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INDUSTRIALIZATION STRATEGY

by

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Import Substitution as an Industrialization Strategy*

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Introduction

An industrialization strategy biased toward import substitution is, I think, almost an inevitable phenomenon in less developed countries. Often it emerges in an apparently natural way -- perhaps even inadvertently -- following the imposition of import controls in response to a balance of payments problem. What is initially viewed as a curb on the consumption of less essential imports soon becomes rationalized as a protective device to encourage production of their substitutes. Since the market is already there for the taking, a

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sufficient degree of protection will promise quick easy gains in industrial output, primarily in finished consumption goods even though materials and parts, as well as capital equipment, must be imported.

Moreover a dual theoretical rationale for an import substitution orientation in development strategy easily emerges to justify its continuance.¹ World demand for primary commodities is held to be growing too slowly for their export to play a leading role in economic growth. The export of manufactures in competition with developed countries appears unpromising both because of the disadvantages of technological backwardness and small scale and because of protection in the wealthy countries where the principal markets are. This leaves production for the home market, balanced in relation to home market demand, as the seemingly most promising avenue of growth.

The first aspect of the rationale for an import substitution bias is a defensive one, implying, in effect, that this is the only way out of a difficulty. The other has a more positive character, however, suggesting the possibility of an

¹The description of this rationale that follows is obviously based on well-known theories of R. Nurkse and W.A. Lewis. It by no means does justice, however, to the sophistication and depth of their views. Popular versions of famous theories, which serve as the rationale for political decisions, are often unfortunately only caricatures of the originals.

emerging self-sustaining growth mechanism. Behind import controls the domestic manufacturer can obtain high prices for goods even of inferior quality, thereby "earning" high profits that can be saved and reinvested. This means turning the terms of trade against agriculture (and other non-protected sectors) to create the saving for industrial growth. Eventually, it is hoped, agriculture too will benefit as industrial progress reduces costs and prices, and as industrial expansion offers higher productivity employment to rural labor.

This line of thinking has a natural appeal in newly developing countries. It promises less dependence on traditional exports -- hence, less fear that "export lag" or declining terms of trade (or both) will inhibit development. The problem of competition with the more advanced technology in developed countries is avoided by curbing imports and not encouraging new exports. The balance of payments problem -- the need to import growing quantities of capital goods -- is solved instead by saving foreign exchange through import substitution. The difficult problems associated with increasing agricultural productivity can be pushed into the background, since it is the twist of the terms of trade that initially wrests saving from agriculture. And, via this shift in income distribution to the "capitalist sector" and the latter's response, a cycle of profit-saving-reinvestment-increased productivity-higher profit-etc. can supposedly emerge to render growth self-sustaining.

While this is, no doubt, an over-simplified view of the origins of an import substitution strategy as well as of its rationale, it is suggestive, I think, of the experience of a number of developing countries that have had some success in the first stage of implementation of such a strategy -- the take-over of an existing market for consumption goods from the foreign supplier. Common also to their experience, however, seems to be the greater difficulty of meeting the challenges that lie beyond the first stage -- namely, extending production backward to intermediate goods, capital goods and raw materials, and breaking into the world market with exports of manufactures. Yet these are crucial to ultimate success in that, without one or both, the pace of industrial growth must falter and the emergence of a self-sustaining growth mechanism is frustrated. For expanding consumption goods production only, unless this results in growing exports or import replacement, is incompatible with growth of saving.

The conclusion is, then, that beyond the first stage in an import substitution strategy -- the expansion, behind protection, of finished consumption goods production to the limits of the domestic markets -- lies the necessity of developing production of intermediate goods, capital goods, and raw materials; or expanding exports; or both. It is a simple matter to formulate

and implement a policy of protection for the first stage. Often this happens almost inadvertently, as was suggested above. But the crude policies of protection that may serve adequately in the first stage, and the economic structure that they encourage, are likely, in my opinion, to become barriers to growth in subsequent stages.² Why this is so, and what might be done to prevent it or correct it, is the subject of this paper.

Section 1 comprises a discussion of the emergence of barriers to growth under three headings: economic inefficiency (misallocation of resources); technical inefficiency (failure to minimize costs); and the saving gap (failure to achieve an adequate rise in domestic saving). While the distinctions may not always seem clear-cut, this scheme of presentation does serve to emphasize that a naïve import substitution strategy can impede growth via an adverse influence on the marginal saving rate, as well as on the social product; and that its influence on the latter over time depends as much on inducements to efficiency and innovation as on resource allocation.

²Because of a rising import bill of materials, parts and equipment to sustain production in the protected industries, and because of a resistance on the part of unprotected sectors and income groups (e.g. agriculture and labor) to any deterioration of their terms of trade, barriers to growth taking the form of balance of payments difficulties and inflation may arise long before the first stage is completed.

There follows in Section II a brief summary of the policy implications of the critique of such an import substitution strategy.

I

Economic Inefficiency

An import substitution bias means a balance of payments policy that favors import control or restriction (often via exchange control) over export encouragement. This, in turn, implies a lower value for foreign exchange than that appropriate to a policy of equal encouragement to exports and import substitution. If market prices were given and could be taken to represent unit costs and utilities at the margin, the resulting resource allocation would require a greater value of resources to save an additional unit of foreign exchange through import substitution than to earn an additional unit of foreign exchange through export expansion.

Since this kind of welfare loss is generally well understood, the persistence of this direction of bias in balance of payments policies suggests either that considerations other than economic efficiency are considered to be more important, or that the assumptions underlying this kind of welfare judgment are considered to be invalid. About all an economist can do with regard to the former is to point to the cost and, since this emerges anyway in a discussion of economic efficiency, I will focus on the latter.

