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Chapter Title: Evidence with Regard to Skills, Direction of Trade, Capital Intensity, and International Value Added Coefficients

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6 Evidence with Regard to Skills, Direction of Trade, Capital Intensity, and International Value Added Coefficients

The data presented in chapter 5 already indicate that the countries covered in the projects have, at least in the "revealed" sense, their comparative advantage in the industrial sector in relatively labor-intensive industries. Those data provide, however, only a first and descriptive approximation to the link between alternative trade strategies and employment.

In this chapter we proceed further by examining the available data on various characteristics of factor inputs and trade that shed more light on the relationship between trade strategies and employment. At this stage the spirit continues to be "descriptive," in the sense that the coefficients are taken as given, without analysis of the underlying influences shaping them.

6.1 Skilled and Unskilled Labor Inputs

One of the empirical regularities that emerge in studies of developed countries' trade is the significance of indicators of skills as determinants of comparative advantage, however defined (see Branson and Monoyios 1977; Baldwin 1979). The theory developed in chapter 4 did not essentially distinguish between skilled and unskilled labor, but it makes more sense to regard the skills as a component of capital or as a separate factor of production than to regard all labor as homogeneous.[1]

It was indicated in chapter 2 that not all labor is homogeneous and that, in particular, education, training, experience, and other factors influence the productivity of a worker or groups of workers. Despite the desirability of attempting uniform estimates across countries of the skill composition of employment in different industries, we recognized from the outset of the project that the problems involved would be insuperable. It is difficult enough to obtain data within a country that contains enough information on worker attributes to permit estimation of their human capital or other measures of skills and training; across countries, any attempt to estimate skills comparably would be impossible not only because categories differ but also because it is not clear that units of measurement, such as years of schooling, have similar economic meanings. Country authors were therefore asked to use their judgment in seeking indicators of skills. In some cases, such as Thailand, they were severely constrained by the absence of data. In other cases considerable analysis was possible.

In this section the results of the individual authors' analyses are reviewed. The reader should be cautioned, however, that interpretation of the results is incomplete until the labor market has been analyzed, especially with regard to the determinants of wage structure and other factors that influence the choice of factor intensity, including the use of skilled or unskilled workers. Here focus is simply upon the differentials that exist, without regard to how much greater or less those differentials might have been had the trade regime or factor market structure been altered.

The country authors' estimates of the separate coefficients for skilled, unskilled, and managerial labor inputs are reported in table 6.1. There appear to be large and systematic differences between skill coefficients for HOS exportable and HOS import-competing industries. They are more pronounced than differences in overall labor coefficients. These differences prevail despite a variety of factors, discussed in chapter 7 below, that tend to keep them below the level they might assume in the absence of factor market distortions. They are confirmed not only by the individual country studies, but also by results reported in *Trade and Employment in Developing Countries*, vol. 2, *Factor Supply and Substitution* (Krueger 1982) in the papers by Henderson and by Corbo and Meller.[2]

It should be recognized that the definition of skills differed from country to country, depending on data availability. Since coefficients generally pertained to urban-sector production in HOS exporting and import-competing industries, it is a reasonable conjecture that in most cases the term "unskilled" labor refers to individuals without any training beyond primary school. In many countries, however, some degree of literacy is a prerequisite for factory employment, and the unskilled labor coefficients reported here may in fact reflect the number of persons in the least educated or trained category eligible for employment in any modern-sector activity.

There were only four countries—Brazil, Chile, the Ivory Coast, and Tunisia—for which authors had sufficient data to compute direct-plus-home-goods-indirect labor coefficients. In all cases the pattern was very similar to that shown in table 6.1.

Table 6.1 **Ratio of Direct Coefficients of HOS Exportable to HOS Import-Competing Industries per DVA, Managerial, Skilled, and Unskilled Labor**

Country	Period	Unskilled	Skilled	Managerial
Brazil	1959	n.a.	.954	n.a.
	1971	n.a.	.978	n.a.
Chile	1966–68	n.a.	.842	n.a.
Colombia	1973	2.174	.519	1.231
Indonesia	1971	2.273	.810	1.100
Ivory Coast	1972	1.510	.960	.835
Tunisia	1972	1.582	.810	n.a.
Uruguay	1968	1.404	.939	n.a.

