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Chapter Title: The Effect of Trade Strategies and Domestic Factor Market Distortions on Employment

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8 The Effect of Trade Strategies and Domestic Factor Market Distortions on Employment

The evidence presented in chapter 7 indicates that there are sizable factor market imperfections in some of the project countries. Knowledge that they are large, however, does in itself not tell us the effect these distortions have on labor coefficients and employment potential.

The task of this chapter is to analyze the influence of trade regime (product market) interventions and domestic factor market distortions on labor coefficients. The objective, of course, is to provide a rough estimate of the order of magnitude of the potential increase in the demand for labor, especially unskilled labor, that might arise under altered trade strategies and under altered factor market conditions.

8.1 Within-Strategy Inefficiencies

The labor coefficients for exporting and import-competing HOS industries reported in chapters 5 and 6 reflect the outcome of several influences: the "natural" factor intensity underlying comparative advantage; the domestic factor market incentives discussed in chapter 7; and the particular instruments chosen to promote the trade strategy in operation in each country.

Insofar as the trade strategy, through exchange rate overvaluation or other instruments, influences incentives to employ alternative techniques of production, that influence is reflected in the estimates provided in chapter 7. However, there is another route through which trade strategy influences labor coefficients: by affecting the composition of industries encouraged under a given regime. Empirically, the phenomenon is far

In revising this chapter, I benefited greatly from comments by members of the Workshop on Economic Development at the Center for Research on Economic Development at the University of Michigan.

more important under import substitution regimes than under export promotion: the height of protection accorded to different industries under import substitution varies considerably, and it is at least a plausible hypothesis that alternative structures of effective protection might result in labor coefficients associated with exporting and import-competing activities different from those reported in chapters 5 and 6.

In this section, concern is with the degree to which observed coefficients by trade category may have been influenced by elements of the protective structure. Two types of evidence are available: first, there are country authors' estimates of the association between the height of protection (both for exporting and import-competing industries) and the inferences that can be drawn from the variation in labor coefficients within trade categories as to the potential for greater labor utilization[1] within trade strategies; second, there is the evidence from countries that did alter their trade strategies as to the effect on observed coefficients of the change.

It should be noted first that there is a good basis for believing that any attempt to estimate the degree to which observed coefficients might be altered by improved resource allocation within existing trade regimes is likely to result in an underestimate of the "true" potential. To some extent this is indicated by the experience of countries that altered their trade strategies, discussed below. However, there are other reasons. To an unknown extent, choice and implementation of trade strategy and factor market distortions may interact to preclude the emergence of certain activities, and it is not possible to infer the potential of those "missing" activities. For example, Lipsey, Kravis, and Roldan's (1982) results demonstrate that the choice of location of activities by multinational corporations is influenced by the real wage rate prevailing in the host country. To the extent that some countries with relatively abundant labor nonetheless established and enforced high legal minimum wage levels, certain types of labor-intensive activities may not have been located in those countries, and instead developed elsewhere in the world, possibly even in countries with a higher capital/labor endowment but a lower real wage.

Likewise, Henderson's findings, discussed in more detail in section 8.3.2, show relatively broad-based comparative advantage for South Korea and Taiwan, contrasted with relatively narrowly based comparative advantage for some of the import substitution countries. What this suggests is that the coefficients and activities observed under import substitution may not at all reflect what would happen, either in import substitution or in exporting activities, under an alteration in trade strategy and domestic factor market structure. Stated in another way, using the existing HOS exportable activities observed under an import substitution regime as a guideline to indicate where comparative advantage lies for industrial exports may vastly understate the potential for improved efficiency of resource allocation among exportables. It is quite possible that some potential exportable activities do not even exist under an import substitution strategy, and that some activities that do export do so only because their major raison d'être is the incentives generated under an import substitution regime.

Bearing in mind that the estimates of within-regime inefficiencies probably understate the potential for gain through reallocation, we can turn to the evidence from the country studies. Focus is upon the potential effect upon average labor input coefficients for HOS exportables and import-competing industries that might have resulted under alternative incentives within existing trade strategies.

8.1.1 Variance in Levels of Protection

Data on the mean height of effective protection by the major categories of tradables are given in table 8.1.[2] As can be seen, not only was the level of protection different for import-competing and exportable activities, but there were sometimes large differences in rates of protection for different types of goods within the same category. For Indonesia, for example, the average level of effective protection for HOS import-competing goods was 66 percent, but it was 132 percent for those Pitt classified as protected, and −14 percent for those deemed competitive.

The data in table 8.1 are only the beginning of the story. Within categories there was often wide variance, as was seen in chapter 3. For Chile, for example, Corbo and Meller calculated the range of ERPs for each category of tradables. For HOS exportables, the range of ERPs for export sale was −23 to +14 percent; for HOS import-competing goods sold domestically, it was −15 to +1,830 percent. Carvalho and Haddad estimated ERPs for Brazil for a variety of years. Among manufacturing industries in 1958, during the Brazilian import substitution period, ERPs ranged from 17 percent for pharmaceuticals and 22 percent for machinery to 281 for plastics and 387 percent for food products. In Tunisia, HOS exports had a mean rate of effective protection of 23 percent with a standard deviation of 44 percent, while HOS import-competing goods had a mean rate of protection of 300 percent and a standard deviation of 772 percent (Nabli 1981, table 10.6).[3] Uruguay's range was also large: even at a two-digit level, ERPs for goods produced for the domestic market ranged from 20 percent for leather and leather products to 689 percent for transport equipment and 1,014 percent for beverages, while for exports they ranged from 24 percent for leather products to 156 percent for primary metal products (Bension and Caumont 1981, table 11.7).

Table 8.1 Effective Rates of Protection by Trade Categories

Country	Year	Exportables: PCB-HOS	Exportables: Other HOS	Exportables: All HOS	Importables: Protected HOS	Importables: Competitive HOS	Total HOS
Argentina	1969	n.a.	−3	−3	n.a.	n.a.	130
Brazil		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Chile	1967	n.a.	0	n.a.	n.a.	n.a.	267
Colombia	1969	n.a.	34	−17	n.a.	n.a.	n.a.
Indonesia	1971	n.a.	−11	n.a.	132	−13	66
Ivory Coast	1973	−40	35	−36	84	−21	13
Pakistan		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
South Korea (manufacturing)	1968	n.a.	5	n.a.	n.a.	n.a.	−9
Thailand	1973	−18	0	−10	69	25	53
Tunisia	1969	−13	−8	n.a.	n.a.	n.a.	90
Uruguay	1968	—	37	—	384	—	—

Sources: Argentina, Nogues 1980, table 2.3; all others, Krueger et al. 1981: Brazil, table 2.9; Chile, table 3.10; Colombia, table 4.4; Indonesia, table 5.11; Ivory Coast, table 6.10; South Korea, table 8.9; Thailand, table 9.9; Tunisia, table 10.6 (Blake's estimates); Uruguay, table 11.7.

8.1.2 Labor Coefficients by Level of Protection

A natural question therefore arises. Insofar as labor coefficients vary systematically with the level of protection and there existed opportunities within trade strategy to alter the mix of industries toward those with less protection, there presumably existed opportunities to increase international value added, employment, and real incomes for given levels of investment within the manufacturing sector by switching within a category to less-protected activities.