Before turning to the validity of the assumptions on which welfare judgments against interference with free market results are based, however, we should note another kind of misallocation that appears to be both very likely and very substantial in the context of an import substitution strategy. That is the bias against production of intermediate goods, capital goods and raw materials. The reason is, of course, that these are inputs in the industries which develop in the first stage and, as such, are usually more liberally imported than are the finished consumption goods that compete with the emerging domestic industries. This means not only a bias against vertical balance in import substitution -- i.e., backward linkage is discouraged -- but also an inflated and irrationally differentiated structure of protection at the finishing stages of production.

This is so because the total rate of protection depends not only on the particular rate of protection that applies to the product of that industry, but also on the particular rates that apply at the preceding stage in the production process. The former acts as a subsidy while the latter act as taxes on value added in a particular industry. It may be useful to put these relationships more formally at this point.³

³The formal exposition is patterned closely after that of Harry G. Johnson in his "Tariffs and Economic Development," Journal of Development Studies, October, 1965, p. 20.

Let X_i represent the output of any industry and $\sum_j a_{ji} X_i$ its intermediate inputs, both valued at given world prices -- i.e., the prices that would prevail with free trade.

Then

$$V_i = X_i - \sum_j a_{ji} X_i \quad (1)$$

is value added at free trade prices, and

$$V_i(1+T_i) = X_i(1+t_i) - \sum_j a_{ji}(1+t_j)X_i \quad (2)$$

is actual value added under the system of protection. The t 's represent the proportions by which the system of protection permits the actual domestic prices of the outputs of various industries to exceed their free trade prices, while T_i is the total rate of protection of the i^{th} industry -- the proportion by which its value added can exceed what would be its free trade value. This can be written also as

$$V_i(1+T_i) = X_i + t_i X_i - \sum_j a_{ji} X_i - \sum_j a_{ji} t_j X_i$$

and by substituting (1) in the right-hand side

$$V_i(1+T_i) = V_i + t_i X_i - \sum_j a_{ji} t_j X_i$$

We can solve this for the total rate of protection

$$T_i = \frac{V_i + t_i X_i - \sum_j a_{ji} t_j X_i}{V_i} - 1 \quad \text{or}$$

$$T_i = \frac{t_i - \sum_j a_{ji} t_j}{V_i/X_i} \quad (3)$$

From (3) we can see that the total rate of protection of an industry will be greater the greater is its own particular rate of protection, the smaller are the particular rates of protection of its supplying industries, and the smaller is the proportion of its value added to the total value of its output. Now consider the distorted pattern of protection that can result from a policy of restricting most severely the import of consumption goods, while permitting inputs into these industries to be more liberally imported.

First, as was noted above, exports are penalized by the lower value of foreign exchange that is consistent with the bias toward import restriction. But the extent of the bias can be much greater than the particular degrees of protection would suggest. Suppose, for example, that the protective device employed were a 50 per cent duty on consumption goods while intermediate inputs could be imported at free trade prices. Then if value added in manufacturing (at free trade prices) were 25 per cent of total (free trade) value, equation (3) tells us that the total degree of protection would be 200 per cent! If the protection is effective, the economy is paying marginal resources adding value in import-substituting industries 200 per cent more, for each unit of foreign exchange saved, than it is paying marginal resources

earning a unit of foreign exchange in export industries. This could mean either higher rewards per unit of resources, or more resources -- i.e., less efficiency, or both.⁴

A similar magnification of the distortion in degrees of protection occurs, of course, between industries producing consumption goods and those producing materials, parts and equipment when the latter are more liberally imported. Thus, the bias against backward-linkage import substitution is more pronounced than a simple comparison of particular rates of protection would suggest. Moreover, the resulting relative lack of domestic sources of supply for these inputs, together with the fact that the total degree of protection is inversely related to the (proportional) value added contribution of the industry, means that such a system of protection particularly encourages heavy users of foreign exchange. Finally, we should note that in protecting the balance of payments via import restriction, it is a very common practice to restrict most severely the least essential imports. This tends to bias import substitution, albeit perhaps inadvertently, in favor of less essential industries.

The conclusion is that an import substitution bias in development strategy, when accompanied -- as is, I think,

⁴This assumes no terms of trade effect, but see below, p. 11.

typical -- by relatively liberal import policies with respect to "essential" imports (both in the form of inputs for domestic industries and special categories of consumption goods), can create a rather extreme distortion of incentives away from the pattern that would result from free markets. Moreover, the direction of distortion appears to be unfortunate in that it particularly discourages export expansion and backward-linkage import substitution, one or both of which is crucial to sustained industrial growth, as noted above; while it gives the greatest encouragement to industries most heavily requiring foreign exchange to produce less essential products.

Despite this, protection is often defended as a means of correcting "market failures," and once we abandon the assumption that free market prices are necessarily the best welfare indicators we are obliged to consider several more or less respectable arguments for this view.

Johnson has argued that the only economic justification for tariffs is the terms of trade effect of trading more or less.⁵ For an open economy that can affect via trade the prices of the goods it buys and sells, full Paretoan optimality requires equality between the ratio of domestic prices of exports and imports and the marginal terms of trade, rather

⁵Op. cit., p. 8.

than the international price ratios. This means restricting trade until

$$\frac{P_h}{q_h} = \frac{P_w}{q_w} \cdot \frac{1 + \frac{1}{n}}{1 - \frac{1}{e}} \quad (4)$$

where p represents the price of imports and q the price of exports, the subscripts h and w indicating home and world prices, while n and e are the world elasticities of supply of imports and demand for exports, respectively.⁶ This could be accomplished by establishing a dual exchange rate system, the price of foreign exchange for imports exceeding that for exports

in the proportion $C = \frac{1 + \frac{1}{n}}{1 - \frac{1}{e}}$ (the "correction" for terms of

trade effects). The more common method of favoring import substitution over exports, however, is by tariffs or exchange control. In this case imports should be restricted (and the price of foreign exchange reduced) until the condition described by equation (4) is met.

