure of factor use available. Even if data on horsepower or energy consumption were available for home goods activities, they would be poor measures of the capital services provided in these predominantly service and agricultural sectors. Direct and home goods indirect labor requirements per million rupiahs of direct and home goods indirect value added for various classifications of Indonesian HOS tradables are presented in table 5.17. There is only a minor difference between the direct and the direct plus indirect results. Exportable labor requirements fall slightly, while those of importable activities remain practically constant. This implies that home goods labor requirements are close to those of importables. In summary, these estimates provide results that mirror those from the analysis of direct requirements only.

5.4.5 Net Factor Content of Trade

The HOS factor proportions explanation of trade predicts, among other things, that a labor-abundant country like Indonesia will import commodities with a higher capital/labor ratio than those it exports. In particular, with balanced trade, it predicts that Indonesia will be a net exporter of labor and a net importer of capital. The net factor content of trade, the statistic necessary to test this proposition, measures the net factor content of a representative basket of exports and competing imports leaving the trade balance unchanged. To correctly test the HOS proposition, trade flows should be partitioned between less labor-abundant and more labor-abundant areas. Since Indonesia probably lies near the bottom of a ranking of all countries by capital/labor ratios, it might be expected that the Indonesian net factor content of trade to every broad grouping of countries will reflect a net export of labor.

The conversion of factor requirements per unit of DVA into international value-added terms for reasons explained in chapter 1 was accomplished by applying the calculated *ERP*s. In aggregating exportable and importable industries for the net factor content of trade calculation, the weighting system used is the actual international value-added content of the 1971 basket of competing imports and exports. The resulting statistic thus differs from the calculated factor requirements at domestic prices by both the prices used and the system of weights.

An examination of the IVA columns of table 5.13 reveals that, with balanced trade, Indonesia is clearly a net exporter of labor and a net importer of capital and skills. The capital/labor ratio of her imports is from six to fourteen times that of her exports, depending on the capital

Table 5.17 **Direct and Home Goods Indirect Labor Requirements by Trade Destination or Origin (Total Man-Days per Million Rupiahs of Direct and Home Goods Indirect Domestic Value Added)**

HOS Manufacturing Sectors	Total, All Countries	Developed Countries				Less Developed Countries[a]				
		Total	Japan	Singapore and Hong Kong	Other DCs	Total	ASEAN Except Singapore	South Korea and Taiwan	Socialist Countries	Other LDCs
				All Sectors in Tradable Classification						
Exportable sectors										
Per DVA	1,990	1,989	1,270	2,092	2,129	1,975	2,865	2,864	2,234	1,221
Per IVA	2,060	2,056	1,175	1,937	2,188	2,093	2,240	1,676	1,894	2,154
Import-competing sectors										
Per DVA	1,038	998	816	1,142	1,057	1,171	1,122	964	1,276	1,184
Per IVA	1,245	1,208	1,103	1,699	1,183	1,447	1,213	1,318	1,744	1,264
				Processed NRB Sectors Excluded						
Exportable sectors										
Per DVA	1,514	1,503	1,241	1,916	1,425	1,932	2,242	1,295	1,978	2,081
Per IVA	1,623	1,625	1,057	1,847	1,533	1,711	1,588	1,528	1,811	1,378
Import-competing sectors										
Per DVA	960	961	749	1,140	1,016	924	1,108	835	951	1,036
Per IVA	1,222	1,224	1,115	1,696	1,194	1,143	1,731	1,188	1,231	1,099

Source: Same as table 5.11.

[a]Including socialist countries.

measure used. With processed NRB industries excluded, the estimated capital/labor ratios of imports range from four to eighteen times that of exports. Imports also embody 65 percent more skill-days than exports and more than three times as many skill-days per man-day of direct labor, a result not significantly altered by the exclusion of processed NRB sectors.

Table 5.18 provides the data needed for bilateral tests of the HOS propositions with respect to the net factor content of trade. There it is seen that for all nine trade destinations and origins specified Indonesia is a net exporter of labor. For all three measures of capital Indonesia is a net importer of capital in trade with all nine destinations, with the sole exception of the electricity consumption measure in trade with socialist countries. In addition, Indonesia is a net importer of skill-days from eight of nine trading areas, socialist countries again being the exception. When processed NRB industries are excluded from the calculations, the results are nearly the same as those based on the full set of HOS tradable sectors; however, the two exceptions noted above disappear.

The results including both direct and indirect labor requirements and value added at international prices are found in table 5.17. There it may be seen that exports embody more labor than competing imports regardless of the inclusion or exclusion of processed NRB sectors. Bilateral tests using all HOS manufacturing sectors yield similar results for trade with both developed and less developed countries but, if raw-material-based sectors are excluded, not for trade with Japan and ASEAN countries except Singapore.

