Chapter Title: Notes

Chapter Author: Anne O. Krueger

Notes

Chapter 1

1. This collection of papers was the outcome of a major study of the issue sponsored by the Ford Foundation. See especially Edwards's summary (1974, p. 29). Logically, the analysis should center on the labor intensity of exportables relative to import-competing goods unless the fraction of income spent on home goods changes with the type of trade regime.

2. These two companion volumes provide a synthesis of the results of that project. See also Little, Scitovsky, and Scott (1970).

3. See also the series of studies done by the OECD. The synthesis volume, which contains references to the individual studies, is Little, Scitovsky, and Scott (1970).

4. That there has been implicit subsidization of capital goods imports has long been recognized. However, there have been very few attempts to qualify or estimate the importance of these subsidies and their effects on choice of techniques in developing countries. Two interesting exceptions are: McCabe and Michalopoulos (1971) and Öngut (1970). See chapters 7 and 8 of this volume for further discussion.

5. These conclusions emerge from the NBER project. An initial version is presented in Bhagwati and Krueger (1973). A more complete statement is contained in Krueger (1978).

Chapter 2

1. See also T. Paul Schultz's pathbreaking paper in the second volume of this series (Schultz 1982). Schultz's work is the first systematic analysis of the link between rates of effective protection and earnings structure in a developing country.

2. There are two sets of models that posit an upper bound on the number of "productive" jobs that can be created. The first is the "technological" explanation, first set forth by Eckaus (1955). According to that view, the labor/capital endowment in the industrial sector of developing countries exceeds the maximum technologically feasible ratio. The alternative is the "two-gap" model, in which a foreign exchange or savings limit prevents further expansion in real output. The model is associated with Hollis B. Chenery and Michael Bruno. See section 2.2.1 for further discussion.

3. See section 2.2 for a definition of the "formal" and "informal" markets.

4. As will be seen in chapter 5, authors who were able to obtain data on labor coefficients for agricultural activities generally found that export-oriented activities in that sector were

consistent with greater labor utilization. However, labor coefficients for agriculture are averages, and there is reason to believe that there may be significant divergences between marginal and average coefficients in the agricultural sectors of many of the project countries. Since the question underlying the project is the implications of a switch in trade strategies that would imply resource reallocation (with marginal, not average, coefficients predominating), the agricultural coefficients were viewed with suspicion. There is less basis for believing that marginal and average differ in the industrial sector than in the rural sector.

5. For an analysis of the role of skills and determinants of the wage structure, see section 2.3.3.

6. Although it is not empirically important for purposes of analyzing the relationship between trade strategies and employment, it is even possible that in a neoclassical labor market an upward shift in the demand for labor could result in decreased employment (if the labor supply curve were backward bending).

7. See Sen (1975) for a fuller discussion of ways the labor supply to the urban sector might be perfectly elastic.

8. For a model of growth and employment in a dual economy, see Jorgenson (1961) and Ranis and Fei (1961).

9. A market is said to be more fragmented the less changes in one part of the market affect other parts. If labor is perfectly immobile between two areas, those markets are entirely fragmented.

10. For a recent treatment of short-term macroeconomic policy in developing countries, see Behrman and Hanson (1979).

11. See especially Behrman (1982).

12. For a recent treatment of macroeconomic aspects of development, see the collection in Blitzer, Clark, and Taylor (1975), which focuses upon input-output models and supply constraints. Nowhere is attention given to aggregate demand.

13. Not all developing countries' labor markets are so regarded among the countries covered here. Hong Kong, Pakistan, and South Korea were generally thought to have well-functioning labor markets in the neoclassical sense.

14. Some believe that the differential may reflect only skill differentials, differences in living costs, and a premium to induce additional migrants as needed. If that were the case it would not constitute a distortion, and the labor market could be regarded as neoclassical.

15. In particular, migrants might be risk averse, in which case expected urban income could be above rural income at equilibrium.

16. Several extensions of the model have been made that endogenize the urban wage. Calvo (1978) developed a model of maximizing trade union behavior that endogenized the urban/rural wage differential. See also Stiglitz (1974).

17. For an exposition of the model in an open-economy setting see Bhagwati and Srinivasan (1974).

18. For a fuller discussion of the question whether there is "disguised unemployment" in rural areas, see Sen (1975, chap. 3). There is also a problem of "balancing" growth to maintain approximately constant terms of trade between agriculture and industry. But opportunities to trade on the international market can obviate the need for balance in that sense.

19. We saw in connection with table 2.1 that in some Latin American countries the agricultural labor force is already fairly small, but that the problem of finding productive urban employment opportunities is a key issue.

20. In contrast to rural labor markets, for which an important question is whether unemployment or underemployment exists other than in the sense of low productivity, there is little dispute that urban unemployment à la Harris-Todaro is a significant phenomenon in a number of countries. Although there are important questions about the reliability of unemployment measures, who the unemployed are, and the causes of unemployment, these questions did not arise in a central way for purposes of analyzing the trade strategies–employment relationship. They are therefore not covered here.

21. For a careful analysis for one country, see Nelson, Schultz, and Slighton (1971) on Colombia.

22. Argentine data are often presented below. There is also evidence of an informal sector in Argentina.

23. See table 6.6 for illustrative data on Pakistan.

24. See chapter 4 for a definition.

25. If exports or import-competing goods originated in firms with above-average productivity within each industry within the modern sector, the bias might be upward.