How does this description of optimality relate to the picture of misallocation which preceded it? First, the general degree of protection would have to be equal to $(C - 1)$ and it should apply uniformly at all stages of the production

⁶S. Alexander, "Devaluation versus Import Restriction as an Instrument for Improving the Trade Balance" IMF Staff Papers, April 1951, p. 379.

process. If all industries were effectively so protected the total rate of protection for each industry would be equal to its particular rate -- i.e., the uniform general rate (C - 1). This can be seen by setting $t_i = t_j = t$ in equation (3)

$$T_i = \frac{t - \sum_j a_{ji} t}{V_i/X_i} \quad (3a)$$

and since $V_i/X_i = \frac{X_i - \sum_j a_{ji} X_i}{X_i}$

$$T_i = \frac{t(1 - \sum_j a_{ji})}{1 - \sum_j a_{ji}} = t$$

As Johnson has pointed out, however, for a trading country the export industries' rates of protection (in the absence of export taxes) must effectively be zero.⁷ If any of these exportables are inputs in other domestic industries, total rates of protection will differ among industries in accordance with their use of these inputs and their (proportional) value added contributions. This does not mean, however, that resources will be misallocated in this case,

⁷Johnson, *op. cit.*, p. 22. This assumes that the export industries are competitive. If they are not they can act as discriminating monopolists behind protection. But if they (all) exploit their monopoly power in the world market there is no need for the government to do so via a policy of protection. Since, however, the most important cases of high values for C are likely to be associated with primary commodity exports, the assumption that the home prices of exports are equal to the world prices (or below them by the amount of export taxes where these play a role in the adjustment to the condition described by equation (4)) is probably a reasonable one.

since the resulting pattern of protection is just what is needed to bring domestic rates of transformation between exports and imports in line with the international marginal terms of trade.

Put this way there seems to be a perfectly respectable argument for protection when the marginal terms of trade are below the average. The appropriate rate of protection is $(C - 1)$ and to avoid inter-industry distortions in the pattern of protection the simple rule is a uniform rate for all industries.

There are, however, two serious weaknesses in the argument. First is the assumption of a single elasticity of demand for all exports⁸ -- presumably a weighted average. For most developing countries, however, the primary reason for a value of C in excess of unity is the relatively low elasticity of demand for one or a few primary exports which weigh heavily in the total. Basing a system of protection on the weighted average elasticity would mean a strong bias against all of the other (actual and potential) export industries.

This strongly suggests that the few exports with low elasticity of demand be removed from the jurisdiction of general trade policies and treated as special cases requiring

⁸A single elasticity of supply for all imports is also assumed, but this is normally more defensible.

taxes, supply restrictions, or something of the sort. If this is done, however, the second weakness, alluded to above, of the terms of trade argument for protection becomes more apparent. For the argument assumes no retaliation -- an assumption that might be valid in the case of modest across-the-board protection, but which can be held with less assurance in the case of a much stronger price influence concentrated on one or a few commodities. It is, in other words, precisely where the potential terms of trade gains from trade restriction are greatest that the threat of retaliation is most likely.

A situation where a country can avoid serious misallocation of resources only by means that hurt others and invite retaliation calls for some kind of international agreement to resolve the inherent conflict. So what appears to remain as valid of the terms of trade argument for protection is that it should apply selectively to a relatively few commodities, and that this should lead to an international agreement on prices. Short of achieving this kind of international cooperation it is probably in the interest of the developing countries to apply supply restriction schemes for these commodities because of the paramount importance of freeing all other exports from the penalty of an undervaluation of foreign exchange.

What of the other common arguments for protection: infant industry, external economics, and factor price disequilibrium? Johnson has argued that since these do not involve a failure of international price ratios (or marginal terms of trade) to represent true opportunity costs in international trade, any policy designed to implement these arguments that simultaneously disturbs the relation between domestic and international price ratios will thereby create, as well as correct, distortion.⁹ The appropriate measures to bring true social costs and values into line in each of these cases would involve a system of taxes and subsidies, not a system of trade restriction. His argument is correct on the assumption that the government can in fact implement a fiscal policy that itself involves less distortion than, say, taxing imports. If, on the other hand, the fiscal measures available are quite limited for institutional reasons, the argument is weakened. Nevertheless, the advantages of fiscal remedies are so pronounced in each of these cases that the argument for trade restriction is, in my opinion, very dubious. Let me consider each of these cases, in turn.

⁹Johnson, op.cit., pp. 8-9. It is assumed here that the relation has already been corrected for terms of trade effects.

The infant industry argument has two roots. One is the relation of efficiency to scale and the other is the relation of efficiency to time. Increasing returns to scale and a time-consuming learning process then serve as valid bases of the case for protection of infant industries.

The logic of the argument calls for specific protection of certain industries, however, rather than general protection of the sort described above (in the introduction) as an import substitution strategy. The reason is two-fold. First, industries differ with respect to their scale-efficiency and time-efficiency relationships. Long-run comparative advantage depends in part, then, on their relative differences in the response of efficiency to scale and time. Second, the extent and pace of response is itself likely to be a function of the concentration of resources. That is, even if all industries had the same response functions it would normally pay to concentrate on fewer industries, at least up to a certain point in their development, rather than to disperse resources across a broad front.

This is obvious for the scale-efficiency relationship, but it may be true for the time-efficiency relationship, as well. That is, a concentration rather than a dispersion of investment, technical and organizational skills, and education

and training may mean a more rapid average rate of progress in efficiency for the whole economy. Scitovsky emphasizes in this connection the relationship between the pace of growth of an industry and its rate of innovations, concluding that the rapid pace made possible for some industries (as opposed to the pedestrian rate for all in a balanced growth context) means concentrated growth would permit and encourage a more rapid overall rate of increase of productivity.¹⁰

So the logic of the infant industry argument calls for concentrated industrial growth rather than growth balanced in relation to domestic demand, implying greater emphasis on exports and less on import substitution. But protection against imports penalizes exports via the lower value of foreign exchange. An optimal set of policies would include, therefore, subsidies to exports from the selected industries equal to their rates of protection, both set (somehow) equal to the (discounted) future relative advantage of these industries.