5.5 Factor Proportions and the Height of Protection

In this section the influence of the trade regime on the commodity composition of trade is examined. If the levels of protection provided vary among industries, the commodity composition of trade, and hence its factor composition, are likely to be affected.

To test this proposition, we again aggregate importable industries by three levels of protection. It would be expected that, the closer an industry lies to Indonesia's comparative advantage, the less protection is needed to enable it to produce domestically. Thus it is expected that least-protected industries would be the least capital- and skill-intensive.

Factor requirements data for each of the three groups are presented in table 5.19, weighted in the same manner as direct factor requirements. Note that the only direct absolute factor requirement that changes monotonically over the three groups is skill-days. But two capital-labor ratios, electricity per man-day and energy per man-day, rise monotonically. It is interesting that industries with medium protection have the greatest absolute labor and capital requirements (by every measure).

Table 5.18 **Direct Factor Requirements per Unit of IVA by Trade Destination or Origin (per Million Rupiahs of International Value Added)**

Trade Origin or Destination	Total Man-Days		Skill-Days		Horsepower		Electricity (Kwh)		Energy (Rp 000)	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(a)
					Exportable HOS Manufacturing Sectors					
Developed countries	2,229	1,750	1,800	1,928	6.99	4.65	4,352	6,113	30.47	21.06
Japan	1,273	1,119	1,693	1,639	6.33	5.77	3,038	3,274	25.43	26.56
Singapore and Hong Kong	2,077	2,003	2,174	2,255	3.72	3.65	8,351	8,517	17.95	13.90
Other DCs	2,372	1,653	1,653	1,730	8.41	5.23	2,832	4,759	36.13	25.50
Less developed countries	2,257	1,856	2,043	1,961	6.98	5.03	4,762	6,648	16.81	18.50
ASEAN except Singapore	2,494	1,737	1,627	1,366	7.88	5.28	1,612	2,848	30.08	30.28
South Korea and Taiwan	1,792	1,624	746	1,108	6.33	11.17	721	903	13.58	28.99
Socialist countries	2,082	1,962	2,286	2,280	5.20	4.39	7,771	8,628	13.16	13.51
Other LDCs	2,528	1,486	1,899	1,106	10.30	6.25	615	1,589	16.57	30.54
					Import-Competing HOS Manufacturing Sectors					
Developed countries	1,124	1,127	3,172	3,395	39.71	41.75	13,069	14,398	215.41	231.14
Japan	983	982	3,231	3,411	33.02	34.00	15,409	16,650	256.64	272.90
Singapore and Hong Kong	1,624	1,620	3,851	3,863	43.31	43.46	15,725	15,788	233.45	233.83
Other DCs	1,130	1,129	3,018	3,292	43.40	46.69	11,105	12,596	185.72	202.20
Less developed countries	1,345	1,015	1,960	2,594	24.25	30.75	10,309	17,652	209.28	292.61
ASEAN except Singapore	1,081	1,268	1,814	3,446	25.12	33.76	5,455	16,336	187.36	460.11
South Korea and Taiwan	998	825	2,164	2,268	26.91	28.70	20,141	22,319	343.13	366.65
Socialist countries	1,669	1,074	1,950	2,459	21.35	28.66	7,710	11,988	192.07	224.68
Other LDCs	1,211	968	1,976	2,823	27.84	37.57	13,661	26,463	152.55	216.04

Source: Author's computations as described in text.

Note: Col. a: All sectors in tradable classification.

col. b: Processed NRB sectors excluded.

Table 5.19 **Direct Factor Requirements per Unit of DVA and Height of Protection**

Factor Requirements	Export-ables	All HOS Imports	Importables: With Lowest Protection	Importables: With Medium Protection	Importables: With Highest Protection
	Per Million Rupiahs of Domestic Value Added				
Total man-days	2,175	1,038	1,130	1,326	752
Skill-days	1,175	1,451	1,225	1,200	1,958
Total horsepower	7.23	17.66	27.20	24.74	6.26
Electric motor horsepower	2.46	7.99	7.35	17.43	2.05
Electricity (kwh)	2,386	3,886	3,105	5,524	3,791
Energy (Rp 000)	44.59	91.42	81.85	103.19	90.84
Electricity per man-day	1.10	3.74	2.75	4.17	5.04
Skill-days per man-day	0.54	1.40	1.08	1.02	2.60
Energy (Rp) per man-day	20.50	88.07	72.43	77.82	120.80
	Ratios of LDC to DC Factor Requirements[a]				
Total man-days		1.184	1.024	1.104	1.115
Skill-days		0.789	0.999	0.711	0.863
Total horsepower		0.759	0.928	0.343	1.137
Electric motor horsepower		0.366	0.288	0.198	1.237
Electricity (kwh)		0.614	0.182	0.343	1.819
Energy (Rp 000)		0.996	0.859	0.985	1.157

Source: Author's computations as described in text.