26. Inducements to use capital-intensive techniques can also lead to a nonoptimal choice of techniques or mix of industries. That topic is covered in chapter 7.

27. Nabli estimates an elasticity of .09 for the period 1961-71 for manufacturing establishments excluding food processing and handicrafts.

28. The situation in Pakistan changed in the early 1970s.

29. See Calvo (1978).

30. Many believe that urban living costs exceed rural living costs by a margin sufficient to explain much of the observed wage differential between unskilled urban and rural earners. There is also a school of thought that alleges that better-paid workers are more productive. On this see Mirrlees (1975).

31. The term "human capital" was developed to indicate that investments in man are as important as investments in machines and other physical capital goods in the development process. See Becker (1975).

32. See Schultz (1982) for the estimation of an earnings function based on Colombian data. For analyses of the links between ability and human capital variables in earnings functions see Griliches (1972) and Behrman et al. (1979).

33. For a review of estimates of rates of return to human capital in developing countries, see Psacharopoulos (1973).

Chapter 3

1. There is a range of commodities whose allocation to export or import categories is ambiguous, and the precept that is simple in theory is not so readily implemented in practice. See chapter 5 below for a discussion of the allocation of commodities and industries to trade categories on the basis of the conceptual framework of chapter 4.

2. In the presence of such distortions, shadow prices can be used to estimate DMRTs. Estimation itself is difficult empirically, though it is conceptually straightforward. See Srinivasan and Bhagwati (1978) for a discussion.

3. There are of course a number of problems in estimating B empirically. With many commodities, weights must be used to form aggregate p's and q's. Sometimes the same commodity is sold at different prices in the domestic market and abroad. Also, price comparisons, not tariff rates, are the appropriate bases for estimating B.

4. To be sure, governments can and do provide rebates to compensate for the cost differential between domestic and imported goods. In some instances these are automatic and may offset the export disincentives. More often, however, the incentives to overstate actual usage in order to get bigger rebates lead the authorities to institute fairly careful checks that are time-consuming and constitute a disincentive to exports.

5. See Díaz-Alejandro (1965) for an analysis of this phenomenon.

6. A number of countries have taxed a major raw material export while encouraging import substitution, but that further increases the bias toward import-competing industries.

7. All countries have policies they term "export promotion." In many instances, however, examination of incentives reveals that the promotion measures are really nothing more than partial offsets to the discrimination exports would otherwise face in light of exchange rate overvaluation and the high domestic prices confronting exporters. What is meant by genuine export promotion in this context is a trade strategy in which, on balance, incentives are not tipped toward import substitution. This might be because a country's

policies were very close to free trade or because incentives for exporting equaled or exceeded those for selling in the domestic market.

8. The effective rate of protection for a given activity is the rate of protection to domestic value added in that activity. If t_j is the nominal tariff (or tariff equivalent) on the jth input to industry i, then E_i, the ERP for industry i, is

$$E_i = \frac{t_i - \Sigma_j \, a_{ji}t_j}{1 - \Sigma_j \, a_{ji}},$$

where a_{ji} is the input of j at international prices per dollar (at international prices) of output of i.

9. ERP estimates are difficult to make, and data are not available for the countries covered in the project other than for the years indicated (except in cases where alternative sources provide noncomparable estimates). See table 3.2, where an indication is given of how trade strategies altered within individual countries over time.

10. See the description of Chile's protective structure in Behrman (1976, p. 144).

11. This discussion draws heavily on the findings of the NBER project on foreign trade regimes and economic development. See Bhagwati (1978) for a full analysis of these issues.

12. In some cases, such as Argentina and Indonesia, "official prices" or "check prices" are established for some commodities, and tariffs are payable on the official price rather than the actual price of the import. This can make straightforward reliance upon the tariff schedule highly misleading if the former is higher.

13. To be sure, a sufficiently high rate of protection through tariffs can achieve the same result. This has been the case in Argentina and Uruguay, where tariff levels have been set so high that the domestic price exceeded the international price by less than the tariff rate ("water" in the tariff).

14. Capital goods imports are generally permitted at low rates of duty. When the exchange rate is overvalued, this can result in a substantial incentive for favored industries to use relatively capital-intensive techniques. See chapter 7 for an analysis of this phenomenon in the project countries.

15. Qualifications to this statement are necessary because the presence of a uniform export subsidy rate does not imply equal incentives to exports when the ratio of value added to output varies across sectors: sectors with high ratios of imported inputs are implicitly subject to a higher rate of incentive than are those with a low ratio of imported inputs if the subsidy per dollar of exports is the same and imported inputs are permitted at a lower price of foreign exchange.

16. Variance can arise chiefly if different activities have very different value added/output ratios, with export incentives based on value of output.

17. Credit availability at low or negative real rate of interest can provide incentives for exporters to use overly capital-intensive techniques. See chapters 7 and 8.

18. Export-oriented regimes often establish export promotion agencies to facilitate marketing and give favored treatment to successful exporters in all government dealings. There is also the intangible—but sometimes very important—value of the government commitment that exporting will continue to be profitable.