Notes:
Colombia: Unskilled worker ratio refers to blue-collar workers.
Indonesia: "Unskilled" is sum of "male operative"and "female operative" man-days.
Ivory Coast: Modern sector HOS coefficients from Monson 1981, table 6.13: averages for exportables and import-competing industries were used.
Uruguay: Skilled workers are "white-collar" workers.

For most of the countries with results reported in table 6.1 authors were forced, through lack of adequate data, to use some sort of weighting system for various categories of labor. In some instances these categories were simple counts of the work force by category assigned in the census or labor force survey. In Tunisia, for example, data were available for seven categories of labor: seasonal employees, apprentices, unskilled labor, semiskilled and skilled labor, supervisory personnel, white-collar employees, and management and engineers. To estimate skill content of different activities, Nabli formed skill indexes by taking the average wage in the ith skill category relative to the average wage for unskilled labor, w_i, and using those ratios as weights. He then formed an index, SK_j, of the skill content of the jth industry

$$(1) \qquad SK_j = \frac{\Sigma w_i S_{ij}}{L_j},$$

where S_{ij} is the number of persons with skill level i in industry j and L_j is the total numbers of workers in industry j.

Weights ranged from 0.36 for apprentices to 6.77 for management and engineers. For unskilled labor, he added man-years of seasonal employees, apprentices, unskilled labor, and half of the skilled and semiskilled category. Because they are indexes, they are sensitive to choice of weights and, in particular, to average wages by skill category. The ratios for skilled and unskilled workers for Tunisia given in table 6.1 are based on those calculations.

In an effort to avoid use of arbitrary weights (which are especially flawed if there is reason to believe that the sorts of labor market distortions discussed in chapter 7 influence relative wages), Carvalho and Haddad followed an alternative procedure.[3] They had the advantage of having previous work by Senna (1975), who has estimated an earnings function for Brazil. He had estimated the equation.

$$\ln W_i = \alpha_0 + \beta_1 S_i + \beta_2 J_i + \beta_3 J_i^2 + u_i, \quad (2)$$

where S_i is the number of full years of formal school attendance and J_i is number of years in the labor force for the ith worker. Carvalho and Haddad had data on the characteristics of the Brazilian labor force in individual industries and used Senna's regression estimates of the earnings function to estimate the "human capital content" of the labor force in industry. Using those estimates, they calculated the average skill intensities for expanding exportable and import-competing production and transformed those into an index by setting 100 equal to the average manufacturing wage in 1970.

The range of skill intensity over the twenty-two industries in their computation was from 89.4 (construction) to 165.4 (oil and derivatives). However, seventeen of their twenty-two observations fell within 10 percent of the mean. For 1959, as can be seen from table 6.1, the average skill content of exportable industries was below that for import-competing industries: for import-competing industries the figure was 100.3 percent, while for exports it was 95.7. By 1971 both import-competing and export industries had wages above the average, perhaps reflecting the fact that in Brazil home goods are intensive in the use of unskilled labor. Carvalho and Haddad also compared their estimates for 1971 of skill intensity with those they would have obtained had they used a direct measure of the ratio of the industry's wages to the average industrial wage. For 1971 their index of skill intensity was 111.9 for import-competing activities and 109.5 for exportables, reflecting a difference of 2.1 percent (contrasted with the range of about 20 percent). Had they instead used average wages, they would have calculated an index of 130 for import-competing activities and 120 for exportables, giving a difference of about 8 percent. While one cannot rely too heavily upon a single instance, it is somewhat reassuring that the direction of difference in skill intensity and the general order of magnitude appears to be much the same regardless of which measure is used to reflect it.