[a]More precisely, ratios of factor requirements of products competing with imports from LDCs to factor requirements of products competing with imports from DCs.

Most-protected industries, which might be expected to be inefficient, nevertheless seem to use both less labor and less capital to produce one million rupiahs of DVA than do the other groups.[32] However, the correct measure of efficiency would be in terms of factor requirements per unit of IVA, because otherwise the inefficiency of highly protected industries is disguised by their inflated domestic value added. Using this measure (see table 5.20), note that the most-protected industries use more labor, skills, and capital (by two out of the three measures) than do other import-competing sectors. Exportables use by far the most labor, but they use much smaller inputs of capital than any importable group.

An explanation is possible for the odd behavior of some of the factor proportions data of table 5.19. The least-protected group is composed of only six industries, which include two capital goods industries, electrical machinery and apparatus (109) and shipbuilding, boatbuilding, and repairing (114), as well as one activity on the margin of being noncompeting, fertilizer (84). These industries are very capital-intensive according to our capital proxy measures and, because their volume of trade is large, they carry a heavy weight in the factor requirement

computation. It also seems likely that in the case of electrical machinery and shipbuilding imported commodities may differ substantially from domestically produced commodities. Therefore the data for the least-protected group should be viewed with caution. For the most-protected group, it appears likely that the capital measures, particularly horsepower, are poor measures of real capital services provided to the activities involved. For example, the horsepower (and other capital) requirements in the drug, motor vehicle assembly, cosmetics, cigarettes, and storage and dry battery industries are very low compared with their relative capital intensity in other countries. Probably the capital requirements data available do not adequately measure the more complex types of capital used in these industries. The same may be true for all activities; thus my capital requirements estimates generally should be viewed with some caution.

As would be expected, table 5.19 shows that capital requirements of products competing with LDCs are lower than capital requirements of products competing with DCs for both medium- and least-protected sectors. The difference is particularly striking for the electric motor horsepower and electricity consumption measures, which represent more sophisticated capital than the other measures. The contrary results for the most-protected industries are perhaps also due to the inadequacy of the capital proxies used in measuring the flow of real capital services to these sectors.

It is also of interest to check whether new investment by activity is related to the height of protection. Table 5.21 presents data on fixed capital formation obtained from manufacturing surveys, which, though limited to two years, permit some tentative observations to be made. The data indicate that in 1972–73 fixed capital formation per unit of DVA in import-competing sectors was 24 percent higher than in exportable sectors. The difference in capital formation between least-

Table 5.20 **Direct Factor Requirements per Unit of IVA and Height of Protection (per Million Rupiahs of International Value Added)**

Factor Requirements	Exportable Sectors	All HOS Import-Competing Sectors	Import-Competing Sectors		
			With Lowest Protection	With Medium Protection	With Highest Protection
Total man-days	2,230	1,159	373	1,565	1,794
Skill-days	1,809	2,983	721	2,250	7,780
Total horsepower	6.99	37.30	28.59	49.22	32.77
Electric motor horsepower	2.53	23.39	17.83	37.63	10.15
Electricity (kwh)	4,367	12,639	10,139	10,673	19,746
Energy (Rp 000)	29.97	214.45	85.46	185.14	468.54

Source: Author's computations as described in text.

Table 5.21 Fixed Capital Formation, 1972–73, and Height of Protection

Tradable Group	New Fixed Capital Formation per Unit of Domestic Value Added
Exportables	.250
Excluding rubber milling (94)[a]	.216
Import-competing	.310
Sectors with lowest protection	.300
Excluding fertilizer (84) and electrical machinery (109)	.194
Sectors with medium protection	.303
Sectors with highest protection	.228
Excluding cigarettes (65)	.284
Negative IVA sectors	.498

Source: Biro Pusat Statistik, *Statistik industri* (1972, 1973).
[a]Numbers refer to input-output code.

protected and medium-protected sectors is not very striking. If the fertilizer (84) and electrical machinery (109) industries are excluded from least-protected groups, the rate of capital formation falls markedly. Rice milling predominates in the remaining figure. Most-protected industries have a lower rate of capital formation than both least- and medium-protected industries. Since they are unable to export, growth in these industries is constrained by the size of the domestic market. Some of the largest industries in the group—cigarettes and motor vehicles, for example—also have new capital formation strictly controlled or prohibited by the government investment board.

Industries with negative IVA are found to have the highest rate of fixed capital formation among all groups investigated. Since negative IVA implies that domestic production is absolutely inefficient, the indication is that the trade regime is providing above-average incentives to the least desirable activities.