There remains another problem, however, We do not have in this case a uniform degree of protection across the economy, with the result that industries using as inputs the

¹⁰T. Scitovsky, "Growth--Balanced or Unbalanced?", Papers on Value and Growth (Stanford University Press, 1964), pp. 107-109.

outputs of the protected industries would be penalized, the degree of penalty depending not only on the amount used of the various protected goods, but also on each industry's (proportional) value added contribution. In order to avoid misallocation from this source, these differential penalties would have to be offset by matching subsidies. At this point Johnson's argument for avoiding all of this "patching up" by subsidizing directly the "infant industries" in the first place appears very sound.¹¹

The presence of external economies is another reason sometimes given to defend protection. Broadly viewed external economies comprise all elements of interdependence among industries, both direct and through the market. It will be convenient for what follows to distinguish within these simply between interdependence in production and interdependence in consumption.

An emphasis on interdependence in consumption leads to "horizontally balanced" growth in line with market demand. While this yields external economies via complementarities in consumption, it means that external diseconomies prevail in

¹¹Johnson also rightly stresses the loss in consumer surplus from distorting the relationship of domestic to international prices. Op. cit., p. 10.

interdependence in production via competition for scarce resources. In contrast, an emphasis on interdependence in production leads to "vertically balanced" growth in line with backward and forward linkages in production. This, of course, yields external economies on the supply side, but ignores complementarities in consumption, thus requiring an ability to sell in the world market to solve the demand problem.

There seems to be no obvious reason for giving greater emphasis in general to one kind of interdependence over another -- i.e., for generally favoring horizontal balance and import substitution over vertical balance and export expansion because of the existence of external economies. On other grounds a preference could be established. For example, if the terms of trade were the only criterion, horizontal balance should be preferred. Or, if saving and growth were the only criterion, vertical balance should be preferred.¹² But if the world market is available to fill the gaps in demand and supply the external economies argument does not necessarily favor either domestic supply balance or domestic demand balance.

¹²See below, pp. 30-38.

The essence of the external economies argument for protection, however, is the inability of private decisions based on market criteria to take account of the results of interdependence.¹³ While this may be a nearly universal phenomenon in the context of a dynamic growth process, there will be certain areas where the total gains from interrelated decisions can be judged to be particularly large in relation to what the market promises atomistic decisions. These then should be treated in a manner similar to that suggested above for infant industries. And the same argument for subsidy rather than protection applies. In the absence of any reason for altering the relation between domestic and international prices, the only defense for protection in these cases would be that import duties were the least inefficient method of taxation available to the government.

I turn finally to the factor price disequilibrium argument for protection of manufacturing. Put in its simplest form it is that wage rates in manufacturing¹⁴ exceed the opportunity cost of labor from other sectors and this puts

¹³T. Scitovsky, "Two Concepts of External Economies," Papers on Value and Growth, op. cit., pp. 69-83.

¹⁴This need not be restricted to the manufacturing sector.

domestic manufactures at an unwarranted disadvantage with imports. Protection of domestic manufactures is then the suggested remedy.

Lary has argued correctly that, since the factor price disequilibrium applies to manufacture for export as well as for import substitution, the former should be equally encouraged. He has advocated a dual exchange rate -- a higher price of foreign exchange for both exporting and importing manufactures and a lower price for trading agricultural products.¹⁵ This is a step in the right direction in that it corrects an unwarranted bias against exports. But there remains a bias against the use of labor in the factor mix and a bias against the use of domestic manufactures as inputs. These can be eliminated along with the others, however, by a simple subsidy on the employment of labor where its market price is above its opportunity cost. Again it seems that restriction of imports is an inept and costly way to correct a market failure.

The conclusion that emerges from this analysis of the economic efficiency of favoring import substitution via protection is somewhat depressing. First, the system as it develops in the first stage is likely to misallocate resources

¹⁵H. Lary, "Economic Development and the Capacity to Import -- National Policies," in Lectures on Economic Development (Istanbul University, 1958).

by means of a strong bias against exports, against backward-linkage import substitution, in favor of less essential industries, and in favor of heavy users of foreign exchange. Nor can any of the arguments for correction of market failures bolster very much the case for this kind of protection. Even the terms of trade argument appears dubious when a concern with low world demand elasticities for a few exports dictates an under-valuation of foreign exchange that heavily penalizes all other exports (actual and potential).

This is a qualitative judgment, of course, and the really important question is its quantitative significance. Some striking evidence bearing on this has been presented recently by Soligo and Stern for Pakistan.¹⁶ Using the Tims-Stern input-output model for 1963/64, they have calculated implicit rates of protection for forty-eight manufacturing industries. Their "implicit" rates correspond to my "total" rates, but with an important difference. In my notation theirs is

$$U_i = \frac{t_i - \sum_j a_{ji} t_j}{V_i/X_i + (t_i - \sum_j a_{ji} t_j)} \quad (5)$$

which can be compared with equation (3) above.

¹⁶R. Soligo and J. Stern, "Tariff Protection, Import Substitution and Investment Efficiency," Pakistan Development Review, Summer 1965, pp. 249-270.

Put more simply the difference is this:

$$T_i = \frac{W_i - V_i}{V_i} \quad \text{and}$$
$$U_i = \frac{W_i - V_i}{W_i} \quad (6)$$

where W_i is $V_i(1 + T_i)$, actual value added under the system of protection (see equation (2) above). It follows that their implicit rate of protection

$$U_i = T_i \cdot \frac{V_i}{W_i} = \frac{T_i}{T_i + 1}$$

The Soligo-Stern measure of the rate of protection has one very decisive advantage in that it can apply to cases where V_i is negative, which my T cannot. And this turns out to be of considerable importance in assessing the Pakistan data.

A negative V_i means that for an industry, the value of output at world prices is less than the value of intermediate inputs at world prices. Abandoning production and importing the finished product would save both foreign exchange and domestic resources.