Returning to the data in table 6.1, when man-days per unit of DVA are broken down into skilled man-days, unskilled man-days, and managerial man-days, the picture that emerges is that unskilled labor coefficients in HOS import-competing industries are even smaller relative to HOS exporting industries than are total labor coefficients. In each case for which a breakdown is available, the unskilled labor coefficient ratio for exportables exceeds that for total labor. Likewise, in all cases the skilled labor coefficient in import-competing industries exceeds that in exportable industries. Data from Hong Kong show a similar picture. Recall that the overall ratio of direct labor coefficients was 0.719 in 1973. By contrast, the ratio of professional labor in import-competing industries to that in exportable industries was 1.77. Nogues likewise estimated a higher skill coefficient of import-competing industries, by 27 percent when a skill classification was used. Use of average wages as a proxy for skills yielded much the same order of magnitude.

Thus, based on the evidence from the countries covered in the project, it appears that not only are the HOS exportables generally more labor-using than HOS import-competing goods, but their input of unskilled labor is greater than that of import-competing industries by an even wider margin, while import-competing industries place a greater demand on the skilled labor forces in those countries.

6.2 Patterns by Direction of Trade

We saw in chapter 4 that there are a priori grounds for expecting differences in factor intensity both between exports destined to developed (more capital-abundant) countries and those destined to other developing countries and between imports by source. This expectation was in general borne out by the results of the individual country authors.

Table 6.2 provides the basic data from the individual country studies and Hong Kong. In some instances, notably Indonesia and Hong Kong, a sufficiently large fraction of exports is destined for developed countries that it is difficult to attach significance to the separate coefficients. In other cases, however, the trade with other developing countries is sizable, and differences in factor proportions are considerable. For Chile, for example, about half of all HOS exports are destined to other LAFTA (Latin American Free Trade Area) countries. Chile's exports to developed countries have a labor coefficient of 61, contrasted with 29 for exports to the LAFTA region. Uruguay, likewise, has sizable exports to LAFTA and, again, these exports appear to be far less labor intensive than exports to developed countries. For Brazil, too, LAFTA exports are less labor intensive than other exports.

For the Ivory Coast and Pakistan there are also pronounced differences on the import-competing side: for those two countries, production competing with imports from other LDCs was far more labor intensive than was production competing with imports originating from developed countries.

Table 6.2 **Direct Labor Coefficients per Unit of DVA by Direction of Trade**

		HOS Exportables			HOS Import-Competing		
Country	Period	DC	LDC	Total	DC	LDC	Total
Argentina	1973	164	147	n.a.	n.a.	n.a.	n.a.
Brazil	1959	115	141	115	n.a.	n.a.	128
	1970	89	79	87	n.a.	n.a.	71
	1972	109	78	87	n.a.	n.a.	71
Chile	1966–68	61	29	34	43	43	43
Colombia	1970	28	21	24	n.a.	n.a.	n.a.
	1973	32	24	29	n.a.	n.a.	n.a.
Hong Kong	1973	75	67	73	62	55	60
Indonesia	1971	2,176	2,149	2,175	994	1,117	1,038
Ivory Coast	1972	n.a.	n.a.	2,488	1,520	1,743	1,652
Pakistan	1969–70	90	88	88	70	120	71
Thailand	1973	22	20	22	11	22	11
Uruguay	1968	441	239	366	n.a.	n.a.	238

Notes:

Brazil: Data are from Carvalho and Haddad (1981), table 2.14, and represent total labor requirements per DVA. The numbers for developed countries are an unweighted average of EEC and United States and Canada coefficients, while the LDC numbers refer to LAFTA trade.

Colombia: DC figure is an unweighted average of "United States" and "other developed countries."

Indonesia: Total man-days from Pitt 1981, table 5.15.

Ivory Coast: Data (expressed in man-hours) taken from Monson 1981, table 6.11 and refer to modern HOS sectors. No breakdown of HOS exportable trade between DCs and LDCs was made owing to the unimportance of the latter.