5.6 Summary and Conclusions

In examining the factor requirements of bundles of manufactured tradables containing one million rupiahs of DVA, it was found that HOS exportable manufacturing industries required twice as much labor as importable industries but substantially less capital and skills. When trade was partitioned between developed and less developed countries for origins and destinations, it was not possible to conclude definitively that Indonesian exportable production destined for DCs had a lower capital-labor ratio than that bound for LDCs, although the evidence

pointed in that direction. The reason for the ambiguity hinged on inadequate proxies for capital and the question of how trade with Hong Kong and Singapore should be treated. However, in every case skill-labor ratios were lower for exports to DCs than to LDCs. Second, my results did indicate that the capital-labor ratio of imports from developed countries exceeded that of imports from less developed countries.

In comparing the factor requirements of baskets of tradables containing equal quantities of value added at international prices, it was found that Indonesia was clearly a net exporter of labor and net importer of capital and skills in her trade in HOS manufactures; when trade was partitioned between developed and less developed countries, the above result still held in every case.

The results above hold irrespective of whether factor requirements are measured by direct or direct plus home goods indirect coefficients.

An examination of the height of protection and factor proportions found that when importable activities were partitioned into three groups based on their effective protection, capital/labor ratios were higher (by two of three measures) the greater the effective protection afforded the group. The most-protected industries used only 61 percent of the labor of all least-protected industries, though industries with medium protection used more labor than least-protected industries.

Eleven out of fifteen HOS manufacturing sectors that had negative rates of protection were exportable sectors, and on average HOS exportables received negative effective protection. On the other hand, substantial protection was afforded importable industries. Indeed, eight HOS importable industries were found to have negative international value added. Noncompeting importables had low ERPs. Thus the incentive system was definitely biased against exports and favored importable industries.

An important result of this research is an estimate of the employment trade-off implicit in Indonesia's choice of trade strategy. It has been noted that, since the conclusion of a period of dramatic trade liberalization in 1971, the Indonesian trade regime has tended to become more restrictive. In particular, levels of protection seem to have increased recently in response to emerging excess capacity in certain industries. The employment cost of following an import substitution strategy in Indonesia is severe. One million dollars of increased value added from manufactured exports generates 57 percent more employment than an equivalent reduction in competing imports. If manufactured exports were to increase by 15 percent per year, a rate of growth that should be readily attainable,[33] the employment necessary to produce these exports would rise from its 1971 level of 374,000 full-time equivalents to almost 1.7 million by 1981. This increase would be enough to employ about 11 percent of the projected growth in the labor force over that period.

Appendix

Table 5.A.1 Protection in Indonesian Manufacturing, 1971

Input-Output Code	Sector	Nominal Protection $(pd/pw - 1) \times 100$	Effective Protection $(DVA/IVA - 1) \times 100$	Trade Classification
45	Canning and preserving of meat	5.0%	50.0%	HOS-MC
46	Dairy products	74.0	Neg. IVA	HOS-MC
47	Canning and preserving of fruits and vegetables	80.0	5,400.0	HOS-MC
48	Canning and preserving of fish and other seafoods	0	1.0	HOS-X
49	Coconut oil and cooking oil	−10.0	67.8	HOS-X
50	Vegetable and animal oils and fats	−10.0	−12.3	HOS-X
51	Rice milling, cleaning, and polishing	−13.0	−14.7	HOS-MC
52	Wheat flour and other grain mill products	−18.0	471.8	HOS-MC
53	Dried cassava and tapioca flour	−10.0	−19.0	HOS-X
54	Bread and bakery products	89.1	Neg. IVA	HOS-MC
55	Noodles, macaroni, and similar products	0	35.4	HOS-MC
56	Sugar refining	26.0	52.7	HOS-MC
57	Cocoa, chocolate, and sugar confectionery	29.8	154.3	HOS-MC
58	Coffee grinding	−15.0	−18.7	HOS-X
59	Tea processing	0	0.4	HOS-X
60	Soybean products	0	24.9	HOS-MC
61	Other food products n.e.c.	10.9	35.8	HOS-MC
62	Alcoholic beverages	38.1	92.6	HOS-MC
63	Soft drinks and carbonated water	67.0	1,172.7	HOS-MC
64	Processed tobacco	−10.0	−27.0	HOS-X