This was found to be true for twenty-three industries in Pakistan, including food processing, beverages, cigarettes, textiles and wearing apparel, petroleum and coal products, furniture, cycles, and motor vehicles. Since V was negative

for each of these industries, U was greater than unity. Among the twenty-five with values for U less than unity (implying no absolute waste of resources from the activity), the values varied widely from -0.27 for grain milling to 0.92 for matches (suggesting relative waste of resources). The pattern of differential protection corresponds to what one would expect from an import substitution bias.

In general i) consumer goods are much more heavily protected than either intermediate or investment and related goods, ii) within the consumer goods industries, non-essentials, such as beverages and cigarettes, are much more heavily protected than essential industries such as grain and rice milling, salt and tea, iii) textiles are the most heavily protected group of industries, although the protection is approximately the same for all components of the group and iv) the least protected industries are those producing heavy machinery, both electrical and non-electrical, and transport equipment other than motor vehicles and cycles. Fertilizer is also among the least protected group.¹⁷

A similar study of protection is in process for the Philippine economy and some preliminary results are presented in the accompanying table for 55 manufacturing industries, accounting for more than 80 per cent of gross value added in manufacturing. While the estimates should be taken as tentative and subject to revision, they indicate broadly, I think, the range of degrees of protection accorded manufacturing by the system of tariffs and indirect taxes.

¹⁷Op. cit., p. 259.

TABLE I

Total Rates of Protection
for
Selected Philippine Manufacturing Industries^{a/}
(Preliminary Estimates)

<u>ISIC Code</u>		<u>U</u>	<u>T</u>
3121	Coconut oil and copra cake	-.54	-.35
2441	Embroideries (not exported U = .60)	-.29	-.22
*2031	Pineapple canning	-.24	-.20
*3811	Ship repairing	-.19	-.16
2331	Cordage, twine and net	-.15	-.13
*2514	Plywood	-.15	-.13
2511 & 2512	Lumber	-.08	-.07
2131	Brewery and malt products	-.04	-.04
2093	Desiccated coconut	-.02	-.02
2024	Milk processing	.04	.04
3621	Agricultural tractors	.11	.12
*3114	Fertilizers	.13	.15
3641	Food products machinery	.13	.15
3211	Petroleum refining	.17	.20
3831	Motor trucks and buses	.18	.22
3113	Compressed, liquefied or solidified gases	.22	.29
*3192	Medical and pharmaceutical preparations	.25	.33
2072	Sugar central and refinery products	.27	.36
*3411	Basic iron and steel products	.31	.45
3731	Batteries	.35	.53
2095	Coffee	.41	.69
3194	Soap and other cleaning compounds	.42	.71
3321	Glass containers	.43	.76
3832	Motor vehicles engines, parts and bodies	.48	.91
3021	Tires and tubes	.48	.94
2721	Paper stationery	.50	.98
2433	Women's & children's garments	.54	1.19
2723	Cartons, cardboards, boxes	.58	1.40
2712	Paper and board mill products	.59	1.45
3993	Fabricated plastic products	.63	1.67
3873	Household sewing machines	.65	1.84
2431	Men's and boys' garments	.66	1.94
3531	Fabricated structural iron and steel	.66	1.97
2411	Shoes, except rubber	.67	2.04
3391	Structural concrete products	.67	2.05

TABLE I
Total Rates of Protection (continued)

<u>ISIC Code</u>		<u>U</u>	<u>T</u>
3733	Electric wires and wiring devices	.69	2.21
3322	Flat glass	.70	2.36
*2053	Wheat mill products	.72	2.51
*3341	Cement	.72	2.63
3532	Architectural metal work	.73	2.72
2320	Knitting mill products	.73	2.77
3722	Radios, phonographs & TV	.79	3.79
2141	Soft drinks	.87	6.62
3011	Rubber shoes, slippers and boots	.91	10.07
2097	Starch and its by-products	.93	13.77
2096	Prepared animal feeds	.95	21.03
2611	Wood & rattan furniture, not upholstered	1.02	
3542	Metal closures and crowns	1.10	
3131	Paints and varnishes	1.14	
2081 & 2082	Candy, cocoa and chocolate products	1.10	
2211	Cigarettes	1.21	
**2314	Cotton textile mill products	1.32	
2094	Vegetable lard and margarine	1.34	
3193	Perfumes, cosmetics and other toilet preparations	1.44	
3831	Autos	2.03	

a/ See Appendix for notes on the method of estimation.

* These industries are exempted from taxes on imported machinery and equipment. The exemption will decline each year until it disappears in 1969. The effect of this, which has not been taken into account in the above estimations, would be to raise only slightly the rates of protection for these industries, since duties on machinery and equipment are generally very low.

** The cotton textile industry has special tax exemption under R.A. 4086. The exemption will decline each year until it disappears in 1971. Without this exemption U would be 1.04.

The estimates, however, are based on value added in domestic prices and the system of duties and indirect taxes, with value added in world prices deduced by discounting outputs and inputs by their particular rates of protection. Thus

$$U_i = \frac{W_i - V_i}{W_i} = 1 - \frac{\frac{1}{1+t_i} - \sum_j \frac{a_{ji}}{1+t_j}}{W_i/X_i}$$

and

$$T_i = \frac{U_i}{1 - U_i}$$

This means that they measure the total rates of protection accorded to these industries.

Any inferences from this data about efficiency of resource allocation, however, involve an assumption about the extent to which the protection accorded is actually used. Casual empiricism suggests to the writer, for example, that the soft drink industries do not take full advantage of the protection available to them. This may be true of many other industries, as well. In general, absence of a significant volume of imports would suggest the possibility that a portion of the accorded protection is redundant. Moreover, there are many ways, both legal and illegal, to get around the nominal set of duties and taxes. Finally, however, the data in the table do not take into account the tax and duty exemptions accorded

certain industries under the Basic Industries Law, the effect of which would be to raise slightly their total degrees of protection.