There were three countries for which authors provided estimates of the labor coefficients in their countries by height of protection.[4] The estimates are reproduced in table 8.2. As can be seen, in these cases there did appear to be a relationship. In Chile, exportables with ERPs above the median had average labor coefficients below those of import-competing industries. Within import-competing industries, less-protected activities had a labor coefficient about one-fourth larger than did activities with above-median levels of protection. For Indonesia the same pattern emerges for import-competing activities with below- and above-average levels of protection, although firms with average levels of protection had somewhat higher labor coefficients than firms with below average levels of protection. For the Ivory Coast, exportables' labor coefficients decreased as effective protection increased; for import-competing goods, however, below-average protection implied somewhat lower labor coefficients. This reflects in part the fact that part of the Ivory Coast's HOS import-competing industry is competing with other low-wage African countries. It is highly protected and, despite the labor coefficients, has a much higher capital/labor ratio than does production competing with imports from DCs. (See Monson 1981, pp. 266–67, and section 8.1.3.6 below.)

For Tunisia, Nabli attempted to evaluate the relationship between labor coefficients and ERPs by regression analysis. He computed a simple correlation coefficient between indicators of factor intensity and ERP estimates, excluding those with negative ERPs and those with ERPs over 400 percent. While there was no significant relationship for total labor inputs, there was evidence of negative association between unskilled labor intensity and the height of ERPs (Nabli 1981, p. 484). Reasoning that the weakness of the results might be attributable to the scaling procedure used, Nabli then classified activities into seven groups, according to their height of effective protection, and computed average labor employed per unit of DVA for each group. Again, results were stronger for unskilled labor: the average unskilled labor coefficient for the two groups with the lowest average effective protection (negative and less than 50 percent) was 37 percent greater than that for the two groups receiving the highest effective protection (Nabli 1981, pp. 460–61).

Table 8.2 **Labor Coefficients by Level of Protection (Labor Units per Unit of DVA)**

	Chile	Indo-nesia	Ivory Coast[b]
Exportables with ERPs			
Below median or average	91.98	—	2,695
Median or average	—	2,175	2,488
Above median or average	44.39	—	2,160
Import-competing industries with ERPs			
Below median or average	67.77	1,130	1,534
Median or average	—	1,326[a]	1,652
Above median or average	53.81	752	1,709

Sources: Krueger et al. 1981: Chile, table 3.17; Indonesia, table 5.19; Ivory Coast, table 6.13.

[a]This number refers to inputs with "medium" levels of protection.

[b]Numbers are total man-hours (management, skilled, unskilled, and artisanal) per million FCFAs, HOS activities only.

The same general pattern emerged in Thailand: Akrasanee regressed value added per employee (taken as a measure of capital intensity) on the rate of effective protection and found a significant positive association for direct, but not direct plus home goods, value added (Akrasanee 1981, p. 429).

8.1.3 Potential for Within-Strategy Gains

Thus there does appear to be evidence of a link between labor intensity and the height of effective protection within both exporting and import-competing industries among the countries covered. It remains to estimate how much potential there was for altering coefficients within strategy. This can best be done considering the evidence from each country in turn.

8.1.3.1 Argentina

Although there was considerable variation in ERPs and labor coefficients among import-competing industries, Nogues concluded that import substitution had proceeded so far in Argentina that there was little scope by the early 1970s for shifting activities within import-competing industries. On the export side, there was substantially greater potential, although the chief source of within-strategy variation appeared to be the labor intensity of exportables going to LAFTA, which was markedly less than that of exportables destined for developed countries. In general, Argentine HOS exports going to LAFTA originated from import-competing industries, and it did not appear that, given the strong protection accorded the domestic market, there was much potential for improved resource allocation and greater employment within the existing trade strategy.

8.1.3.2 Brazil

Data for Brazil are too aggregated to provide meaningful evidence on the within-strategy variance in labor coefficients. What is available and suggestive of the indiscriminate nature of incentives under the import substitution strategy is a comparison of trade levels and labor coefficients in 1959 and 1968–74. If one takes either 1959 or 1970 labor coefficients and applies them to actual HOS trade flows over the years, the results are striking. They are presented in table 8.3. The first two columns give the estimated average labor input per million cruzeiros of actual exports and imports on the basis of constant 1959 labor coefficients for each sector. The last two columns provide the same estimates based on 1970 labor coefficients. These data are based on the twenty-one-sector input-output table, and it is quite possible that further disaggregation might show somewhat different results. Nonetheless, the figures are instructive. Holding input coefficients constant, the changing composition of Brazilian exports over the period 1959–74 would have required a 70 percent increase in employment for the same value of exports, based on 1959 labor coefficients. Using 1970 coefficients, the estimate is even larger: about 83 percent. It will be recalled that the Brazilian government had begun altering trade strategies in the mid-1960s, and that the export boom began in 1968.

The data seem to indicate that the industrial composition of the import-competing industries (as reflected in the actual bundle of imports) changed little after the shift in trade strategies. The change in labor coefficients among exportables is sizable, and the estimated magnitude is

Table 8.3 **Brazilian Employment per Unit of Trade Implied by the 1959 and 1970 Labor Coefficients (1968 = 100)**

	1959 Labor Coefficients		1970 Labor Coefficients	
Year	Exports	Imports	Exports	Imports
1959	70.9	100.2	69.6	102.5
1968	100.0	100.0	100.0	100.0
1969	104.3	101.6	105.0	101.3
1970	106.2	102.2	107.5	101.9
1971	107.0	103.6	109.9	103.8
1972	112.8	104.8	117.4	105.7
1973	125.2	103.1	131.7	103.1
1974	120.4	90.0	127.3	90.6

Source: Data are from Carvalho and Haddad 1978, appendix tables A1, A5, A7, and A10.

remarkably similar regardless of whether 1959 or 1970 coefficients are used. This probably reflected a more rational allocation of resources among export industries, emanating from more uniform export incentives (as contrasted with the exporting from import substitution industries that had occurred earlier). With greater uniformity, there was a sizable increase in the labor intensity of exportables. If that interpretation is correct, it gives support to the suggestion offered above, that an observed difference at a point in time in labor-input coefficients between exportables and the import competing goods under import substitution regimes understates the potential difference.[5]

8.1.3.3 Chile

Chile is among the project countries whose trade regimes was biased toward import substitution throughout the period covered by Corbo and Meller. Differences in labor coefficients by level of protection were reported in table 8.2, and we saw that exportables with above-average protection were less labor-using than import-competing industries with below-average protection, thus attesting to the large variation within trade categories.

Further evidence comes from data that Corbo and Meller provide on labor coefficients per DVA for individual four-digit industries. These cover only the eight largest HOS exportable industries and the ten largest HOS import-competing industries. Even among HOS exportables, most either were directed to other LDCs (see Corbo and Meller 1981, table 3.12) or are related to resource availability, as with canning of fruits and vegetables, wine, sawmills, and pulp and paper. The range of labor coefficients among the eight HOS exportable industries is from 21.5 persons per million escudos of direct value added (for malt liquor and materials) to 121.2 persons for sawmills. For import-competing industries, the range is from 20.3 persons per direct DVA (motor vehicles) to 71.5 for structural metal products and 83 for repair of aircraft and aircraft parts (which is almost always an industry in which domestic production within the category does not correspond to imports).

The overlapping of these ranges is, of course, to be expected, and there is no strong suggestion of selectivity within either exports or import-competing HOS industries. This impression is reinforced by the results Corbo and Meller obtained when they regressed net imports for individual commodity groups at the four-digit ISIC levels against unskilled labor and capital coefficients. Although signs were as expected and the coefficients significant for skilled labor (positive) and unskilled labor (negative), the explanatory power of these variables was not high: R^2s ranged from .33 to .39 (see Corbo and Meller 1981, table 3.18), thus further suggesting high variance in factor proportions among both export and import-competing industries.