Table 5.A.1—*continued*

Input-Output Code	Sector	Nominal Protection $(pd/pw - 1) \times 100$	Effective Protection $(DVA/IVA - 1) \times 100$	Trade Classification
65	Cigarettes	81.7	555.8	HOS-MC
66	Spinning industries	− 7.6	134.3	HOS-MC
67	Weaving industries	44.3	Neg. IVA	HOS-MC
68	Textile bleaching, printing, dyeing, and finishing, excluding batik	10.0	22.2	HOS-MC
69	Batik industries	0	−37.9	HOS-X
70	Knitting industries	75.0	Neg. IVA	HOS-MC
71	Made-up textile goods, excluding wearing apparel	78.3	Neg. IVA	HOS-MC
72	Wearing apparel, excluding footwear	55.3	198.6	HOS-MC
73	Carpets, rugs, ropes, and other	34.9	Neg. IVA	HOS-MC
74	Tanneries and leather finishing	0	− 4.4	HOS-X
75	Leather products, excluding footwear industries	0	− 9.6	HOS-X
76	Footwear of leather	63.4	180.8	HOS-MC
77	Sawmills, planing, and other wood processing	0	.5	HOS-X
78	Wood and cork products	0	− 1.9	HOS-X
79	Furniture and fixtures, excluding those primarily of metal	32.2	353.3	HOS-MC
80	Pulp, paper, and cardboard	30.4	67.0	HOS-MC
81	Paper products	44.1	72.2	HOS-MC
82	Printing, publishing, and allied industries	25.0	42.1	HOS-MC
83	Basic industrial chemicals, excluding fertilizers	8.1	18.6	HOS-NC
84	Fertilizers and pesticides	0	− 8.9	HOS-MC
85	Paints, varnishes, and lacquers	65.0	297.4	HOS-MC
86	Drugs and medicines	37.4	107.2	HOS-MC
87	Soap and cleaning preparations	41.3	701.0	HOS-MC

Table 5.A.1—*continued*

Input-Output Code	Sector	Nominal Protection $(pd/pw - 1) \times 100$	Effective Protection $(DVA/IVA - 1) \times 100$	Trade Classification
88	Cosmetics	38.8	143.8	HOS-MC
89	Matches	76.6	317.6	HOS-MC
90	Other chemical industries	27.9	Neg. IVA	HOS-MC
91	Petroleum refining	−12.0	Unclassified	Unclassified
92	Other petroleum and coal industries	− 6.0	Unclassified	Unclassified
93	Tires and tubes	57.0	Neg. IVA	HOS-MC
94	Smoking and remilling of rubber	−11.0	−11.7	HOS-X
95	Other rubber products	31.2	194.9	HOS-MC
96	Plasticware	34.0	129.0	HOS-MC
97	Ceramics and earthenwares	64.0	189.2	HOS-MC
98	Glass and glass products	40.8	92.5	HOS-MC
99	Structural clay products	46.4	90.2	HOS-MC
100	Cement	21.5	159.0	HOS-MC
101	Other nonmetallic mineral products	36.3	104.7	HOS-MC
102	Iron and steel	4.3	7.2	HOS-NC
103	Nonferrous basic metals	0	0	NRB-X
104	Cutlery, hand tools, and general hardware	27.9	77.0	HOS-MC
105	Furniture and fixtures, primarily of metal	21.0	69.9	HOS-MC
106	Structural metal products	13.0	29.8	HOS-MC
107	Other fabricated metal products	18.6	50.1	HOS-MC
108	Nonelectrical machinery	4.7	5.3	HOS-NC
109	Electrical machinery and apparatus	12.8	16.3	HOS-MC
110	Radio,television, and communication equipment and apparatus	46.8	217.0	HOS-NC

Table 5.A.1—*continued*

Input-Output Code	Sector	Nominal Protection $(pd/pw - 1) \times 100$	Effective Protection $(DVA/IVA - 1) \times 100$	Trade Classification
111	Electrical appliances and housewares	44.8	96.4	HOS-NC
112	Accumulator and dry battery industries	47.0	193.1	HOS-MC
113	Other electrical apparatus and supplies and repairing	12.7	10.3	HOS-NC
114	Ship and boat building and repairing	4.7	1.5	HOS-MC
115	Railroad equipment	.2	− 3.5	HOS-NC
116	Motor vehicles	110.0	525.7	HOS-MC
117	Motorcycles, bicycles, and other vehicles	55.8	204.3	HOS-MC
118	Repairing of motorized and nonmotorized vehicles	Home good	Home good	Home good
119	Aircraft	9.6	− 1.9	HOS-NC
120	Professional and scientific equipment	8.3	18.4	HOS-NC
121	Photographic and optical goods	13.8	16.1	HOS-NC
122	Watches and clocks	59.1	Nonproduced	HOS-NC
123	Jewelry and related articles	21.5	101.2	HOS-MC
124	Musical instruments	41.0	151.1	HOS-NC
125	Sporting and athletic goods	48.4	419.9	HOS-MC
126	Other manufacturing industries	0	−13.3	HOS-X
172	Kretek (clove cigarettes)	0	−23.1	HOS-X
173	Other nonproduced manufacturing	38.0	Nonproduced	HOS-NC

Note: HOS-MC = Heckscher-Ohlin-Samuelson import-competing tradable.
HOS-NC = Heckscher-Ohlin-Samuelson noncompeting importable.
HOS-X = Heckscher-Ohlin-Samuelson exportable.
NRB-X = Natural resource based exportable.