Pakistan: Excludes PCB exports (Guisinger 1981, table 7.14).

Thailand: Data supplied by Akrasanee 1981 for HOS import-competing goods, exclusion of alcoholic beverages and tobacco gives twenty-one for DCs and total.

The orders of magnitude of difference in labor intensity according to export destination are in some cases as great as the differences between overall labor coefficients for HOS exportables and import-competing production. For Chile, for example, reducing one unit of DVA of exportable production for developed countries and replacing it with one unit of DVA of import-competing production would entail a net "loss" of eighteen jobs, or a reduction of 28 percent in employment. By contrast, contraction of a unit of DVA of HOS exportable production for other LDCs (almost entirely LAFTA) and replacement with a unit of DVA of domestic import-competing production would result in a change from twenty-nine jobs to forty-three jobs—an increase of almost 50 percent in employment. To be sure, the coefficients are not necessarily perfect indicators of what would happen with an alteration in trade strategy, but the orders of magnitude are sufficient to suggest that it matters not only which sectors—NRB or HOS—trade originates in, but also which countries are the trading partners. For Chile, an export promotion strategy based upon the LAFTA market would probably result in a shift toward less labor-using industries, while an export promotion strategy based upon trade with the developed countries would have the opposite result.

This finding is supportive of the observation made in chapter 3, namely that not all policies designated as "export promotion" really constitute an "export-oriented" trade strategy. Uruguay and Chile, among others, were heavily oriented toward import substitution: the exports that were destined for LAFTA were subject to special inducements and represented much more the outcome of the incentives for import substitution than any genuine export promotion orientation.[4] Thus the bias of the regime remained toward import substitution industries, so much so that there were incentives for some of those industries to export. This finding is of importance in considering the overall implications of alternative trade strategies for employment. I return to it in chapter 9 below.

6.3 Evidence with Respect to Capital Intensity

Because even graver difficulties surround the availability and reliability of data on capital stock than data on labor, primary focus in all country studies was on labor coefficients. In theory, of course, capital coefficients would be inversely related to labor coefficients in a two-factor model at free trade. Nonetheless, where the data permitted, authors were encouraged to provide information on capital inputs. The results are summarized in table 6.3. For the countries for which data are available, except Chile, the results are as expected: HOS exportables were less capital-using than import-competing activities. For Indonesia, where Pitt had four proxy variables with which to approximate capital utilization, all show wide divergences. Only in electricity utilization was the difference between HOS exportables and HOS import-competing industries less than two to one, and even in terms of electricity used the differential exceeded 50 percent. For Uruguay data were available separately for exports destined to DCs and to LDCs, and they are reported separately. As can be seen, kilowatts used per DVA in trade with developed countries were 21 percent less than those employed in import substitution industries (where all HOS import-competing industries were replacing imports from developed countries). For trade with other developing countries, primarily LAFTA, kilowatts per unit of DVA were 2,573, or

Table 6.3 Evidence with Regard to Capital Inputs per Unit of DVA

	HOS Exportables	HOS Import-Competing Industries
Argentina		
Cost of energy	29.96	51.03
Chile		
Thousand escudos of fixed assets	1,643.00	852.00
Hong Kong		
Profits 1973	222.94	315.39
Depreciation 1973	55.46	70.71
Indonesia		
Electric motor horsepower	2.46	7.99
Total horsepower	7.23	17.66
Electricity used (kwh)	2,386.00	3,886.00
Energy consumed (Rp 000)	45.00	91.00
Prime-mover horsepower	4.77	9.67
South Korea	99.00[a]	115.00[a]
Uruguay		
Kilowatts trade with DCs	915.00	1,163.00
Kilowatts trade with LDCs	2,573.00	

[a]Per unit of output.

2.2 times as great as those for import-competing industries. The figures are, of course, even more extreme in terms of IVA. For Chile it will be recalled that pulp and paper exports to LAFTA were a sufficiently large component of Chile's HOS exports that they dominated the labor coefficients.