19. See the large literature on growth-rate determinants among developed countries, in particular Denison (1967) and Christensen, Cummings, and Jorgenson (1980). Robinson (1971) surveyed the available evidence for developing countries.

20. Heller and Porter (1978) later contended that Michaely should have computed the growth rate of GNP net of exports for his test. They reestimated his relations on that basis and found that they still held. They also reinforced Michaely's earlier finding that the relationship between changing export share and growth is much stronger among higher-income developing countries than it is among low-income developing countries.

21. Data from Hong Kong are used where pertinent in later chapters. Hong Kong appears to conform very closely to free trade, with virtually no tariffs and a bias of unity. See Sung (1979) and Lin, Mok, and Ho (1980) for details.

22. In part this may have been because the growth in export earnings reflects almost entirely the fact that the price of copper was in a slump in 1960 and rose throughout the decade.

23. Among import substitution countries covered in the project, Brazil before 1968, Chile, Colombia before 1967, Tunisia, and Uruguay have all had such episodes (as did Argentina).

24. See Krueger (1978) for a fuller discussion.

25. Balassa (1978a, p. 45) makes much of this point. He cites incremental capital/output ratios for the period 1960–73 of 1.76 for Singapore, 2.10 for South Korea, and 2.44 for Taiwan and contrasts them with corresponding ratios of 5.49 for Chile and 5.72 for India.

26. See chapter 4 for reasons why that might be expected.

Chapter 4

1. Note that, even with factor intensity reversals, *all* industries would employ more labor-intensive techniques at a lower wage/rental ratio under any efficient allocation. This implication would be useful empirically were it not for the impossibility of identifying homogeneous factors across countries.

2. For a given price set, it can never be more profitable to produce three commodities than two. This is what makes the composition of output indeterminate.

3. In the context of a multicommodity model, specialization takes on a different meaning from the one it has in two-commodity models. In the latter, specialization implies a positive production level for only one commodity. With many commodities, specialization means the failure to produce at least as many commodities in common as there are factors of production.

4. If commodity prices were truly imposed at random, it would be highly improbable that either country would have positive production levels for more than a few goods (and there is no assurance whatever that the commodities at either factor intensity extreme would be produced at all). In reality, prices are determined in the market and are related to production costs via supply and demand: at the wage/rental ratio associated with a particular commodity's production, there are prices at which other commodities can also be produced at competitive equilibrium; if the factor demands derived from the output mix demanded at those prices are not equal to factor supplies, the wage/rental ratio can adjust as commodity prices alter.

5. The empirical likelihood of such an outcome is open to question, especially if one takes into account transport costs. A simple proof that it could happen in the model set forth above is as follows. If the wage/rental ratio were lower in country 8 than in country 9, then commodity 6 would be cheaper to produce in country 8 than in country 9 at prevailing factor prices and the competitive profit conditions would not be met. Therefore the wage/rental ratios in countries 8 and 9 must be the same. The reverse reasoning can then be used between countries 7 and 8, as a higher wage/rental ratio in 8 than in 7 would imply that commodity 5 could not be competitively produced (see Bhagwati 1972 for a fuller discussion).

6. Whether an industry is an import substitute or an export is simply a matter of the precise nature of the factor endowment relative to other countries and, of course, demand conditions. Consider, for example, country 1 in figure 4.1. It must export commodity 1 and may export commodity 2, depending on whether production is greater or less than domestic demand. It could, however, be using virtually all its resources in the production of commodity 1, so that demand for commodity 2 exceeded domestic production. In that case commodity 1 would be exported and commodities 2 through n imported.

7. In effect, this is the "small country" assumption, and it could not be valid indefinitely, since continued growth, with the rest of the world of constant size, would eventually make the country in question very large. Many of the statements in this section can, however, be interpreted to apply to a situation in which all countries but one are accumulating capital

relative to labor at a common rate and the country in question is growing more rapidly. Formal extension of the model to that case is difficult and is not attempted here. The problem lies in the fact that, as shown by the Rybczynski theorem (Rybczynski 1955), if a country is producing two commodities and its capital/labor endowment increases, output of the capital-intensive commodity must increase more rapidly than the proportional change in the capital stock, while output of the labor-intensive commodity must change less than the percentage change in the quantity of labor (so that, if there was no change in the quantity of labor, output of the labor-intensive commodity would have to decrease). An attempt to describe growth of the world economy would therefore require consideration of demand conditions, since price changes would surely have to be explicitly incorporated into the model.

8. It could happen that production of one commodity ceased simultaneously with the start of the other. In that event there would be no period with a constant wage/rental ratio.

9. It is shown below that introducing transport costs probably smooths the stepwise progression described here.

10. Strictly speaking, the assumptions made are insufficient, if the labor force is growing, to ensure such an outcome: output of the more labor-intensive commodity could be growing, but at a slower rate than the growth of the labor force. This is where the "small country" assumption becomes inadequate.

11. A necessary condition for the validity of the assertion is that food is a normal good.

12. Strictly speaking, this statement is valid only if it is assumed that there is no upper limit to the marginal product of labor in agriculture.