These qualifications should warn the reader to be cautious about drawing conclusions about relative efficiency in the use of resources from these preliminary estimates. Nevertheless, to see what they suggest about the pattern of bias, we can classify the industries in five groups, as follows:

I. Exports

Coconut Oil	Lumber
Embroideries	Brewery and Malt
Pineapple Canning	Desiccated Coconut
Cordage	Sugar
Plywood	

II. Capital Goods

Ship repair	Food machinery
Agricultural tractors	Trucks and buses

III. Inputs into Construction

Plywood	Flat glass
Lumber	Cement
Structural iron and steel	Architectural metal
Structural concrete products	Paints and varnishes
Electric wires, etc.	

IV. Intermediate Goods

Fertilizers	Glass containers
Petroleum refining	Tires and tubes
Compressed gases	Cartons, /cardboards
Basic iron and steel	Electric wires, etc.
Batteries	Prepared animal feeds
Motor vehicles, parts and bodies	Metal crowns

V. Import-substitute Consumption Goods

All other (24 industries)

The significance of the classification is obvious except, perhaps in the case of group III. Capital formation involves the acquisition of equipment and structures (neglecting inventories as not relevant here). Protection of equipment producing industries is favorable to allocation of resources to investment goods industries, while protection accorded to inputs into construction is unfavorable. Therefore, high rates in group II and low rates in group III would indicate a bias in favor of expansion of the investment goods industries, and vice versa.

The median industry is "Cartons, cardboards, boxes," which is in group IV -- intermediate goods. Eight others in that group have rates below the median, while only three have rates above. In contrast, eighteen of the twenty-four industries in group V -- import-substitute consumption goods -- have rates above the median. All nine export industries have rates below the median and eight of them have negative rates. The exception is sugar which is protected by the U.S. quota and restrictions on imports. (See Appendix B.)

All four capital goods industries have rates below the median, while seven of nine construction input industries have rates above the median. Consequently there is a dual bias against the investment goods industries.

Unweighted averages of rates for each group show the same pattern of bias:

<u>Group</u>	<u>Average Rate</u>
Exports	-.14
Capital goods	.06
Inputs into construction	.56
Intermediate goods	.49
Import-substitute consumption goods	.83

Thus the bias appears to follow the pattern we should expect from a naive import substitution strategy. Consumption goods industries are strongly favored over intermediate goods and capital goods industries. Moreover, the bias is strongly in favor of luxury goods industries like autos, perfumes and cosmetics, cigarettes, candy and chocolate products, and radio and TV sets. On the other hand, not all of the highest rate industries are luxury industries. In any case, we can conclude that the system of protection is biased toward industries that are less essential on growth criteria, and probably also on consumption criteria; and that the overall extent of distortion in resource allocation is probably very great.

The present system of protection has been in effect, of course, only since decontrol. Most commentators refer to the period of exchange control during the 1950's as the period of import restriction leading to industrialization. Decontrol is assumed to have involved a liberalization of import

restriction. This is, no doubt, correct, although many duties have been raised since decontrol. The implication is, then, that protection was overall greater in the 1950's, so that the bias against exports was even more pronounced. Moreover, it is the heavily import dependent industries that suffered most from decontrol and, by implication, were more strongly favored under exchange controls. These tend to be the high rate industries because of the relatively low value added (in world prices) at the finishing stages of production. Thus, it is possible that the system of protection was more distorted (in the same pattern), as well as more protective overall.

If this pattern of protection was in existence during the period of rapid advance in manufacturing in the 1950's, we should expect to see some of its influence on trends in international trade and industry. No attempt will be made here to set forth a statistical picture of the industrialization and trade of that period. A casual observation of the readily available data suggests, however, that the growth of manufacturing was mainly concentrated in consumption goods industries and that capital goods and materials for consumption goods industries rose sharply in importance in the import bill, at the expense of manufactured consumption goods. Exports of manufactures failed to develop

to any significant extent, despite rapid increases in production. Finally, the pace of industrial growth retarded markedly in the second half of the period. This is seen in Table II which gives the year-to-year percentage changes in the industrial production index of the Central Bank. (There is good reason to believe that this index has increasingly understated the gains in industrial production, so that the retardation may have been less striking than Table II indicates.)

TABLE II^{18/}

Percentage Changes in Industrial Production

<u>Year</u>	<u>% Change from Previous Year</u>
1950	20.7
1951	17.3
1952	5.3
1953	13.0
1954	12.4
1955	12.6
1956	15.7
1957	8.0
1958	7.7
1959	8.3
1960	3.2
1961	6.6
1962	5.7
1963	6.4
1964	8.3
1965	2.0

It appears, then, that the major trends in manufacturing and trade roughly correspond to what one would expect from an import restriction bias in industrialization strategy, and are consistent with the pattern of incentives implied by the structure of protection that developed.

^{18/} Central Bank of the Philippines, Statistical Bulletin, March 1966, p. 247.

Technical Inefficiency

A relatively high total rate of protection for an industry may, of course, imply high factor incomes or relative inefficiency, or both. I have no evidence to present on this point, but it seems to me that for several reasons we might expect relative inefficiency to be widespread among those industries with the highest total rates of protection. First, a system of protection of the kind under discussion will inevitably include under its umbrella all kinds of comparatively disadvantageous industries. Second, for others (including "infant industries"), the protection against foreign competition permits monopolistic or oligopolistic market positions that take the edge off the drive for efficiency and technical progress. Third, the dispersion of resources in horizontally-balanced industrial growth sacrifices potential gains from economies of scale and the stimulus to innovations and learning from faster concentrated growth.

It is possible, on the other hand, that some of these highly protected industries have a real comparative advantage and are reasonably efficient, so that the protection permits high factor incomes. The factor-price disequilibrium case fits here. The protection may permit the industry to pay the required excess above labor's opportunity cost that the market

dictates. We have seen above, however, that this is no more than a third-best sort of argument for protection.