Overall, the available data reinforce the conclusions emerging from the labor coefficients: HOS exportables tend to use more labor and less capital per unit of domestic value added than do import-competing industries.

6.4 Coefficients per Unit of International Value Added by Trade Categories

As was shown in chapter 5, consideration of labor—or other input—coefficients per unit of domestic value added is appropriate if the question under analysis pertains to alternative uses of given bundles of domestic resources. If, instead, one wishes to evaluate the effect of alternative allocations while holding the trade balance constant, coefficients per unit of *international value added* should be employed. These coefficients are closer to an efficiency notion of factor utilization, while domestic coefficients come closer to some representation of a full-employment condition.

At free and balanced trade, of course, the industry-specific coefficients are the same regardless of whether domestic or international value added is used, and the relationship of L/DVA and L/IVA ratios is one to one. Moreover, if adequate data were available so that one could rely on capital/labor ratios, the ordering of factor intensity would be invariant with respect to use of domestic or international measures.

However, when tariffs or other protective devices leads to differentials in the domestic/foreign price ratios for different commodities or industries, the one-to-one relationship between IVA and DVA breaks down.[5] Even in a two-factor HOS world, it could happen that L/DVA and L/IVA rankings were reversed. Figure 6.1 illustrates this possibility. In figure 6.1, unit isoquants for commodities A and B are given by the *aa* and *bb* curves respectively. At a wage/rental ratio represented by minus the slope of w^0w^0, industry A is labor-intensive, using a combination of labor and capital inputs represented by the coordinates of a^0, while industry B is more capital-using, with inputs at b^0. At input prices represented by the slopes of w^1w^1 (which is reproduced as w^2w^2), industry A would employ the combination of inputs indicated at a^1, while industry B would employ that represented at b^1. Thus a country with factor prices w^0w^0 would be able, at free trade, to produce both commodities at a price ratio of one to one. A country with factor prices represented by w^1w^1 ($= w^2w^2$) would not be able to produce both commodities at the one-to-one price ratio. If the wage/rental ratio represented by w^0w^0 determined international prices of both commodities, a country with factor prices w^1w^1 could produce both commodities only with protection to industry B. With such protection (in the amount $w^1 - w^2$ divided by Ow^2), both industries could produce under competitive conditions. Industry A would always be labor intensive in that the labor/capital ratio in that industry would exceed that in industry B for all common wage/rental ratios. Moreover, L/DVA in industry A would exceed that in industry B. However, L/IVA in industry B would exceed that in industry A, since it would require *both* more labor and more capital per unit of output in B than in A at the factor prices represented by w^1w^1.

The reason for this can be more readily seen in figure 6.2, which is not consistent with an HOS world of incomplete specialization and identical production functions between countries.[6] In figure 6.2, isoquants for commodities A and B are drawn for a unit of output of each commodity evaluated in domestic prices. Given the domestic factor prices represented by the slope of the line p_dp, factor proportions a^0 and b^0 would be employed in the two industries. Industry A is again labor intensive. Suppose now that industry A is the export industry, and not subject to protection, while industry B is highly protected. If, for example, the