13. If there is "disguised unemployment" in the rural sector, so that workers leave at some fixed wage as urban jobs become available, the real wage would remain constant for a greater interval of capital accumulation and output would increase more rapidly in the urban sector. The composition of output would not start changing until the urban real wage began rising. See chapter 2 for a discussion of the issues involved in identifying the nature of the urban labor supply, and see also Sen (1975).

14. Once import-competing production is adequate to satisfy the domestic market, the domestic price of the good is free to vary within the range determined by transport costs. It could even be less than the international price, but by an amount insufficient to enable exports with competitive profit levels. Thus the domestic price of exportables must be exactly equal to their international price less transport costs; the domestic price of import-ables can be anywhere from the international price less transport costs to the international price plus transport costs. It must exactly equal the latter only when imports and domestic production are both sold in the domestic market.

15. For a summary of the basic theorems of the HOS model when home goods are present, see Batra (1973, chap. 12).

16. Likewise, if it were assumed that production of home goods required only labor as an input, the analysis would not be affected. Note that intermediate goods also do not affect the analysis insofar as they are all tradable; when they are home goods, the complications discussed above arise.

17. This follows because labor-abundant manufacturing sectors will need less of a transport-cost barrier to enable their firms to compete with the labor-intensive commod-ities.

18. But see the interesting paper by Hufbauer and Chilas (1975), who attempted to estimate the effect of protection on the extent of specialization among the Western Euro-pean countries compared with regions of the United States: the authors found that Amer-ican regions were more specialized than comparable European countries, thus providing another piece of indirect evidence in support of the view that specialization patterns and not comparison of import-competing and export coefficients are the appropriate forms for empirical work.

19. To attempt to formalize an n-country model in which there are distortions in more than one country is an incredibly complex task that will not be attempted here.

20. Travis (1964) has expounded the position that it is trade impediments that prevent the realization of the HOS predictions.

21. See chapter 5 for a discussion of these measures in the project countries.

22. As is evidenced in chapter 8, this probably occurred in some of the project countries.

23. Intermediate goods have not been explicitly dealt with here. If they were, then it would be effective rates of protection that should be correlated with capital intensity.

24. For the most capital-abundant country, protection rates should be positively correlated with the labor intensity of the industry. For countries in the middle, one would have to partition commodities into those more capital intensive and those less capital intensive than the manufacturing sector's factor endowment. The hypothesis is that the height of protection needed to induce domestic production is positively correlated with labor intensity for the commodities on that side of the sector's endowment, and positively correlated with capital intensity for commodities on the other side.

25. The presence of protection, which would induce production in more capital-intensive industries than would occur under an efficient protection pattern, increases the likelihood that there would be greater capital intensity in the import-competing commodities than in export industries. This result holds only for the countries with extreme manufacturing endowments, however.

26. Of course one would have to use the appropriate protection measure, including the tariff equivalents of quotas and the subsidy equivalents of credits and the like and omitting all tariff redundancy. In addition, appropriate measures of capital and labor would, as always, be necessary.

27. Strictly speaking, if factor markets are distorted, the price of home goods will in general diverge from that which would prevail under competition in all markets. It must therefore be assumed in this section that there are no home goods. Since transport costs do not affect the results, because international prices are assumed given, they too will be assumed absent. The world under discussion is therefore one in which there are n manufactured goods and food, with all prices given to the country under consideration by the international market. There are, as before, three domestic factors: land, which is always fully employed in agriculture; capital, which is always fully employed in manufacturing; and labor, which is used in both sectors. It will be seen that there are a number of possible distortions, each of which can be characterized by a set of conditions on the wage and employment of labor. Full employment may or may not be assumed, and the wage may or may not be common between agriculture and manufacturing or within manufacturing.

28. Of course, if one knew the subsidy and tax equivalents of these measures, they could then be treated as protective rates, and empirical work could proceed in the same manner as described for the commodity market distortions.

29. If one regards the "real wage floor" as applying only to the manufacturing sector, the case merges with the full employment, constant differential case discussed next.

30. A difficulty with this interpretation is that there are generally some commodities, such as textiles, produced in both sectors.

31. Recall that it is assumed initially that domestic prices equal international prices. The effects of introducing tariffs in the context of the factor market distortion are examined below.

32. If a labor-abundant country did specialize in producing the capital-intensive good and was on its transformation curve (at D in figure 4.2a), it would be using more labor-intensive techniques of production than other countries whose "true" comparative advantage lay in producing that commodity. It should be stressed again that this could happen only if the distortion-ridden country somehow managed to increase the relative price of the capital-intensive commodity enough to make production profitable at a high real wage with labor-intensive techniques of production. One can doubt whether there are many instances of wrong specialization and full employment.

33. That employment (and output) in agriculture will fall follows immediately from the fact that the real wage increases from its distortion-free level.

34. This can be seen most easily by thinking of the "dual" of the undistorted case. Consider the wage rate that would prevail with complete specialization in commodity 1. Let the wage rise to the point where it pays to produce commodities 1 and 2, that is, to the wage/rental ratio implied by the prices of the first two commodities. Then production of both commodities will be profitable, and, with total capital stock the same, employment must be smaller. Let the wage increase a little more. Now production only of commodity 2 will be profitable; as the real wage rises (for a given price of output and capital stock), employment in the second industry will be smaller. At some point the wage will be that implied by the prices of goods 2 and 3, and production of both will be profitable, and so on. It should also be noted that the value of production of manufactured goods, evaluated at international prices, will decrease with increase in the real wage.