Table 5.A.2 **Labor Requirements, Trade Patterns, and Wages in Indonesian Manufacturing, 1971**

Industry Code[a]	Labor Requirements (Man-Days per Million Rupiahs of DVA)		Wages per Man-Day (Rupiahs)	Trade[b] with DCs (Millions of Rupiahs)	Trade[b] with DCs (%)
	Direct	Direct plus Indirect			
Exportables					
48	1,335	1,256	124	667	98
49	792	788	360	4,713	100
50	600	602	500	19,633	98
53	2,462	2,149	142	5,861	100
58	3,876	3,212	220	20,496	95
59	3,715	4,008	135	11,227	99
64	4,057	3,624	91	5,810	98
69	3,261	2,920	160	392	91
74	940	919	295	2,086	93
75	2,161	2,028	195	24	100
77	1,023	999	415	691	95
78	5,000	4,331	125	357	83
94	2,300	2,119	270	98,263	96
126	2,235	2,109	160	2,179	94
172	715	708	184	4	100
Importables					
45	514	516	260	180	80
46	128	178	731	8,147	99
47	1,615	1,510	296	214	38
51	1,150	1,123	259	20,083	69
52	104	243	768	4,782	100
54	2,066	2,150	235	295	83
55	2,688	2,606	210	0	0
56	1,571	1,556	194	1,317	15
57	626	627	294	171	62
60	3,253	3,085	142	948	95
61	1,747	1,631	196	1,490	97
62	156	235	1,086	1,004	91
63	245	294	609	268	89
65	52	104	1,179	48	96
66	304	375	575	8,712	49
67	870	847	259	14,915	75
68	825	792	291	0	0
70	2,105	1,910	162	324	81
71	1,358	1,334	213	1,070	82
72	1,990	1,951	346	960	79
73	1,546	1,440	253	2,670	56
76	845	840	295	134	89

Table 5.A.2—*continued*

Industry Code[a]	Labor Requirements (Man-Days per Million Rupiahs of DVA) Direct	Direct plus Indirect	Wages per Man-Day (Rupiahs)	Trade[b] with DCs (Millions of Rupiahs)	Trade[b] with DCs (%)
79	3,894	3,669	225	227	76
80	290	313	698	11,549	79
81	178	196	994	741	87
82	1,406	1,362	326	12,984	97
84	116	209	943	13,824	99
85	517	319	537	*	100
86	243	315	390	6,556	92
87	468	475	570	731	78
88	504	522	691	1,599	82
89	2,566	2,433	157	4	83
90	806	778	281	6,122	96
93	241	297	713	3,485	97
95	1,067	1,045	180	1,802	96
96	1,902	1,752	200	3,045	89
97	452	799	561	1,379	61
98	650	1,064	340	2,860	72
99	3,240	3,139	160	857	92
100	133	833	920	5,355	66
101	2,840	2,817	195	1,298	98
104	1,149	1,108	244	2,252	87
105	1,200	1,145	319	1,657	94
106	170	201	561	8,866	99
107	1,115	1,092	329	11,835	89
109	132	208	910	23,014	95
112	526	537	445	1,892	64
114	488	491	1,016	606	98
116	440	457	822	65,016	99
117	134	157	492	7,916	76
123	3,000	2,796	160	459	100
125	1,546	1,429	210	257	97

Source: Pitt 1977.

*Less than 0.5 million rupiahs.

[a]See table 5.A.1 for name of each industry.

[b]Trade refers to exports for exportables and imports for importables.

Notes

1. For a complete review of Indonesian economic development, see Booth and McCawley (1980) and the "Survey of Recent Developments" found in each issue of the *Bulletin of Indonesian Economic Studies.*

2. The Jakarta cost-of-living index is presented in table 5.10.

3. Determining the value of Indonesia's manufactured exports is complicated by the problem of defining a "manufactured" export and by the problem of re-export. A recent analysis by Arndt (1977) of the Indonesian trade minister's claim that 1976 industrial exports totaled $220 million is an enlightening example. After eliminating processed goods such as sawn timber, vegetable oils, and crumb rubber, Arndt noted that much of the SITC classification "manufactured goods" was accounted for by tin, unwrought and in bars, and most of the $53.2 million of "machinery and transportation equipment" consisted of reexport. The items that he claims can plausibly be considered manufactured exports totaled only $9.6 million out of $2.4 billion in nonoil exports in 1976.