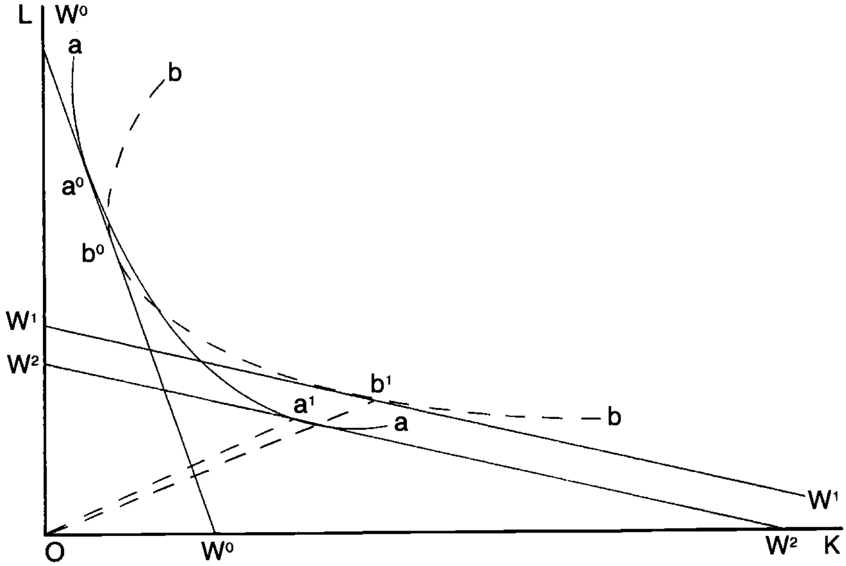

Fig. 6.1

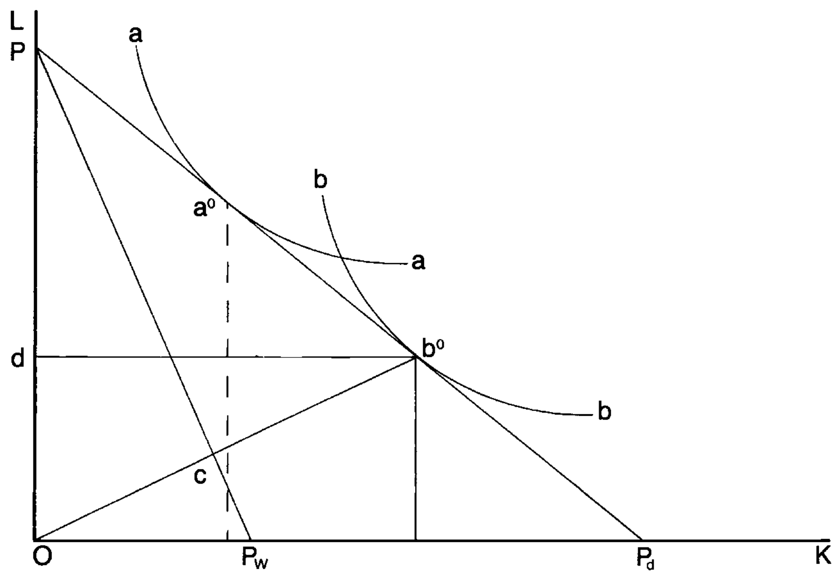

Fig. 6.2

world price ratio is pp_w, then labor per unit of international value added in industry B would be *od* times the ratio of domestic value added to international value added, or *ob*/*oc*. As can be seen, the proportionate difference between *ob* and *oc* is sufficient so that labor (and capital) per IVA in B exceeds that in A.

Regardless of which of the two underlying cases causes a reversal, it is apparent that a reversal of labor intensities between a DVA and an IVA basis represents a case paralleling "absolute inefficiency" in the engineering sense: when the ratios reverse, it would have been possible to achieve more international value added per unit of labor *and* of capital in the less protected industry. Stated otherwise, when a relatively labor-intensive commodity in a labor-abundant country uses more labor and more capital per unit of IVA (while using less labor per unit of DVA), there is no set of relative input prices at which it would be efficient to operate the industry *using existing factor proportions*.[7]

With that background in mind, the L/IVA coefficients from the country studies can be analyzed.[8] They are presented in table 6.4, in a format comparable to that of table 5.1 for purposes of comparison. Recall that all ratios are expressed relative to the labor per IVA in HOS import-competing activities. To transform estimates of labor per DVA into labor coefficients per unit of IVA, the L/DVA coefficients must be multiplied by the ratio of DVA to IVA (i.e., one plus the rate of effective protection). If ERPs for all exportables were zero, the L/DVA and L/IVA would be identical for exporting industries. If a regime were biased toward import substitution, so that ERPs for import-competing industries were positive, L/DVA would be less than L/IVA. This is what leads to the possibility of reversal, especially when there is negative effective protection for exportables (so that L/IVA is less than L/DVA) and positive effective protection for import substitutes (so that L/DVA is less than L/IVA).[9]

In practice, some exportable activities have positive levels of protection, and others have negative ones, so that the relationship between exporting and import substitution L/DVA and L/IVA ratios is not quite as straightforward as it at first sight appears.