35. The straightforward definition of "labor intensive" in this context is clearly that more hours of labor are employed per unit of international value added in one sector than in the other.

36. If agriculture is labor intensive relative to industry, and the real wage is higher in industry, the reversal could never happen in physical terms, although it might be that labor's share became higher in industry than in agriculture.

37. If the wage differential were between all manufacturing, on the one hand, and agriculture, on the other, the analysis would be the same as for the Harris-Todaro case.

38. For a survey of the literature, see Magee (1973). Corden (1974. chap. 5) has a good exposition of the basic model and its implications.

39. I am indebted to Stephen Magee, who called this representation to my attention.

40. Note that the relative price of the labor-intensive commodity must increase or production would simply become completely specialized.

41. It should be stressed that this result could not be observed unless the relative price of the commodity was above the level that would prevail at free trade. If, for example, textiles are the "efficient" export for a particular country and are observed to be capital intensive relative to other produced commodities, one could rule out the proposition that they were naturally labor intensive unless their relative price was higher domestically than in international markets. This could happen, of course, but it would require subsidization of exports *and* factor market distortion so that the wage/rental ratio facing the export industry was higher than that facing the other industry.

42. One could presumably test whether there had been a reversal of the factor intensities in response to the differential by contrasting the factor-intensity ordering of the country with that of other countries thought to be unaffected by the distortion.

43. See note 42, which also applies here.

Chapter 5

1. Some of the Latin American country authors believed that the T_i statistic did not adequately discriminate between competing and noncompeting imports, because prohibitions against imports of anything produced domestically implied that all goods actually imported were noncompeting.

2. Yun Wing Sung (1979) found that for Hong Kong the T_is had a highly skewed distribution. He therefore transformed the statistic into a related one of $(P_i - C_i)/P_i$. With the benefit of hindsight, it might have been preferable to use the latter statistic throughout, though it is not evident that it affected the results of the individual country studies.

3. See below for a discussion of the shift in Brazil's trade composition.

4. Look at table 3.3 to see the prevalence of this phenomenon.

5. In principle, a country could have a sufficiently distorted incentive system for exports so that some commodities were exported that would not be economic at free trade, and one could have a category of "protected" exportables. This did not arise in practice in any of the country studies, although some country authors did break down exports into "more protected" and "less protected."

6. There are also problems associated with estimating the factor proportions that would probably be used in the development of new import substitution industries. See chapter 1 of Krueger et al. (1981) for a discussion of that issue.

7. See Leamer (1980) for a discussion of the appropriate test of a country's relative factor abundance in this case.

8. This is because, under balanced trade "gross exports," that is, the value added domestically plus the value of imported inputs used in production of exports (not export-ables), equal "gross imports," that is, imports used in domestic consumption plus imports used in production of goods for export. Likewise, "net" exports (gross exports less the value of imports reexported) equal "net" imports (gross imports less the value of imports reexported). With imbalanced trade, the difficulty lies in the fact that gross, not net, exports are observed.

9. For a full exposition of this procedure and its rationale see chapter 1 of the first volume in this series (Krueger et al. 1981).

10. This discussion assumes that a single factor price prevails throughout the country's economy. The existence of factor market distortions in the sense of different factor prices confronting producers in different sectors is taken up in chapters 7 and 8.

11. Recall that in some instances the availability of a domestically produced raw material was judged to be a significant determinant of comparative advantage for a particular manufacturing sector. See section 5.1.2.

12. The absolute numbers are telling in this regard. Monson's (1981) estimates of total labor coefficients indicate that 2,488 man-hours of labor are used for modern-sector HOS exportable production per million FCFA of domestic value added. This compares with 19,933 man-hours for NRB exports. That NRB exports predominate is reflected by the fact that the average over NRB and HOS exports is 18,993 man-hours per million FCFA of DVA.

13. Pulp and paper exports are destined primarily for Chile's LAFTA trading partners; see section 6.2 below.

14. If the Tunisian figure is recomputed to include oil among NRB exports, the Tunisian NRB exports become an exception to the statement above.

15. Westphal and Kim (1977) also based their estimates on output, not on value added. Labor/capital ratios derived that way are not biased, and it is therefore those ratios that are reported in table 5.2.

16. For 1968 Westphal and Kim estimate that the labor/capital ratio in primary exports was 5.69, compared with 15.48 for primary imports. That contrasts with labor/capital ratios of 3.55 for manufactured exports and 2.33 for manufactured import-competing goods. See Westphal and Kim (1977, table VII-10).

17. In correspondence, Hong offered an index of labor intensity of South Korean domestic output and exportables with 1960 = 100. According to these data, labor intensity behaved as follows:

	1963	1966	1968	1970	1973	1975
Domestic output	1.000	.553	.610	.500	.382	.333
Exportables	1.026	.884	.873	.670	.460	.263

This pattern is generally consistent with the Westphal-Kim findings. By 1975, subsidies to using capital were an important component of the export incentive system. See Hong's discussion in Krueger et al. (1981).