4. The data also indicate that females accounted for most of the increase in manufacturing employment over this period.

5. There are some serious pitfalls in comparing Indonesian census data over time. Gavin Jones (1978) provides a number of alternative measures of employment growth by making various corrections to the census data.

6. This phenomenon was first examined by Papanek (1974).

7. The data suffer from a number of weaknesses. First, average manufacturing wages may have changed because the commodity composition of manufacturing changed somewhat over this period. Second, because of the highly variable rates of capacity utilization over the period, the data may not represent "payment per year of labor services," since employees may have worked part time. The problem of payment in kind does not appear important because the data supposedly include such payment valued at market prices. The problem of manufacturing's changing commodity mix was partially resolved by calculating real wages for one manufacturing subsector (textiles). As a whole, the textile real wage demonstrates the same downward slide as manufacturing except for a larger decline in textile wages in 1965–67. This drop may represent the extremely low levels of capacity utilization of those years.

8. This is also true for a time series on household servant wages in Jakarta. Papanek (1974, p. 12) notes that real wages on estates in 1938 were probably 15 percent higher than in any subsequent year.

9. However, aid foreign exchange (Devisa Kredit) continued to receive a special rate of Rp 326 until December 1970.

10. The price-level deflator is the cost-of-living index for a government worker in Jakarta linked with the sixty-two-item Jakarta cost-of-living index.

11. The ratio of the black-market rate to the EER_x may not be a good indicator of the EER_x's overvaluation for at least two reasons. For one thing, pressure on the black-market rate may come from a desire to export capital abroad when it is legally prohibited. In the case of Indonesia, the leaps in the black-market rate in late 1959 and early 1960 were in part due to severe government actions against Chinese entrepreneurs, which resulted in a surge of Indo-Chinese capital out of the country. Second, the black-market rate reflects exchange restrictions not only on exports but also on imports. Given an EER for exports, the black-market rate would be higher the greater the restrictions on imports.

12. A theory of smuggling that explains the simultaneous existence of legal trade, smuggling, and price disparity is found in Pitt (1978). The theory presented there considers legal trade and smuggling as activities carried out by the same firms. A large share of smuggling takes the form of misinvoiced, misgraded, and misweighed legal trade. The greater the legal export, the easier it is to hide smuggling from enforcement agencies and therefore the less costly smuggling will be. Thus legal trade can be viewed as an input into the smuggling activity. Price

disparity exists because firms will bid the price of the smuggled commodity above its legal trade return as long as profit can be made in combined smuggling and legal trade.

13. Lee and Pitt (1978) found that new weaving firms in Indonesia are much more capital-intensive than older firms. The newest quintile of firms in their sample had a capital/labor ratio two and one-half times as great as the oldest quintile of firms and 31 percent greater than average.

14. The table also serves as the basis for the sectoral disaggregation of the employment calculations that follow. It should be noted that the 171-sector input-output table for Indonesia used in this research is not identical to that published by the Biro Pusat Statistik (1976). In the published 175-sector table, small-scale agriculture processing activities are considered separate sectors or are aggregated into the NRB agricultural activity.

15. Had the data been available, price comparisons would have been used to check nominal protection estimates in all sectors.

16. Large quantities of cloves ($30.4 million in 1971) are imported for use in the kretek (clove cigarette) industry.

17. MPO is the acronym for *menghitung pajak orang-lain*, literally, "to count the tax of another person." The name is derived from the fact that the seller of a taxed commodity usually withholds the tax on behalf of the purchaser.

18. Richard and Peggy Musgrave, in an unpublished memorandum, provide the following analysis:

"Assume that for a firm the only cost is the price of merchandise purchased. The profits tax T equals:

$$T = tP - Z$$

where P is profits, t the profit tax rate, and Z the MPO credit claimed. Furthermore, assume that profits are estimated by a margin m on sales S, so

$$P = mS,$$

and that sales are determined as a markup u on cost C, so

$$S = (1 + u)C.$$

Cost can be presumptively determined on the basis of Z, so that

$$C = Z/g$$

where g is the MPO tax rate. Thus, substituting and solving for T, one obtains

$$T = t\left(\frac{m(1+u)}{g} - 1\right)Z$$

and since

$$u = \frac{m}{1-m} \text{ then } T = t\left[\frac{m(1+m/1-m)}{g} - 1\right]Z$$

When $g = .02$, the term in the brackets is positive when m exceeds 1.96 percent. Since m would typically be above that, the tax increases with Z and the firm would decrease its tax liability by underreporting Z its MPO credit."