Nonetheless, as can be seen from table 6.4, the ratio of labor coefficients in HOS exportable industries to those in import substitution activities is generally less when expressed for IVA than for DVA, reflecting the general bias of the trade regimes toward import substitution. For Chile, for example, the ratio of labor requirements overall for HOS exportables to HOS import-competing activities per DVA was 0.8, while the ratio is 0.47 for IVA. Only in Pakistan and the Ivory Coast does the ratio rise, since HOS exports received positive levels of effective protection in those two countries.

Table 6.4 **Direct Labor Coefficients per Unit of IVA (Ratio of Direct Coefficients in Designated Trade Category to Direct Requirements per IVA in HOS Import-Competing Activities)**

	HOS Exports		
Country	Manufactures Not PCB	PCB Manufactures	Total
Argentina	n.a.	n.a.	.55
Chile	n.a.	n.a.	.47
Colombia	n.a.	n.a.	1.63
Indonesia	1.31[a]	n.a.	1.65[a]
Ivory Coast			
Modern sector	n.a.	n.a.	1.42[b]
Total	n.a.	n.a.	1.33
Pakistan	1.28[c]	n.a.	1.53[c]
Thailand	2.36	.85	1.23
Tunisia	n.a.	n.a.	.91
Uruguay	n.a.	n.a.	.66

[a]Direct-plus-home-goods-indirect labor per unit of IVA. For comparison, the comparable ratios for DVA are 1.46 for non-PCB manufactures and 1.92 for all HOS exports relative to import-competing HOS goods.

[b]See note to table 5.1 on Ivory Coast. Values refer to ratios of direct-plus-home-goods indirect labor per unit of IVA.

[c]Direct-plus-home-goods indirect labor per unit of IVA from Guisinger 1981, table 7.12. For comparison, the figures for DVA are 1.41 and 1.30.

There are three cases of reversals: Argentine, Tunisian, and Uruguayan HOS exports. In those instances, labor coefficients for import-competing activities per IVA exceed those for exportable activities. The reasons are exactly those illustrated in figures 6.1 and 6.2: the ratio of DVA to IVA exceeds the proportionate difference in labor inputs. In Uruguay the difference is extremely large: HOS exportables took 50 percent more labor per unit of domestic value added than did import-competing goods, but only two-thirds as much labor per unit of international value added. This reflects the very high degree of protection accorded to import-competing industries (see table 7.1) in Uruguay.

The order of magnitude of the Uruguayan reversal can be seen from the following calculation. Suppose the direct capital employed in producing one million dollars of IVA in import-competing industries in Uruguay, as reflected in thousand kilowatts of energy consumption (4,576) had instead been allocated to HOS exporting industries. In import-competing industries, 934 workers were employed per million dollars of IVA; 4,576 thousand kilowatts would have been the capital coefficient for $3.1 million of IVA in HOS exportables to developed countries. The number of workers per million dollars IVA in HOS exportables was 707; it would therefore, at constant coefficients, have taken 2,191 workers, compared with the 934 in import substitution industries, to employ the same amount of capital (if energy consumption is an adequate proxy for capital inputs), and the international value of output could have been three times as great. To be sure, the estimates are imprecise, and in any event the Uruguayan economy could not for long have sustained such a shift in resources. Labor would undoubtedly have become scarcer, and factor proportions would have altered in response to an altered wage/rental ratio. Nonetheless, the numbers are large enough to indicate a sizable loss in potential welfare given the actual coefficients and trade strategy followed.