8.1.3.4 Colombia

Among the most convincing pieces of evidence about the wide variance in activities induced by an import substitution regime was Thoumi's careful examination of the industries that changed trade categories in Colombia between 1970 and 1973. Recall that Colombia switched trade strategies in the late 1960s, removing much of the bias for selling in the home market. There is reason to believe that in 1970 the pattern of output still largely reflected the earlier incentive structure and that, during the next several years, the composition of output and trade was shifting in line with comparative advantage as the new incentives induced producers to alter their production patterns. Excluding food and tobacco, there were six industries that had been import-competing and became exporting industries by 1973. The unweighted average labor coefficient for those six industries was 32.9. By contrast there were four industries that had been exporting in 1970 and were classified as import-competing by 1973. Their average labor coefficient was 11.3, although the number of industries was smaller and the reliability of that coefficient is open to question.

That examination of the 1970 trade pattern shows some import-competing industries with relatively high labor coefficients and others with very low ones, relative to what occurred with a realignment of incentives, is strong evidence that the Colombian import substitution strategy had encouraged import-competing industries without great selectivity. This suggests that, if it had been possible under import substitution to channel more resources into those relatively more labor-using industries, the employment implications of the import substitution strategy would have been less unfavorable than they in fact were. That such a move would also have improved resource allocation is suggested by Thoumi's examination of the effective protection rates associated with the industries that switched classifications: industries that became exports by 1973 had an effective protective rate of 11 percent (contrasted with 19 percent for all manufacturing), while industries that turned from exporting to import-competing had an average effective protective rate of 16 percent. It would be of great interest to trace Colombia's shifting pattern of trade after 1973 as her realigned trade strategy continued to pull resources in new directions. And, though the data do not permit a diagnosis of the extent to which the export strategy induced a greater uniformity in input coefficients across sectors, they strongly indicate that the pattern of trade induced under the import substitution regime had considerably greater variance in input coefficients than an alternate pattern might have had.

One can infer the resulting shift in the ratio of labor coefficients in exportable and import-competing industries from the following line of reasoning. Thoumi estimated that the number of workers per million 1970 pesos of direct value added for all HOS exports rose from 23.8 in

1970 to 29.1 in 1973, or 22 percent; if sugar, petrochemicals, and jewelry are excluded, the increase was from 28.6 to 35.5, or 24 percent. There is no indication of the corresponding change for import-competing goods. If the shift was of approximately the same order of magnitude (toward greater capital intensity of import-competing activities because the labor-using among them became exportable industries), there would have been a 25 percent increase in capital intensity in import-competing industries owing to their changing composition. The Brazilian evidence, however, suggests that the effect may be substantially smaller on the import side than on the export side, and so a figure of 10 percent seems more plausible. Using that estimate, the implied capital intensity of import-competing industries in 1970 would have been 14.00 (calculated by taking the 1973 ratio of labor coefficients, 1.88, to infer a 1973 coefficient for import-competing industries of 15.39 and multiplying that by 0.9). This estimate implies a labor coefficient for exportable industries in 1970 relative to that of import-competing industries of about 1.7, compared with 1.88 in 1973.

One further point should be stressed. Not only did Colombia's import substitution industries in 1970 consist of a mix of labor-intensive and capital-intensive activities, but those few industries that were exporting encompassed a similar range of factor uses. Thus, while it is possible to conclude that import substitution more discriminately carried out might have resulted in both more output (valued at international prices) and a greater demand for labor, it also follows that the same sort of rationalization might have occurred among the HOS exporting industries, as is evidenced by the realignment of industries traced by Thoumi over the next several years. What is not clear from Thoumi's data, or from other available evidence with regard to other countries, is the cause of the indiscriminate pattern that appears among exporting industries. It may have resulted from incentives within the trade regime or instead may have been a function of domestic policies that reduced the costs of using capital and thus made capital-intensive activities more profitable. It seems clear that both influences—especially currency overvaluation associated with the trade regime itself and domestic policies making credit available at implicitly subsidized interest rates—played a role. It is not, however, possible to evaluate their relative importance.

8.1.3.5 Indonesia

Pitt estimated that man-days per million rupiahs of DVA were 2,175 for HOS exportables and 1,038 for HOS import-competing activities (Pitt 1981, table 5.19). There was, however, sizable variance in labor coefficients according to the height of protection (see table 8.2). Skill and capital utilization per man-day were also higher among highly protected industries: skill-days per man-day for the import substitution group with relatively low protection were 1.08, while for the highly protected group the corresponding figure was 2.60. Energy expenditures per man-day showed a similar pattern: 72.43 rupiahs per man-day for import substitution activities with below-average protection and 120.8 per man-day with above-average protection (contrasted with 20.5 in exportable industries).

These data suggest that there was probably considerable scope for increasing value added (at international prices) and employment within the import substitution sector: if capital, as reflected in energy utilization, was the binding constraint upon the size of the import substitution sector, employment could have increased about 66 percent within import substitution industries if resources had all flowed into the less-protected sectors. If, instead, skill availability was the constraint, the potential increase would have been even larger. To be sure, a shift of resources toward exporting industries at the coefficients reported by Pitt could have generated an even larger increase in IVA and employment for the same capital or skill constraint. Nonetheless, it seems clear that there was scope for improved resource allocation within import substitution industries in Indonesia, which might have permitted substantially more rapid growth of employment within the urban sector than in fact occurred.

There was not much variability among Indonesian HOS exportables, however. It thus appears that in the Indonesian case rational resource allocation within import substitution sectors might have reduced the differential in the labor coefficients between exportable and import-competing industries.

8.1.3.6 Ivory Coast

Labor coefficients for firms with above- and below-average protection were reported in table 8.2. As can be seen, there appears to be somewhat less divergence within exportables and import-competing industries than in other countries. Monson concluded that this was largely because whatever incentives there were—priority firm status with the built-in bias toward capital-intensive techniques, low-interest loans, and the like—were provided to firms regardless of their trade status.

Monson uncovered one source of considerable variance in factor proportions among import substitution industries: import substitution industries competing with imports from other developing countries received higher protection than did imports competing with imports from developed countries and used markedly different factor proportions. Priority firms competing with imports from LDCs produced 89 percent of DVA in those activities and had a capital/labor ratio of 3,824 FCFA per man-hour contrasted with priority firms competing with imports from DCs, whose average capital/labor ratio was 1,522 (see Monson 1981, table 6.14).

Monson noted that policies to encourage import substitution in industries competing with LDC imports had really begun in the early 1970s, and that they therefore constituted a relatively small part of total domestic import substitution activities in 1972, the year covered in his study. Encouragement of industries competing with LDC imports within the import substitution sector would entail much higher costs, and reduced scope for additional employment, than would policies that tended to provide incentives for the relatively lower-cost import substitution activities. Indeed, if the incremental capital stock were the binding constraint upon expansion of value added and employment in Ivorian manufacturing sectors, and if Monson's estimates correctly reflect the disparity in the capital/labor ratios between the two sets of import-competing industries, encouragement of import-competing activities with LDCs would permit only 40 percent the expansion of employment, and about 57 percent the increase in international value added (calculated on the basis of effective protective rates given in Monson's table 6.13), that expansion activities competing with DC imports would provide. Although the size of the activities competing with imports from LDCs was not large in 1972, there is reason to believe that it may have grown since, and that the losses in employment (and foregone IVA) resulting from that policy may be sizable.[6]

8.1.3.7 Pakistan

The Pakistani economy provides an excellent illustration of how complex the interactions between domestic and trade variables can be. Table 8.4 presents data on labor coefficients within individual industries in relation to the import substitution strategy. The first column gives the effective rates of protection prevailing in 1970–71. The next three columns give the range of labor coefficients, including the mean, high, and low coefficients found in firms within the industry. The final three columns give the average labor coefficients within the industries depending on size of firm.