Finally, however, the high degree of protection may mean high profits; and high profits suggest the possibility of a saving-reinvestment growth mechanism. This brings us, then, to the effects on saving of an import-substitution bias in development strategy.

The Saving Gap¹⁹

I have argued above (page 4) that to carry an import substitution strategy successfully beyond the first stage requires either breaking into the export market or extending production backward to materials, intermediate goods, and equipment. Continuing expansion of finished consumption goods for the domestic market, while perfectly compatible with a non-accumulation economy (wherein the growth of income occurs exogenously), can permit growth in capital accumulation (other than accumulation of stocks) only so long as it reduces

¹⁹The following discussion owes much to analyses of the Pakistan and Indian experiences. See A. R. Kahn, "Import Substitution, Consumption Liberalization and Export Expansion," and my "Industrialization in Pakistan: A Case of Frustrated Take-Off?," both in Pakistan Development Review, Summer 1963. For India, an unpublished paper by V.V. Desai of the University of Bombay, entitled "Import Substitution, Growth of Consumer Goods Industries and Economic Development" was particularly useful.

consumption goods imports.²⁰ When the first stage is completed, of course, this is no longer possible. But even during the first stage there is a very real possibility that a bias toward the production of consumption goods balanced in relation to domestic demand will tend to erode the constraints on consumption that are needed to permit accelerating growth.

To see how this might be so, consider first the identity

$$C_d + I_d + E_d = C_m + C_d + S \quad (7)$$

where C_d , I_d , and E_d are value added in domestic production for consumption, investment, and exports. S is domestic saving and C_m is the imported component of consumption. The left-hand side represents the national product and the right-hand side, the disposal of national income.

A rise in any component of the left-hand side implies an equal rise in saving (and investment -- domestic or foreign) if consumption does not rise. Thus a case of pure import substitution (the rise in C_d being matched precisely by a fall in C_m) increases saving exactly as does a rise in the production of capital goods or exports when consumption is constant. The analysis can be extended to the more general case in which consumption rises by some proportion of the rise in national

²⁰Of course rising capital imports could permit growing capital accumulation without any rise in domestic saving. I am assuming here, however, that some rise in domestic saving is essential.

product, and the conclusion is the same. The change in saving associated with a rise in output depends on the change in consumption regardless of the kind of goods the output increase embodies.

The key question is, then, how the marginal consumption rate might be affected by alternative patterns of investment leading to different mixes of output increase. This is usually analyzed in terms of the associated sectoral income increases and saving propensities, but I propose to look at it briefly from the other side -- to consider how the supply mix itself can affect consumption and saving.

Consider the following simple model of a closed economy.

$$\begin{aligned}\Delta Y &= kI && \text{(i)} \\ \Delta S &= s\Delta Y && \text{(ii)} \\ \Delta I &= kaI && \text{(iii)} \\ \Delta S &= \Delta I && \text{(iv)}\end{aligned}$$

Y is national product, I is investment, S is saving, s is the marginal propensity to save, k is the incremental output-capital ratio (identical for all sectors of the economy), and a is the proportion of investment allocated to the investment goods sector.

Given ΔY (the growth target) and the investment coefficient, k , these four equations determine $I, \Delta S, \Delta I$ and either s or a if the other is given. If both are given the system is overdetermined. That is, consistency is required between the marginal saving rate and the proportion of investment allocated to the investment goods sector. This leaves open the question of how consistency is achieved, however. If saving propensities govern, a must adjust to s -- the allocation of investment must respond to the pattern of final demand. Alternatively, however, marginal saving could be constrained by the output mix of consumption and investment goods as determined by the investment allocation -- i.e., by a . It is this latter possibility that I want to explore in the context of an import substitution strategy.

To do this we must introduce international trade into the model. This can be done most simply by assuming that any increase in exports or substitution of domestic production for imports going into consumption will result automatically in investment via import of equipment with the foreign exchange earned or saved. Allocation of investment to sectors producing for export or import substitution will then raise the rate of capital accumulation exactly as will investment in the capital goods sector, and a can refer to the proportion of investment going to these sectors taken together.

Marginal saving depends, then, on a -- the allocation of investment to capital goods production, to production of exports, and to import substitution. But the import substitution strategy described above is strongly biased via the system of protection against both exports and the production of capital goods. And within the category of import substitution it is biased against investment in the production of materials and parts. A high a must depend mainly then on (1) the rapid expansion of capacity to add value at the finishing stages of consumption goods production, and (2) the use of this capacity to reduce the import bill rather than to supply an expanding home consumption.

At first these conditions may easily be met, as import restriction serves not only as a balance of payments control, but also as a principal constraint on consumption. As domestic capacity expands rapidly in response to high rates of protection, however, two things happen. First, a kind of automatic decontrol of consumption takes place as the proportion of consumption constrained by import controls declines. This is partly due to the increased availability of goods and disappearance of scarcity premiums, and partly due to the shift in income distribution from government (customs duties) and profits of importers to income recipients in the new industries.

At the same time the expansion of consumption goods industries creates a rapidly growing demand for imports of materials, parts, and equipment. These two developments shift the focus of control over consumption to taxes and imports of inputs for the new industries. If control over the latter is tightened there arises the phenomenon of excess capacity due to scarcity of imported supplies. While this should be attributed to the misallocation of investment resulting from biases in the system of protection -- too much capacity installed to produce consumption goods and too little to produce materials, parts, and equipment, the pressures are inevitably on the side of permitting the necessary imports. For the availability of excess capacity always promises a cheap way to get an increase in production. Since the increased production will be consumption goods, however, this also precludes the imposition of new taxes to offset the steady erosion of control over consumption. The result is what Khan has called "consumption liberalization."²¹

Consumption liberalization occurs, in a static context, when the rise in domestic output of consumption goods is not fully matched by a decline in imports -- i.e., in

²¹Op. cit., 209.

equation(7) (above), when the rise in C_d exceeds the fall in C_m , with a corresponding diminished effect on saving. In a dynamic context we must expect consumption to grow with growing output and the question whether an increase in production serves to replace imports or liberalize consumption is a more complex one.