For most countries, of course, the numbers are not quite as extreme, though for both Chile and Tunisia the differences are significant. There is no single measure that accurately reflects the degree of bias toward import substitution in a country, but the evidence in the country studies suggests that the three countries with reversals were also among those with the greatest bias toward import substitution. Certainly the differentials between L/DVA and L/IVA ratios are much smaller in the Ivory Coast and Indonesia, where there is considerable evidence that the degree of protection to import-competing industries was substantially smaller (see table 8.1).

If one works only with capital/labor ratios, as seems reasonable given the underlying HOS model, the fact that L/DVA and L/IVA can reverse may be overlooked. Indeed, at the outset of the project we did not expect that such an outcome was possible: the reason for focusing upon labor coefficients rather than labor/capital ratios was that we believed data on numbers of workers, with or without adjustments for hours worked, skills, and experience, would be somewhat more reliable and generally available than data on capital stock employed. That L/DVA and L/IVA ratios diverge as much as they do points to the importance of examining capital and labor coefficients separately, even when reliable data are available for both, in the presence of significant variation in rates of effective protection.

6.5 Conclusions

Chapters 5 and 6 have been essentially descriptive, examining evidence on the labor coefficients for various categories of tradables and other data pertinent to analysis of the effect of alternative trade strategies on employment. Those coefficients are the outcome of market processes and government regulations in the countries covered by the project, and consideration of the determinants of the coefficients must take into account analysis of factor markets in chapters 7 and 8. Nonetheless, in light of the underlying theory suggesting that, in the presence of differentiated incentives and factor market imperfections, little systematic relationship can be expected between factor inputs and the commodity composition of trade, it is interesting that, in most of the countries covered by the project, production of HOS exportables was, by and large, considerably more labor intensive than production of import-competing goods. This picture emerges when considering employment coefficients per unit of DVA; if the size of the capital stock is the constraint upon the size of the manufacturing sector, then the clear implication is that employment could *expand* more under increases in HOS exportable production than under HOS import-competing production. This follows both because there would be more demand for labor in HOS exportable industries and because capital coefficients in those industries are generally lower, implying that total manufacturing value added could expand. In terms of IVA, the differential in employment coefficients is generally smaller, in large part because import-competing industries receive higher effective protection than do HOS exportables. As a consequence it can, and in some cases does, take *both* more labor and more capital per unit of IVA in import-competing industries than in exportables. This is more a reflection of the economic inefficiency of some of import-competing industries than an indication of employment potential: capital/labor ratios are not altered by changing from units of DVA to IVA.

When attention turns to the composition of employment, especially in its skill dimensions, once again the evidence is strong that HOS exportables use more unskilled labor and less skilled and managerial labor than import-competing industries. This result warrants careful analysis, especially in light of the determinants of wage structure in the project countries. Even at this juncture, however, the straightforward idea, emanating from the HOS model, that international trade enables developing countries to substitute their relatively abundant factor—unskilled labor—for their relatively scarce factor, seems to be borne out by the data despite whatever factor market imperfections may have influenced the results.

Finally, there is evidence that regional trading arrangements, especially LAFTA, induce a pattern of trade that uses factor proportions in exportables much more like those in import-competing industries than those in HOS exportables to developed countries. Such a result makes intuitive sense: if all LDCs have a comparative advantage in the world economy in a variety of goods that are relatively intensive in the use of unskilled labor, it is unlikely that they will be able to penetrate each other's markets significantly—transport cost differentials, combined with protection, presumably deter what trade might otherwise be profitable, and the HOS model in any event predicts that gains from trade will be large between countries with dissimilar factor endowments. It therefore seems plausible that, when tariff preferences are extended, they tend to encourage export of import substitution industries' output within the region. Whether this increases or reduces real incomes depends on whether the imports of capital-intensive goods from regional trading partners replace even higher-priced domestic output or whether instead they replace imports from developed countries. If it is the latter, there is clear evidence of trade diversion, with presumed attendant welfare losses from regional preferential arrangements, and very different employment implications for a given trade strategy depending on whether that strategy is global or regional in nature.