As can be seen, the strongest pattern that emerges is that small-scale firms have higher labor utilization rates than large firms, though there is wide variability among categories. For example, large and small firms in the basic metals sector have almost identical coefficients, while medium-sized firms have a labor coefficient only about one-eighth that of the other firms.[7] That small firms in Pakistan are significantly more labor-using probably reflects in substantial part the existence of the informal sector discussed in chapter 2.

For purposes of analyzing within-strategy inefficiencies, these data raise numerous troublesome questions. A trade strategy that encourages the expansion of small-scale firms would undoubtedly have a larger positive influence on the demand for labor than a trade strategy that encouraged expansion of large-scale firms in the same industry to create the same additional domestic value added. However, there is little hard evidence directly identifying the size of firms that would expand under

Table 8.4 Variability in Labor Coefficients in Pakistan by Industry Subgroups and Firm Size, 1969–70, and ERPs

		Man-Years per Million Rupees of DVA					
		Range within Industry Subgroups			Labor Coefficient by Size of Establishment		
Industry	ERP 1970–71	Mean	High	Low	Small	Medium	Large
Food and beverages	130%	62	91	29	127	57	54
Cotton textiles	172	122	274	122	184	171	111
Footwear	n.a.	113	244	85	307	236	91
Paper and paper products	177	101	102	100	248	170	82
Printing and publishing	36	124	271	110	198	131	109
Leather and leather products	177	79	84	30	126	25	58
Rubber and rubber products	132	62	299	20	434	168	39
Industrial chemicals	106	63	95	15	229	64	31
Basic metals	220	119	240	117	124	17	126
Metal products	235	207	538	115	296	157	205
Electrical machinery	192	101	242	45	286	86	98
Nonelectrical machinery	188%	222	473	189	279	208	209

Source: Guisinger 1981, tables 7.9 and 7.11.
Note: ERP for food and beverages is that for edible oils.

either strategy. Import substitution firms may on average be of larger size than exporting firms within a country. An offsetting factor, however, would arise if exports originated in the larger firms within potential export industries.[8]

Given the wide variation in labor coefficients within industries, it is difficult to estimate the degree to which within-strategy efficiency gains (as reflected by shifting resources toward industries with lower ERPs) might be realized in Pakistan. There is not even a strong pattern of association between the height of effective protection and the degree of labor utilization.

8.1.3.8 South Korea

As seen in chapter 3, South Korea's pattern of protection after 1960 was based largely on a commodity's trade status: the same industry was subject to different levels of protection depending on whether the product was destined for export or for sale in the domestic market. Thus, encouragement appears to have been based upon prospective export performance, which meant that incentives for exporting were relatively uniform for different industries.

This incentive pattern appears to have resulted in improved efficiency of resource allocation. This can be seen from Henderson's results based on the Korean input-output tables for 1966, 1970, and 1973. The first year, 1966, was fairly early in South Korea's transition to an export-oriented economy, whereas by 1973 the export orientation of the economy was well established.

Henderson computed "g_j" coefficients for each activity, reflecting the degree to which international value added would be altered with expansion of the activity by one unit (a negative g_j therefore reflects the finding that the activity was, at the margin, uneconomic and that international value added would increase if the activity contracted and the resources were reallocated elsewhere). A rough measure of the efficiency of resource allocation can be taken to be the mean absolue value of the g_js.[9]

Henderson's results show that the developed countries had mean absolute g_js of about .1, whereas most of the developing countries included in his computations had g_js of more than .3. South Korea was an exception. The figure for 1966 was already .19, and by 1973 it had fallen still further, to .15. It is unfortunate that the comparable data are not available for Korea in the 1950s. If the efficiency of resource allocation under import substitution in that country was similar to that of the LDCs for which Henderson did have data, and the mean g_j was more than .3 in the earlier period, it would suggest a substantial improvement in resource allocation, within both exportable and import-competing industries, resulting from the alteration in trade strategy.[10]

Table 8.5 Labor Coefficients for Manufacturing Industries within Trade Categories, Thailand 1973 (Direct Labor Inputs per Million Baht of DVA)

Trade Category	Lowest	Median	Highest
Protected import-competing	4.9	21.6	89.3
Competitive import-competing	5.3	41.9	118.2
Noncompeting imports	10.7	34.9	61.8
PCB-HOS exports	8.8	19.0	86.5
Other HOS exports	14.4	32.2	80.2

Source: Akrasanee 1981, table 9.12.

8.1.3.9 Thailand

Thailand appears to have had above-average variation in input proportions within trade categories. Table 8.5 provides data on the labor input per million baht of DVA according to trade categories, with industries recording the highest, lowest, and median labor inputs. As can be seen, the range within each category is enormous: the industry with the highest labor input had more than 22 times as high a coefficient as the lowest among protected import-competing industries, and for competitive import-competing industries the spread was almost as great. For PCB exports, the range was from 8.8 to 86.5, and even for HOS exports it was from 14.4 to 80.2. Thus, in Thailand's case, it appears that wide variation within sectors was at least as significant in affecting the growth of employment opportunities as was any overall bias of the regime. These differences were also reflected in wide ranges of effective protection rates within, as well as between, categories of tradables (see Akrasanee 1981, tables 9.8, 9.9, and 9.10). Clearly there was considerable scope for improving resource allocation within both exportable and import-competing industries.

8.1.3.10 Tunisia

The indiscriminate nature of import substitution in Tunisia prompted Nabli to estimate the order of magnitude of potential gains in employment and output, for the actual investment that took place, that might have been achieved under a more selective import substitution strategy. Nabli started by identifying relatively labor-intensive import substitution industries where imports were still entering the country. He then estimated the expansion in output that could have occurred at existing prices to replace imports and identified some capital-intensive industries that might have contracted. This would have released some capital, but the value of output at domestic prices would have been unaltered while employment would have increased. He then investigated the scope for additional import substitution in industries identified as relatively labor intensive in the rest of the world but for which Tunisia had very low levels of production or had not started the industry, and he examined the scale on which they could have operated with the capital released from the capital-intensive import substitution industries.

Nabli found that domestic value added in import-competing industries could have increased by about 40 percent, while total employment in those industries could have been augmented by 51.5 percent. The increase in employment of unskilled labor would have been even greater—58 percent.

8.1.3.11 Uruguay

The Uruguayan system was characterized by such detailed controls that wide variation was inevitable. This was reflected in a very wide range of ERPs for import-competing goods (import licenses were generally not issued for goods that could be produced domestically) and also for exportables. ERPs for products sold on the home market exceeded 500 percent for beverages, footwear, paper and paper products, rubber products, nonmetallic mineral products, electrical machinery, transport equipment, and miscellaneous manufacturing. By contrast, they were less than 100 percent for printing and publishing, leather and leather products, and nonelectrical machinery. For export, EERs exceeded 50 percent for beverages, footwear, wood and cork products, rubber products, primary metals, nonelectrical machinery, and miscellaneous manufacturing.

Such large divergences in rates of protection were reflected in wide variations in labor and capital coefficients. For export industries, the number of persons employed per million dollars of DVA ranged from 218 (tires) to 1,615 (for wool spinning and weaving), averaging 366. Differences in utilization of unskilled labor were even larger, ranging from 15 persons per million dollars of DVA in the tires sector to 472 in fish preserving. Similarly, electricity utilization per million dollars of DVA ranged from 469 (fish preserving) to 5,498 for cement, averaging 1,483 among the eleven largest HOS export industries. The range of capital/labor ratios (as reflected in electricity utilization per worker) was from 0.55 thousand kilowatts per worker (in wool spinning and weaving) to 26.06 thousand kilowatts per worker in cement production, with an average of 4.06 for the eleven major exportable HOS industries.