18. Thoumi was unable to obtain data to provide estimates comparable to those in table 5.1 for direct-plus-home-goods-indirect labor coefficients. He did, however, calculate the increase in output, value added, and wages and salaries that would result from one peso of direct value added. Import-competing industries had the biggest effect on all three. He indicated the reasons for this result: "The import-competing branches of Colombian manufacturing include the heaviest (most capital-intensive) industries in the country. These industries are also the most energy-and-water-intensive, and the ones in which transporta-

tion costs for their inputs are the highest. The high capital intensity also results in higher banking and insurance inputs" (Thoumi 1981, p. 158).

19. Sung (1979, table 5.9a). As a check on his results, Sung made a comparable calculation for the apparel sector. He estimated a depreciation/labor ratio for the United States of 11.1, compared with 0.9 for Hong Kong.

20. The corresponding figures for 1962, in 1973 prices, are: 684 for noncompeting imports, 346 for import-competing production, and 296 for exportable production. See Sung (1979, table 5.11).

21. Recall that Hong did not correct for differences in value added/output ratios, so capital/labor ratios must be used to generate meaningful results.

22. Thoumi's work contains an estimate of the factor content of "noncompeting imports," but that estimate is derived from domestic coefficients. Those coefficients are derived from the subsectors represented domestically, which presumably are different from the noncompeting import subsectors for which an estimate of factor inputs is desired.

Chapter 6

1. See the Corbo and Meller (1982) results on this point, and also Branson and Monoyios (1977).

2. See chapter 7 for a discussion of optimal factor proportions and skill/capital/labor substitutability.

3. See Paul Schultz's study in *Trade and Employment in Developing Countries*, vol. 2, *Factor Supply and Substitution* (Krueger 1982), discussed in chapters 7 and 8 below. Schultz's finding, that part of effective protection shows up in higher earnings to persons in the protected industry, strongly suggests that the Carvalho-Haddad procedure is preferable to using mean earnings when the necessary data are available.

4. Nogues reported that 72 percent of all Argentine exports to LAFTA were import-competing. Further, these exports were the least labor intensive of all Argentina's exports.

5. However, the ordering of capital/labor ratios remains unchanged.

6. For incomplete specialization, there must be at least one set of factor prices at which both commodities could be profitably produced for a given set of world prices. Since figure 6.2 is drawn with the factor prices and world prices indicated, it would not be possible for every country to face common production functions in each industry and simultaneously produce both commodities.

7. Although figures 6.1 and 6.2 both represent "reversals" from L/DVA to L/IVA, they differ fundamentally in that in figure 6.1 there is a set of factor prices (and therefore endowments) at which it would pay both industries to produce, whereas in figure 6.2 it would never pay to operate industry B at any positive level as long as international prices remained as depicted. In the latter case, if some other country were producing both commodities without protection, it would be presumptive evidence of differences in production functions between countries.

8. Not all country authors computed the IVA statistics. Countries covered in the project and not listed in the table are countries for which the data were not available. For Hong Kong, of course, DVA and IVA coefficients are identical and are not reproduced here.

9. It should be noted that L/IVA is undefined when international value added is negative.

Chapter 7

1. In principle, one should also consider the ways the choice of trade regimes affects labor costs. However, it is difficult to pinpoint mechanisms through which such an effect

might arise; some have suggested that multinational corporations may pay different wages than do domestic firms, but, quite aside from the fact that this could happen under any type of labor regime, it is not evident how the practice would affect relative costs of labor between industries. It is also possible that imported capital equipment might generate demand for a different type of labor than does domestically produced capital equipment, but that would affect the domestic labor market through distortions under the trade regime induced by its treatment of imports of capital goods. There is no evidence on these points available from the country studies and little basis for believing that these or other mechanisms are quantitatively significant.

2. Some export promotion strategies, including notably that of South Korea, have been implemented in part by providing exporters with preferential access to credit. Generally such access is valuable precisely because there is credit rationing. The effects of preferential access are therefore discussed below in connection with domestic capital market imperfections.

3. If domestic consumption was smaller, it would be either because imports of consumer goods were less than they would be at equilibrium (because of their higher price) or because exports of consumer goods were greater than they would otherwise be. This latter possibility could occur only if the effective exchange rate for exportables lay above that for import of capital equipment (and above its equilibrium rate in a unified exchange rate system).

4. The transfer would be from exporters receiving fewer units of domestic currency per unit of foreign exchange that they would at equilibrium to import-license recipients.

5. If all applicants know that licenses will be granted in proportion π to the amount applied for, all applicants will apply for $1/\pi$ times their desired quantity of imports, and the rationing mechanisms will be ineffective. To be sure, if there is excess demand for foreign exchange, the actual proportion will be less than π.

6. Ghana, India, the Philippines, and Turkey also had this set of incentives surrounding the industrial sector, as was documented in the NBER project on foreign trade regimes and economic development.

7. South Korea has in recent years begun contracting to erect large projects in foreign countries, notably in the Middle East, so that construction need not be a home good. In the import substitution countries, however, it seems sensible to so regard it.

8. See, for example, McCabe and Michalopoulos (1971). Nogues (1980) also deals with this question for Argentina. See section 7.2.1.