19. The special exchange rates for cotton and weaving yarn have been adjusted since 1970 as follows:

Beginning Date	*Raw Cotton Exchange Rate per U.S. $1*	*Exchange Rate of General Foreign Exchange per U.S. $1*
3 July 1969	Rp 170	Rp 326
23 Feb. 1971	Rp 215	Rp 378
18 Jan. 1972	Rp 271	Rp 415

Beginning Date	*Weaving Yarn Ex-PL 480 Exchange Rate per U.S. $1*	*Exchange Rate of General Foreign Exchange per U.S. $1*
5 July 1969	Rp 125	Rp 326
3 May 1972	Rp 150	Rp 415

20. The rebate schedule was as follows:

Country of Origin	*Rebate per U.S. $1*
United States and Canada	Rp 60
Netherlands, West Germany, France, Belgium, and the United Kingdom	Rp 40
Australia and New Zealand	Rp 30
Untied aid foreign exchange from United States	Rp 30
Japan	Rp 20

21. These categories accounted for nearly 20 percent of imports (excluding imports of oil companies) in fiscal year 1971/72.

22. This does not imply that underinvoicing does not occur, only that it does not seem to bias the estimates. Special costs associated with illegal transactions, such as side payments to customs officials, may be offsetting the benefits of undervaluation.

23. Textile bleaching, printing, dyeing, and finishing except batik (68), a sector for which there is no trade attributed by the 1971 input-output table, is nonetheless considered a tradable. The absence of any reported trade in the sector is attributable to the inflexibility of the trade statistics. All textiles, printed and dyed or not, enter as weaving sector imports with no attribution of the printing and dyeing activity to that sector. The sector is considered import-competing because it is protected both by higher tariffs on the import of dyed and printed textiles relative to undyed and unprinted textiles and because there are prohibitions on the import of certain varieties of textiles only if they are printed.

24. Examination of trade data for years adjacent to 1971 indicates that railroad and aircraft equipment imports in 1971 were less than average and that those sectors should be classified as noncompeting imports rather than import-competing. Fertilizer had a 1971 value of T that was borderline, 0.81, and in light of rapidly growing productive capacity in this sector, fertilizer was classified as import-competing.

25. Traditionally, a substantial share of of crudely milled Indonesian rubber has been exported to Singapore for remilling and reexport. However, prohibitions on the export of lower grades of rubber, in effect in 1971, diverted most rubber exports through the smoking and remilling sector.

26. It is not clear to which trade classification petroleum refining would belong. Most exports are refined by-products for which sufficient market does not exist in Indonesia, while imports consist of more basic products such as kerosene. According to Johnson (1977, p. 43), most of the refined exports consist of low-sulfur waxy residue. With trade in petroleum products under the control of the state petroleum monopoly, PERTAMINA, it may be that, under an efficient pattern of resource allocation, the value of T might be positive rather than marginally negative.

27. The survey is the *Survey Perusahaan Industri 1973*. Man-days were calculated in the following manner: firms reported the number of days they were in operation during each quarter and the number of employees at the middle of each

quarter, and the two figures were multiplied and summed over the four quarters. The detailed employment data were coded from firm questionnaires for this research. Aggregated data from the survey were published as Biro Pusat Statistik *Statistik Industri 1973* (2 vols.), Jakarta 1975.

28. Because part-time operatives may be more prevalent than part-time white-collar employees, the first assumption may not be strictly true and operative man-days may be overestimated, but not consequentially.

29. These weights are chosen because it is felt that increments in manufacturing value added would be more in proportion to the sectoral composition of consumption than production. The factor requirements calculations therefore represent requirements for incremental units of domestic value added.

30. Even if trade via Singapore and Hong Kong were not of an entrepôt nature, it would not be a misspecification to label them developed countries, since only the correct ranking of countries by factor endowments is of concern. Classified as LDCs, Singapore and Hong Kong would likely be the best capital-endowed among them; if classified as DCs they would be among the least well-endowed. Since Indonesia is near the bottom of a capital-intensity ranking, its position is of no importance here. Therefore Singapore and Hong Kong can be considered developed countries for both import and export trade. Any significant change in the results for imports that would come about by considering them as LDCs will be noted.

31. Although this difference is small, the variance of these sectoral labor coefficients is also small.

32. This might possibly be explained by the presence of large economic profits earned by firms in these oligopolistic sectors.

33. A 15 percent rate of growth of manufactured exports is small relative to the rate of growth projected by "The Study of Long-Term Growth Perspectives" supervised by the Indonesian minister of state for research and reported in Sumitro Djojohadikusumo (1977, p. 26). They estimated a growth rate of manufactured exports of 39.2 percent per annum over the period 1974–80 and 25.2 percent over 1980–85. Since they define manufactured exports much more narrowly than here, their projections are not applicable.

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