The range among Uruguayan import-competing industries was similar. Labor per million dollars of DVA ranged from 34 (tobacco products) to 373 in metal products, averaging 238. Capital utilization ranged from 86 in tobacco products to 5,150 in industrial chemicals, with a consequent range of thousands of kilowatts used per worker from 1.20 in pharmaceuticals to 22.0 in industrial chemicals, with an average of 4.88.[11]

Although the labor per unit of DVA was greater in exportables than in import-competing production on average, there are two of the ten exportable industries whose labor coefficients were below the average of the import-competing sectors, and one import-competing industry whose labor coefficient exceeded the average of the exportable sectors. Moreover, if one sorts Uruguayan exportable industries by their destination (between DC and LDC), the difference in factor proportions is striking. Cement was the largest export to other LDCs and had the highest capital/labor ratio of any of the twenty major industries enumerated by Bension and Caumont. Wool spinning and weaving was the largest industry in terms of HOS exports to developed countries, and it had the lowest capital/labor ratio. Thus a switch of a million dollars of DVA from exporting to LDCs to DCs would have implied a reduction of 85 percent in electricity utilization, and an increase of more than sixfold in employment per million dollars of DVA. Within import-competing industries, the same divergences existed. Without data on the size of the domestic market, it is impossible to ascertain the magnitude of reallocation of resource within import-competing sectors that would have been feasible within an export substitution strategy.

8.2 Substitution Possibilities

That the relative costs of employing the services of labor and capital diverged from their opportunity costs undoubtedly influenced choices of techniques and hence resulted in different labor coefficients than might have been observed under regimes with no factor market imperfections. The magnitude by which relative factor costs may have differed from their shadow prices was estimated in chapter 7. Here the purpose is to employ those estimates to indicate the order of magnitude by which labor coefficients might have been greater under alternative incentives.

For Argentina, Brazil, and Chile, country authors themselves estimated that extent to which factor market imperfections affected the choice of technique. For those countries, the authors' estimates are reviewed first. For other countries where there is an indication of the extent to which factor prices may have diverged from opportunity costs, the estimates of the magnitude of price differentials given in chapter 7 are employed, along with Behrman's estimates of the elasticity of substitution, to indicate the extent to which techniques might have altered in the absence of factor market imperfections.

8.2.1 Argentina

Nogues (1980) first considered the effects of removing distortions introduced by interventions in the labor and financial markets, then estimated the effects of also eliminating the influence of the trade regime on the price of capital goods. His results are presented in table 8.6. The first column gives his estimates of the percentage increase in labor coef-

Table 8.6 **Potential Effect of Removing Factor Market Distortions on Labor/DVA Ratios in Argentine Manufacturing Industries**

	Percentage Increase in L/DVA Resulting from Removal of Distortions in Labor and Financial[a] Markets under	
Industry Category	Protection	Free Trade
Exportables	25.1	18.9
Import-competing	18.5	10.0
With DC	20.8	11.4
With LDCs	23.0	12.1
Other import-competing	23.0	4.1
Total manufacturing	19.0	12.6

Source: Abridged from Nogues 1980, table 3.12.

[a]Assuming: (1) loans granted for ten years; (2) repayable in equal annual installments; (3) real interest rate of −9 percent and opportunity cost of 10 percent.

ficients that might result from removal of labor and financial distortions. As can be seen, for Argentine manufacturing production of tradable goods, Nogues estimated that the labor input per unit of value added might have increased 19 percent. He noted that removing these distortions would not have altered the ranking of industries by factor intensity. When Nogues assumed, in addition, that capital goods prices would be determined under free trade at an equilibrium exchange rate, the estimated total increase in labor utilization declines. This is because of the high proportion of (highly protected) capital goods that are domestically supplied, so that, at free trade, the price of capital goods would be relatively lower. Nonetheless, the combined effect of labor, financial, and trade market interventions has been to encourage the use of capital and discourage the use of labor-intensive techniques, as is reflected in Nogues's estimate that manufacturing employment might have increased 13 percent for the same composition of domestic value added, had firms maximized at prices more closely reflecting opportunity costs of factors of production. To be sure, it is questionable whether the supply of labor to the Argentine manufacturing sector is sufficiently elastic so that a 13 percent increase in demand for labor could be met without an increase in the real wage. The estimates serve to indicate, however, that the effect of factor market distortions may have been sizable.

8.2.2 Brazil

Carvalho and Haddad found that, even in the late 1960s, there was probably still a 30 percent differential between the relative cost of employing labor and capital in the organized sector and in the informal sector, which was not receiving BNDE loans or subject to social insurance taxes. Since these estimates make no allowance for differentials between sectors in severance pay provisions and other fringe benefits, or in minimum wage legislation,[12] it seems clear that even for the late 1960s they understated the amount by which incentives to employ capital were excessive at the height of the import substitution years.

Carvalho and Haddad used estimates of elasticities of substitution provided by earlier work of Macedo (1974) and combined those estimates with plausible values of supply elasticities for capital and labor to attempt to ascertain the effect on factor proportions. Table 8.7 summarizes their results. Column 1 gives the actual number of man-years of employment associated with a million cruzeiros of production in 1970 for each major manufacturing sector. Columns 2 and 3 then give estimates of the incremental employment per million cruzeiros that would have resulted if the social security taxes and the implicit subsidies to capital had been removed and if the elasticity of supply of labor had been infinite. In other words, the estimates of the second and third columns correspond to the case where manufacturing industries could have employed all the additional labor they demanded with no change in the wage (beyond that which would have arisen because of the removal of the social insurance charges). Column 4 then gives the total increments in man-years per million cruzeiros of output if both distortions had been removed. For all manufacturing industries, the unweighted average increase in the labor coefficient would have been about 15 percent on these assumptions.[13]

Carvalho and Haddad also provided estimates of what the effect would have been on employment if the true elasticities of the labor supply and of capital were as indicated above columns 6 and 7. To be sure, a less than perfectly elastic labor supply would have resulted in an increase in the wage in response to the removal of capital subsidies and social insurance taxes. Even after allowing for those phenomena, the increase in manufacturing employment in Brazil would have remained substantial: with an elasticity of the labor supply of unity, an elasticity of supply of capital of unity would have implied an increase in the average labor coefficient of about 8 percent, whereas an elasticity of capital supply of 2 would have implied an increase of about 6.4 percent. To be sure, the magnitude of the effects varies across sectors: tobacco products is estimated to have an increased labor coefficient (in the case of perfectly elastic labor supply) of about 30 percent, while pharmaceuticals has a 25 percent increase in labor input per unit of output. Rubber products, transport equipment, and metal products also show increases of more than 18 percent. By contrast, textiles' labor coefficient rises by 11 percent, and several other sectors also have increments well below 15 percent.