9. For an interesting case study, see Rhee and Westphal (1977).

10. Whether domestic construction represents a viable substitute for imported machinery and equipment is more problematic. There is some evidence that the fraction of construction in total investment rises during periods of extreme restrictiveness of import substitution regimes. However, that phenomenon appears to reflect a diversion of investment away from the industrial and commercial sectors and toward residential construction. See Krueger (1978, pp. 252–57) for a discussion.

11. For an exposition of the view that capital market imperfections are a crucial distortion in LCDs, see McKinnon (1973).

12. Because of "moral hazard" and other uncertainties, it may be rational behavior for banks to determine interest rates and give borrowers less credit than they would wish at those rates. The "moral hazard" and uncertainty argument for credit rationing has been spelled out by Jaffee and Russell (1976). The credit rationing and negative real interest rates discussed here refer to far more extreme circumstances, in which financial institutions would charge higher rates for loans if permitted to do so (and would sometimes do so by under-the-table payments, requiring large minimum balances during the period when loans are outstanding or when other conditions effectively increase the cost of borrowing).

13. For a survey of the rationales for these practices, see Katkhate and Villaneuva (1978).

14. This assumes that the tax does not simply finance fringe benefits desired by workers

in a context in which cash wages might be higher in the nontaxed sector (to compensate for the absence of those benefits).

15. Indeed, it is an interesting question, but one on which the country studies did not shed any light, whether multinational corporations may not use more capital-intensive techniques than their local counterparts precisely because they are induced to locate in the country by tax holidays and exemptions not granted to their local counterparts. Although Lipsey, Kravis, and Roldan (1982) show that use of more capital-intensive techniques is far less widespread than often stated, they could not obtain data on differentials in incentives for domestically owned and foreign capital.

16. It should not be forgotten that the structure of protection constitutes a distortion in the product market. The effect of differentiated tariffs on factor use is considered in chapter 8, along with the effect of the factor market distortions discussed here.

17. The conclusions stated above are those of Carvalho and Haddad, and also of most knowledgeable analysts of the Brazilian economy. It is an unexplained puzzle, therefore, that the index of the price of capital equipment in Brazil rose less rapidly than either the nominal wage or the wholesale price index. Carvalho and Haddad indicate that, from 1955 to 1974, real wages rose 80 percent, while the nominal price of capital goods rose by less than half the increase in the wholesale price index. See Carvalho and Haddad (1981, pp. 59 ff.).

18. There is, however, evidence that investment decisions by individual firms were heavily influenced by foreign exchange availability. See the interesting results reported by Bilsborrow (1977).

19. But see Schultz's analysis of the effect of the trade regime on earnings in Krueger (1982).

20. Data are from Monson (1981), table 6.14.

21. Data are from Monson (1981), table 6.15.

22. This assumption vastly simplifies analysis, since otherwise the value of a credit subsidy hinges upon the tax rate and the value of a tax break hinges upon the fraction interest payments constitute of sales revenue less other costs. When interest payments are subject to tax, the incremental value of either a lower tax rate or an interest subsidy is reduced.

23. However, the average rate of duty collection in Korea has not been very high—duty collections were only 9 percent of imports in 1970. The duty-free provisions were changed to a delayed-payment arrangement after 1974.

24. Among the measures taken during the period of transition from import substitution to export promotion in Korea was a fairly thoroughgoing financial reform that raised nominal interest rates and also lowered the rate of inflation. By the 1970s, however, real interest rates fell sharply.

25. This assumes that the won was not devalued during the period of the loan. For an analysis of the effects of this distortion, see Frank, Kim, and Westphal (1975, chap. 9).

26. A possible exception is Uruguay, but there are not enough data available to judge.

27. Of course, to the extent that different firms or industries had differential access to credit or other privileges, that access affected their demand for capital goods. Since domestic credit market imperfections seem to have been of considerable importance in Tunisia, the statement that all comers had access to imports at the same price is somewhat misleading. See the discussion in Nabli (1981, sec. 10.1.4).

28. Hong Kong is an exception. It is arguable whether Brazil's BNDE loans constitute credit rationing. And the evidence is simply not available for Chile or Colombia.

29. See, for example, Magee (1976, p. 45).

30. If the minimum wage is set at above equilibrium level and employers are induced to hire more skilled, and fewer unskilled, workers than they otherwise would, the resulting "shortage" of skilled workers will be greater than would have resulted had the wage rate for unskilled workers not been constrained. In those circumstances the actual wage paid to

skilled workers would generally be expected to be higher than it would be in the absence of the minimum wage constraint.

Chapter 8

1. Focus throughout the project has been on the link between trade strategies and employment under efficient allocation of resources. Thus, attention is on ways existing trade strategies might have been implemented consistent with greater labor utilization at a positive marginal product and no less international value added.

2. See section 3.1.2 for a definition of the effective rates of protection (ERPs).

3. Note that these data are based on a different set of estimates than those reported in table 8.1. See Nabli (1981) for a discussion of the difference between the two sets.

4. See section 5.1.2 for a discussion of the relation between T_is and ERPs.

5. In the Brazilian case the implications are even stronger. Based on 1970 employment coefficients, the data indicate that employment per million cruzeiros of exports and import-competing products was 11.2 and 16.3 in 1959, contrasted with 16.1 and 15.9 in 1968 and 20.5 and 14.4 in 1974. Thus, observed factor intensities in fact reversed.