It should also be noted that a change in relative input prices would affect costs of labor and capital-intensive industries somewhat differently. If the social insurance taxes were removed, the relative cost of producing the more labor-intensive goods would fall. That being the case,

Table 8.7 **Effect of Social Insurance Taxes on Employment in Brazil (Direct and Indirect Man-Years per Million 1970 Cruzeiros of Output)**

Sector	Actual in 1970 (1)	Increment with Elimination of: Social Security (2)	Subsidies to Capital (3)	Both (2)+(3) (4)	Total (1)+(4) (5)	Total with $\epsilon_L = \epsilon_K = 1$ (6)	Total with $\epsilon_L = 1, \epsilon_K = 2$ (7)
Nonmetallic minerals	67.5	8.1	.8	8.8	76.3	72.1	71.4
Metal products	29.1	3.8	1.6	5.4	34.5	32.5	32.2
Machinery	42.3	5.4	.5	5.9	48.2	45.4	44.9
Electrical machinery	33.5	4.6	.5	5.1	38.6	36.2	35.9
Transport equipment	28.8	4.7	.5	5.2	34.0	31.7	31.4
Wood products	89.6	11.5	.9	12.4	102.0	95.4	94.3
Furniture	81.6	8.0	.6	8.6	90.2	85.6	84.8
Paper products	35.0	4.7	.3	5.0	40.0	37.6	37.2
Rubber products	25.2	4.6	.4	5.0	30.2	27.9	27.5
Leather products	61.7	7.0	.6	7.6	69.3	65.6	64.9
Chemicals	12.0	1.5	.1	1.6	13.6	12.8	12.7
Pharmaceuticals	16.7	3.9	.3	4.2	20.9	19.2	18.8
Perfumery	18.4	3.2	.3	3.5	21.9	20.3	20.0
Plastics	18.7	3.7	.3	4.0	22.7	21.0	20.7
Textiles	52.7	5.5	.4	5.9	58.6	55.8	55.4
Clothing/footwear	89.9	11.9	.9	12.8	102.7	96.0	94.9
Food	26.5	4.7	.3	5.0	31.5	29.4	29.0
Beverages	36.5	6.8	.5	7.3	43.8	40.6	40.1
Tobacco	14.4	4.2	.3	4.5	18.9	17.1	16.8
Publishing	48.5	5.3	.4	5.7	54.2	51.0	50.4
Miscellaneous	48.5	5.4	.4	5.7	54.3	51.4	50.9
Average	41.8	5.6	.5	6.1	47.9	45.0	44.5

Source: Carvalho and Haddad 1981, tables 2.20, 2.22. *Note:* Figures may not sum to totals shown owing to rounding.

the competitive position of some of the labor-intensive items might have improved. Thus the Carvalho-Haddad estimates probably represent something of a lower bound of the effect that distortions must have had on manufacturing employment, both because of the omissions noted above from the list of labor and capital market interventions, and because quantification of the average shift in labor coefficients fails to take into account the shifting composition of output that might result from realignment of relative factor prices.[14]

8.2.3 Chile

Corbo and Meller assessed the influence of the implicit subsidization of capital goods imports on the choice of techniques within various industries. Using their estimated production functions (see Corbo and Meller 1982), they simulated what would have happened had the exchange rate been at its equilibrium level (i.e., the relative price of tradable goods increased 30 percent with respect to home goods) and the favorable treatment of capital goods imports had been eliminated (i.e., had the relative price of capital goods imports contrasted with other tradables increased by 5 percent).[15] Their estimates are reproduced in table 8.8, based on the assumption that the commodity composition of trade would have been unaffected by the removal of the distortion in the pricing of capital goods imports. Hence the reversal of factor proportions in Chile's trade, discussed above, is assumed to persist.

Corbo and Meller estimated that, both for exportable and for import-competing products (both to DCs and to LDCs), employment would have increased about 6–7 percent if the price of capital goods imports had increased about 36 percent. Capital coefficients in both exportable and import-competing industries would have fallen by about 30 percent.[16]

8.2.4 Simulation for Other Countries

For other countries, the estimates from chapter 7 can be combined with Behrman's estimates of the elasticity of substitution to provide an estimate of the order of magnitude of the effect of factor market distortions on employment. It will be recalled that Behrman found that the elasticity of substitution in most of the industries for which he had data was very close to unity, and that a Cobb-Douglas formulation was a reasonable representation for most purposes (Behrman 1981, p. 186).

It is possible to use that result to estimate the proportion by which factor proportions might change. This can be seen as follows. The Cobb-Douglas production function is:

(1) $$Q = A\, L^{\alpha}\, K^{1-\alpha},$$

which can be rewritten as

Table 8.8 **Corbo-Meller Estimates of Effect of Distortions on Factor Proportions (Direct-Plus-Home-Goods-Indirect Coefficients)**

	Labor	Capital	Skills	Capital/ Labor	Skills/ Labor
		Exportables			
Observed coefficients					
World	58.5	1,719	122	29.6	2.10
DCs	98.6	1,830	84	18.6	.85
LDCs	49.6	1,712	131	34.6	2.65
Simulated coefficients					
World	62.9	1,348	133	21.4	2.10
DCs	105.6	1,472	90	13.9	.86
LDCs	53.5	1,321	142	24.7	2.65
		Import-Competing Products			
Observed coefficients					
World	60.1	983	146	16.4	2.42
DCs	60.0	910	148	15.2	2.46
LDCs	60.7	1,339	134	22.0	2.21
Simulated coefficients					
World	64.1	789	156	12.3	2.43
DCs	64.0	731	158	11.4	2.47
LDCs	64.9	1,072	144	16.5	2.22

Source: Corbo and Meller 1981, tables 3.15 and 3.19.
Note: Skills are in "skill units" and are not dimensionally comparable to labor coefficients, which are in man-years.

(2) $$q = Ak^{1-\alpha}, \text{ where } q = Q/L \text{ and } k = K/L.$$

Equation (2) can be solved for the capital/labor ratio as:

(3) $$k = q^{\frac{1}{1-\alpha}} \; A^{-\frac{1}{1-\alpha}}.$$

The first-order conditions for profit maximization are

(4) $$\frac{\partial Q/\partial L}{\partial Q/\partial K} = \frac{\alpha}{1-\alpha} k = w,$$

where $$w = \frac{W}{R}.$$

Let w_s = a distortion-free wage/rental ratio and w_a, the actual wage/rental ratio, equal $w_s\,(1 + d)$, where d is the proportionate distortion.
Combining equations (4) and (3), and letting $w_a = w_s\,(1 + d)$,

(5) $$q_d = c\, w_s^{1-\alpha} \, (1 + d)^{1-\alpha},$$

where $$c = \left(\frac{1-\alpha}{\alpha}\right)^{1-\alpha} A, \text{ and}$$

(6) $$q_s = cws^{1-\alpha},$$

where q_d is the observed (inverse) labor coefficient and q_s is the one that would prevail in the absence of distortion. Combining equations (5) and (6),

(7) $$\frac{q_s}{q_d} = (1+d)1-\alpha.$$

Estimates of the d's are available from table 7.1. All that is not known is the average labor share. Table 8.9 presents estimates of the range of potential percentage increases in labor coefficients for plausible labor shares on the basis of the equation (7).[17] As can be seen, the more capital-intensive the industry, the greater the proportionate increase in the labor coefficient for a given distortion in the wage/rental ratio confronting profit-maximizing firms under the assumptions indicated.

Since the distortions listed in table 7.1 refer at least as much to import substitution as to exportable industries in the project countries, the estimated increases in coefficients in table 8.9 provide estimates of the degree to which all (modern sector) tradable manufacturing industries, both exportable and import-competing, may have substituted away from labor and toward capital as a consequence of distorted incentives. The estimates are indicative only of orders of magnitude involved. Nonetheless, in countries such as Tunisia and Pakistan, with large rural populations and rapid population growth, the estimates in table 8.9 suggest that switching to more appropriate incentives within the manufacturing sector might enable a sizable increase in output and employment for a given rate of investment, even within existing trade strategies.[18]

8.3 Relative Importance of Trade Strategy, Implementation, and Factor Market Distortions

We are now in a position to attempt to estimate the combined potential effect of choice of trade strategy, within-strategy inefficiencies, and factor market distortions on the increase of demand for labor in the project

Table 8.9 **Estimated Increases in Labor Coefficients by Country Assuming Elimination of Factor Market Distortions**

Country	Estimated d	Percentage Increase in Labor Coefficient If Labor Share Is			
		.1	.2	.3	.5
Ivory Coast	.38	33	29	25	17
Pakistan	3.16	360	312	271	203
South Korea	.11	10	9	8	5
Tunisia	.87	76	65	55	37

countries. Such estimates are, of course, based on a number of assumptions, not to mention imprecise data. They can best be interpreted as indicating possible orders of magnitude only. There are two bases for the estimates: data from the individual studies, and comparative analysis within a common model.

8.3.1 Individual Country Estimates

A first set of estimates is contained in table 8.10.[19] There the observed labor coefficients in HOS exportables and import-competing industries (with the labor coefficient in import-competing industries set equal to 100) are given in column 1. Columns 2 and 3 then indicate the percentage increase in the labor coefficient that might have been expected if there were no domestic factor market interventions, and no incentives associated with the trade strategy that lower the cost of using capital-intensive techniques of production (from the estimates in table 7.1). Column 4 then gives the best estimate of the extent to which the labor coefficient might increase by altering the commodity composition of output under the trade strategy indicated. Finally, Column 5 gives the coefficient that would be observed if all sources of distortion were removed.

As can be seen, the estimated increments in labor coefficients are sizable. For example, if the underlying assumptions and data are correct, Tunisia might have generated more than twice as many employment opportunities as in fact were generated under the import substitution strategy. By and large, the estimates suggest that there is more scope for improving the efficiency of resource allocation among import-competing industries than there is among HOS exportable industries. Only for Chile and Colombia do the estimates indicate opportunities for greater proportional potential increases in exportables. In both those instances this reflects the fact that exportables under the import substitution strategy in effect at the time of the estimates probably constituted in part a response to import substitution incentives. In the Chilean case, especially, it was the incentives under import substitution to export to LAFTA out of import substitution output that account for the sizable potential for increasing employment in exportables. This could have been realized simply by shifting toward greater emphasis on exports destined for developed countries.

Table 8.11 summarizes the findings from table 8.10 and in addition provides an estimate of the proportionate differences in labor coefficients under alternative trade strategies. For example, the estimates suggest that the Ivory Coast could have realized an increase in employment within HOS exportable industries of 25 percent, and within import-competing industries of about 40 percent. In addition, shifting a thousand FCFA of domestic value added from HOS import-competing to exportable production (within the modern sector) would have permitted a 21 percent increase in the demand for labor per unit of shift.

These numbers by no means indicate the extent or possibilities for a shift in the demand for labor. In particular, if substitution of labor for capital were encouraged by the dismantling of incentives for employing capital, there could presumably be additional investment in some tradable activities; the increment in the demand for labor that might arise from that source is not considered here, partly because the estimates are already conjectural enough and partly because the same "released capital" effect would occur regardless of which of the three sources of increased demand for labor evaluated in table 8.11 in fact took place. For the latter reason, there is some basis for believing that the magnitude of the numbers in table 8.11 already reflects the relative potential for increasing the demand for labor by working within existing trade strategies and also by altering trade strategies.

Comparisons across countries based on the data in table 8.11 should be made with care. In particular, the low estimated potential for South Korea is a misleading figure, given knowledge of the rapid expansion of manufacturing employment that occurred after that country's switch in trade strategy. Indeed, the evidence suggests that the South Korean emphasis on export promotion resulted in a fairly efficient pattern of production within import-competing as well as exportable industries, which had already been realigned by 1968. Thus, comparison of the Brazilian potential for increasing the demand for labor through shifting trade strategies (which was presumably largely realized during the late 1960s and early 1970s) with the South Korean potential is unwarranted.

Of greater interest is the extent to which inferences can be drawn from the comparative magnitudes within countries. For Tunisia, the greatest potential source of increase in the demand for labor appears to arise from rationalization of the import-competing sectors of the economy. For Pakistan, removing incentives for employing overly capital-intensive techniques appears to offer even greater promise of shifting the demand for labor upward than does a shift in trade strategy. To be sure, Pakistan could, by shifting trade strategies *and* removing incentives to employ capital-intensive techniques, realize an even greater upward shift in the demand for labor. That is, if the labor/value added ratio in Pakistani HOS exporting industries rose by 271 percent in response to the abandonment of capital-intensive techniques *and* Pakistan simultaneously shifted resources toward exportables, the scope for increased employment would be 1.41 times 1.71, or 3.82, since domestic factors of production allocated at the new factor proportions in exportables would result in a labor/value added ratio 2.41 times as high as the preexisting labor/value added ratio in HOS import-competing industries. For all the countries except possi-

Table 8.10 Sources of Potential Increase in Labor Coefficients

Country	Period	Observed Direct Labor Coefficient (1)	Increase (Percentage) with: No Domestic Factor Market Intervention (2)	No Trade Strategy Distortion (3)	No Within-Strategy Inefficiency (4)	Potential Coefficient (5)
		HOS Import-Competing Industries				
Argentina	1973	100	16	−6	0	110
Brazil	1970	100	15	n.a.	n.a.	115
Chile	1966–68	100	n.a.	7	n.a.	107
Colombia	1970	100	n.a.	n.a.	10	110
Indonesia	1971	100	n.a.	n.a.	66	166
Ivory Coast	1972	100	25	0	12	140
Pakistan	1969–70	100	271	0	n.a.	371
South Korea	1968	100	8	0	0	108
Tunisia	1972	100	17	38	51	243

			HOS Exportable Industries			
Argentina	1973	130	25	−6	0	149
Brazil	1970	207	15	n.a.	n.a.	238
Chile	1966–68	80	n.a.	7	68	144
Colombia	1970	170	n.a.	n.a.	24	210
Indonesia	1971	209	n.a.	n.a.	0	209
Ivory Coast	1972	135	25	0	0	169
Pakistan	1969–70	142	271	0	n.a.	384
South Korea	1968	100	8	0	0	108
Tunisia	1972	128	17	38	0	198

Sources: Column 1 from table 5.1; columns 2 and 3 derived from tables 7.1 and 8.9; column 4 from section 8.1 of text. Argentine data are from Nogues 1980, table 3.12.

Notes:

Ivorian estimates are for modern sectors only.

Corbo-Meller estimates for capital costs refer to direct plus home goods indirect (1981, table 8.8).

An estimated labor share of .3 was used from table 8.9.

For Chile, within-strategy inefficiency within exports taken to be LDC exports.

Table 8.11 Potential Sources of Increased Demand for Labor (Percentage of Observed Labor Coefficient)

Country	Period	Increase in Labor Coefficient at Constant Value Added: Exportable	Increase in Labor Coefficient at Constant Value Added: Import-Competing	Shift in Strategy
Argentina	1973	19	10	30
Brazil	1970	15	15	107
Chile	1966–68	80	7	34
Colombia	1970	24	10	91
Indonesia	1971	n.a.	66	26
Ivory Coast	1972	25	40	21
Pakistan	1969–70	271	271	41
South Korea	1968	8	8	0
Tunisia	1972	55	143	23

bly South Korea in 1968, there clearly was sizable room for increasing the demand for labor consistent with improved resource allocation, generally through more than one avenue.

8.3.2 General Equilibrium Estimates

A complementary means of estimating the combined effect of distortions and trade strategies is to develop an optimizing model and employ properties of the solution to indicate the magnitude of divergences from optimality. Henderson did that for the project countries for which adequate data were available, as well as for some developed countries for comparative purposes.[20] His analysis is set forth in *Trade and Employment in Developing Countries,* vol. 2, Factor Supply and Substitution (Krueger 1982), and some results have been mentioned earlier. Here those features of the model that are pertinent for interpreting his estimated costs of trade strategies and distortion are discussed.

Henderson's model is a constrained optimizing model[21] subject to linear and nonlinear constraints. For countries with input-output tables and tariff data available, the model maximizes international value added in tradable-goods production subject to constraints on home-goods production (that it equal base-period domestic consumption levels plus intermediate uses as inputs to tradables) and on the total employment of labor and capital. In addition, there are constraints preventing output levels from lying outside a range of a specified percentage of their observed levels, 25 percent in the empirically implemented version.