6. For purposes of evaluating potential in table 8.10, Monson's estimated labor coefficient for DC importables with below-average protection was contrasted with the average for all DC importables.

7. On an earlier draft of this chapter, one reader raised the question whether the output of the large- and small-scale firms is the same. There is no ready answer to the question, but it is difficult to believe that the systematic pattern seen across all industries reflects only differences in output composition within each industry.

8. There may also be factors associated with the choice of trade regime that influence size of firm regardless of trade category. Carlos Díaz-Alejandro found, for example, that in Colombia import licenses tended to be granted more readily to larger firms (see Díaz-Alejandro 1976, pp. 139ff.). Insofar as licensing procedures, access to foreign exchange, and fixed costs of paperwork bias the allocation of licenses to larger firms, an import substitution regime may affect the overall size distribution of firms.

9. See section 8.3.2 for a comparison across countries. Comparison of mean g_is is somewhat hazardous when the degree of disaggregation differs significantly. But when, as in Korea, the sectoral breakdown remains constant over the set of observations, the reliability of mean g_i as a measure of efficiency of resource allocation is considerably greater.

10. It is also of interest to examine the g_is associated with different sectors and the changes in them over time. The g for cotton yarn, for example, was .37 in both 1966 and 1970. Exports of that commodity were growing rapidly during the period 1966–70. By 1973, g fell to .03, suggesting that the profitability of further expansion of that activity had diminished sharply. A similar pattern prevailed for most other textile activities. By contrast, items such as electrical products and motor vehicles, both of which had sizable negative g's in the 1960s, showed much higher g's in 1973, thus reflecting the shift that was taking place in South Korean comparative advantage.

11. Data are from Bension and Caumont (1981, tables 11.10 and 11.11).

12. Recall from chapter 7 that Carvalho and Haddad believe minimum wage legislation was binding only for a very small fraction of workers by the late 1960s.

13. The proportionate increase in each sector differs both because the estimated elasticities of substitution are sector-specific and because the percentage of social insurance taxes levied on workers in different sectors varied somewhat. See Carvalho and Haddad (1981) for details.

14. It may also be noteworthy that the average proportionate change in labor coefficient of the capital-intensive goods seems to be somewhat greater than that of the labor-intensive

goods. This suggests that the distortions may have worked to increase the observed capital intensity of import-competing industries relative to that of exportables.

15. See Corbo and Meller (1981, Appendix A), for details.

16. Skill coefficients appear unaffected relative to unskilled labor. The reason for this is that Corbo and Meller held the relative price of skilled and unskilled labor constant in their simulation. Since most industries were estimated to have Cobb-Douglas production functions, no change in the ratio of skilled to unskilled labor could have been expected.

17. Note that the q's are defined as output per worker. The estimates in table 8.7 refer to possible increases in labor units per unit of value added. They thus refer to the inverse of the q's.

18. This assumes, of course, that the existing strategy is somehow amended to remove the bias toward choice of capital-intensive techniques for eligible firms.

19. Thailand and Uruguay are omitted from the table for lack of quantitative estimates.

20. He also implemented the model for Kenya, Taiwan, and Turkey. Those results are not reviewed here, since interpretation would require considerable background on those countries. The results are presented in Henderson (1982).

21. Constrained optimization means that limits are placed on the change from base period output values that can occur. These limits are in addition to the usual resource availability and balance constraints.

22. Strictly speaking, the shadow prices attaching to the output limits reflect the gain in international value added that would result from relaxing the capacity constraint (either upward or downward) by a unit. Although both upper- and lower-bound output limits are placed on each activity, only one will have a nonzero shadow price in any solution. A large positive shadow price on an upper-bound constraint indicates that additional capacity would permit a corresponding increase in international value added. A smaller shadow price indicates less potential gain. Negative shadow prices on lower-bound constraints reflect the gain to be had by shifting resources to alternative, more efficient, activities.

23. The force of this qualification can be seen by noting that, even for the West European countries included in Henderson's analysis, the capacity constraints were reached in many sectors. Indeed, it is a property of the model that there will be few (usually only one) marginal sectors in which neither the upper- nor the lower-bound constraint is binding.

24. In the Henderson model there is no way of ascertaining the extent to which the estimated increase in IVA orginates in factor reallocation as marginal rates of substitution between factors are equated across activities rather than in output reallocation at existing factor proportions. Inspection of the magnitude of the output shifts, compared with the relatively smaller magnitude of the realignment of factor proportions, suggests that the increased IVA probably originated more from changing outputs than from realigning factor proportions. But without further work it is impossible to verify this conjecture.

Chapter 9

1. To be sure, there are short-run considerations pertaining to the behavior of income and employment during the transition from one factor market and trade regime to another. Questions pertaining to the transition were not addressed in the project. See Krueger (1978), especially chapters 11 and 12, for a discussion of these issues.

2. In particular, there is considerable evidence that many of the middle-income developing countries persist in protecting their highly labor-intensive industries, such as textiles and footwear, in which they may have lost comparative advantage. Monson's findings for the Ivory Coast and Nogues's conclusions for Argentina are particularly compelling in this regard.