These output constraints are useful for a variety of reasons. They prevent the model from driving to an extremely specialized solution.

They indicate feasible limits of change within medium-term time horizons. Also, the shadow prices attaching to the capacity constraints can be interpreted as indicating the extent of comparative advantage or disadvantage in particular activies, given the pattern of production.[22]

For present purposes, focus is upon the magnitude of the cost of distortions. Of the estimates emanating from Henderson's model, two are especially useful and interesting in this regard. On one hand, he estimated the attainable increase in IVA that could result from reallocation of resources (including factors of production, since substitution between capital and labor according to Cobb-Douglas production functions occurs in the model until the marginal rate of substitution is equated in all activities). This measure is an indicator of the loss in real income associated with the combined influence of the trade strategy and factor market distortions, although it has limited comparability across countries because of differing degrees of aggregation of input-output tables and because the output constraints limited the feasible extent of reallocation of factors between industries. Owing to the 25 percent reallocation limits, the model might show two countries achieving approximately equal proportionate increases in IVA, whereas an unconstrained optimizing model might show one country nearing an optimum within approximately a 25 percent band of output while another country might be shown to have much higher reallocation, with commensurately larger gains in IVA.[23] Also note that the ouput limits constrain the size of gains the model can generate.

The other measure is the average shadow price attaching to the capacity constraints. This number represents an estimate of the gain in IVA that might be had were those constraints relaxed. In that sense it provides some insight on the scope for gains from further reallocation beyond that permitted within the model. One should recall, however, that the problem of differing degrees of aggregation remains and that, for both sets of estimates, observed input coefficients are taken as indicating sectoral coefficients (subject to substitution possibilities) that would exist under either trade strategy. In fact, one suspects that alteration of the trade strategies may influence the coefficients themselves, as was reflected in the Brazilian and Colombian experience reported in section 8.1. It is also given credence by Henderson's findings of relatively broadly based comparative advantage across manufacturing industries for South Korea and Taiwan (and the developed countries) and much more narrowly confined areas of comparative advantage in the import substitution countries.

The estimates are given in table 8.12. The first column gives the year to which the data pertain, and the second column gives the number of sectors in the input-output table employed. The third column gives the average shadow price of the output constraints. This number represents an average, covering both sectors for which the shadow price is positive

Table 8.12 **Estimated Costs of Trade Strategy and Factor Market Distortions, Henderson's Model (Percentage of Base-Period Values)**

			Shadow Price of Output Constraint				
				Average Absolute Value		Increase in Tradables	
Country	Year (1)	Number of Sectors (2)	Average (3)	Positive (4)	Negative (5)	IVA (6)	DVA (7)
Chile	1962	54	8.9	37.5	26.4	3.6	−4.9
Indonesia	1971	168	−3.8	12.3	37.8	3.3	.1
Ivory Coast	1972	47	14.2	31.5	31.8	6.7	−1.0
South Korea	1966	118	−3.3	16.9	21.2	3.9	.7
	1970	118	−4.9	18.0	23.6	4.2	1.0
	1973	118	.7	12.6	16.9	2.8	.4
Tunisia	1972	68	−1.6	24.3	24.9	2.8	−1.4
Uruguay	1961	20	−8.9	9.7	43.8	8.9	−4.8
Belgium	1965	62	2.3	16.3	8.9	3.0	1.7
France	1965	62	6.9	20.8	7.3	2.7	.7
Germany	1965	62	5.9	14.1	6.7	6.8	5.2
Italy	1965	62	1.3	24.4	10.5	2.8	.4

Sources: Henderson 1982, tables 1.5, 1.6, appendix table 1.A.1.

and also those for which it is negative. Countries with a positive average shadow price associated with the output constraints generally show larger potential gains from expanding production for export than inefficiencies in import substitution sectors; countries with a negative shadow price are showing the opposite. This can be seen in more detail by examining the average absolute values of all positive—and all negative—shadow prices, given in columns 4 and 5. These absolute values represent unweighted averages of the individual activity coefficients for those activities with the shadow price of the sign indicated.

For example, for Uruguay, the unweighted average absolute attainable increase in international value added per unit of relaxation of capacity constraints across sectors with a positive shadow price was 9.7 percent. By contrast, the average gain by contracting import substitution sectors beyond the limits imposed by the model was 43.8 percent. For Uruguay, therefore, the costs of inefficiency on the import substitution side seem sizable. Chile's large average positive shadow price seems to reflect a comparative advantage in a variety of sectors that was underexploited in the import substitution regime. The Indonesian averages accord well with Pitt's findings that the export side of the economy seemed to be fairly efficient, but that there were sizable inefficiencies on the import substitution side.

The South Korean data are of interest, given that the number of sectors is standardized over the three years used and that the years covered are those during which the export promotion drive was in progress. In 1966 and 1970, South Korea appears to have had a legacy of import substitution industries, the average inefficiency of which was still fairly substantial. This is reflected in the negative average shadow price attaching to capacity constraints, which suggests that the gain in international value added to South Korea from contracting import substitution industries beyond the capacity limits would have exceeded the gain from expanding her exporting sectors even more than the limits. By 1973, however, the model shows that those gains were largely realized: indeed, both positive and negative shadow prices averaged closer to zero, which is also reflected in the average potential gain in IVA of less than 1 percent.

Comparing the results for the four developed European countries with the results from the project countries is of interest. The Common Market was still in formation in 1965, and trade was expanding rapidly among the member countries. This is reflected in the European estimates, where the average shadow prices attaching to positive capacity constraints were fairly sizable, although still below those for Chile, the Ivory Coast, and Tunisia. What is striking, however, is that the absolute order of magnitude of potential further gains from contracting industries at their lower bound constraints was much less. Indeed, only for Italy did the estimate exceed 10 percent. This suggests that the efficiency of overall resource allocation in the developed countries and, at least by 1973, in South Korea, substantially exceeded that in the import substitution sectors of the countries covered by the project.

These findings are reinforced by the data in the sixth and seventh columns of table 8.12. There the estimated percentage increase in attainable IVA, given domestic factor availability, is given in column 6, while column 7 indicates what would have happened to DVA in tradable production at the model's solution. For all the project countries except Indonesia and South Korea, the model estimated that maximizing IVA would entail a decrease in DVA. This suggests that the observed allocation of resources in the project countries was in response to the incentives prevailing. For Chile, for example, the implied 3.6 percent increase in IVA in the model's solution would be accompanied by a 4.9 percent *decrease* in DVA, a clear indication that the resource shifts implied by the model were not profit-maximizing for producers under Chile's incentive structure.

By contrast, the positive shifts in DVA for South Korea and the four Western European countries suggest that inefficiencies implied by the model's solution were also reflected in domestic prices, and that those prices provided incentives for resource movements. This is especially pronounced in Germany, where much of the large estimated increase in attainable IVA originated in the inefficiency of the agricultural sector; at domestic prices, too, Germany's comparative advantage in industry was reflected.

For the countries covered by both the Henderson model and individual studies, the two sets of results reinforce each other. Regardless of procedures used, all the import substitution countries show large potential gains through increasing the efficiency of the import substitution strategy and resource allocation.[24] Some of them also indicate large potential gains through expanding some activities, primarily for export. There seems to be little doubt that the existing pattern of production, including inefficiencies, has been the result of the trade regime and of incentives confronting domestic producers.

By contrast, the degree of inefficiency in South Korea appears to have been smaller and to have diminished over the period covered by Hong and by Henderson. By 1973 it appears that the efficiency of South Korean resource allocation resembled that of the developed countries more than it did that of the import substitution developing countries.