Khan's solution²² was to calculate a "normal" increase in consumption of a good based on population growth, per capita income increase, the planned marginal saving rate, and an expenditure elasticity of demand. Any increase in supply from production plus imports that was not exported or absorbed by normal consumption was defined as consumption liberalization. He then attempted to measure this over the period 1951/52 to 1959/60 for four of Pakistan's important import substitution industries: cotton cloth, sugar, cigarettes, and paper. In each case he found that a very high proportion of the output increase resulted in consumption liberalization -- from almost 50 per cent in cotton cloth to over 100 per cent in paper.

Desai, in a similar study for India, found that consumption per capita of nine categories of "less-essential" consumption goods increased in the period of protection-induced import substitution (1950's and 1960's) almost twice

²²Ibid., pp. 208-212.

as much as would have been estimated from an income elasticity derived from a pre-protection base period (1948/49-1953/54).²³

These results are at least consistent with the hypothesis that a part of the explanation for the low saving rates in India and Pakistan during this period (despite rapid industrialization) was the bias toward consumption goods production for the home market.²⁴ On the other hand, because of shifts in income distribution and in the proportions of rural and urban populations, because of the existence of controls and other abnormal influences affecting consumption, and finally because of the general complexity of the relation between the consumption of particular goods and aggregate consumption, one cannot be sure how important this was.²⁵

²³Op. cit. The nine categories are automobiles, electric fans, radios, air-conditioners and refrigerators, motor cycles and scooters, rayons, sewing machines, bicycles and pharmaceuticals.

²⁴A case could be made for liberalizing the consumption of certain goods (via price or other inducements) to take advantage of economies of scale or other advantages of concentration. This "consumption distortion" has merit particularly if the favored goods are essential mass consumption goods. To avoid a general consumption rise, however, taxes would have to be raised elsewhere.

²⁵The use of cross-section expenditure elasticities of demand to estimate "normal" consumption may also be open to criticism. In the case at hand, however, the change in per capita income was so slight that their influence on the results was negligible.

Nevertheless, on theoretical grounds a strong case can be made against an import substitution bias in development strategy because of its likely effect on saving. First, the various aspects of economic and technical inefficiency discussed above mean lower incomes, and especially lower profits, with obvious implications for saving. Second, the bias toward producing goods that can be consumed and against goods that cannot (e.g., capital goods and some exports) is likely to make political control of consumption more difficult.²⁶ Finally, at some point there is an absolute necessity to move into exports or to the earlier stages of production, or both; and the longer it is postponed and the more biased against it is the system of protection, the more likely is the economy to find itself in the kind of trap that leads to consumption liberalization.

II

The conclusion I reach from this critique of an industrialization strategy biased toward import substitution is that it does not promise an easy path around the difficulties

²⁶This has now become officially recognized in Pakistan. See the Preface to the Pakistan Third Five-Year Plan (Karachi: Government of Pakistan, March 1965), p. viii.

facing less developed countries. This is not a happy conclusion for the difficulties are very great and the alternatives to an import substitution strategy are not very promising either.

In any case, for what they are worth the policy implications, as they pertain to a single country, have more or less emerged in the course of the critique itself. They are, in general, to avoid the kind of excessive and distorted protection that biases growth toward a horizontal balance of consumption goods production for the domestic market, penalizing both exports and backward-linkage import substitution. The costs of such a policy go beyond simple resource misallocation to adverse effects on technical efficiency, innovations and saving. More emphasis on vertical balance would seem to be essential to success in industrial growth beyond the first stage of import substitution.

This does not mean that policies should be biased against import substitution. What is needed rather are rational choices, both between import substitution and export expansion and among various potential import substitution industries. Especially important in helping the economy (public or private) to make rational choices in this area is to find some means of correcting the undervaluation of foreign exchange. Despite its obvious advantages, however, this is

the kind of advice that will be widely ignored. Let me suggest two reasons why this is so, only one to which I have any kind of an answer.

First is the terms of trade disadvantage from devaluation when world demand elasticities are significantly below infinity for important categories of exports. Insofar as these are primary commodities a particular country will normally count only a few in this category and can easily isolate them from the effects of the devaluation if international price agreements are beyond reach. If, however, new manufactured exports also face relatively low demand elasticities because of "reactive protectionism" in established manufacturing countries, there is a case for maintaining "overvalued" currencies even though this further penalizes such exports. How real is this case is difficult to estimate. Pakistan has discovered that a de facto partial devaluation by means of an export bonus scheme has elicited a very strong response from non-traditional exports. Whether what is true for one would be true for all less developed countries it is not possible for me to judge, however.

In some Latin American countries, apparently, another inhibition against devaluation is an automatic anticipation of an ensuing inflation that hastens it and renders the devaluation

almost immediately ineffective.²⁷ So far as I can judge, economics is not yet able to teach us how to deal very effectively with social-psychological behavior of this sort. It might be of interest in passing to note, however, that the export bonus scheme was not generally recognized in Pakistan as a form of devaluation until economists began explaining it in these terms.

Beyond the difficulties of implementing exchange rate policy, however, lie more fundamental issues around which doubts will certainly arise. For what the above critique may appear to do is to reverse the classic argument of Nurkse in his lectures on "Patterns of Trade and Development."²⁸ There it was the difficulties faced by both traditional and new exports that dictated the option for balanced growth in relation to domestic demand. If the latter has all of the disadvantages catalogued above, however, the last escape route from economic stagnation would seem to have been closed off.

It is only fair to remind ourselves that Nurkse's view of an import substitution strategy bore little resemblance to that pictured above. He emphasized especially the prime

²⁷John B. Sheahan, "Imports, Investment, and Growth: Colombian Experience Since 1950," (mimeographed).

²⁸Equilibrium and Growth in the World Economy, ed. by Haberler (Harvard, 1961), pp. 282-324.

importance of rising agricultural productivity in balanced growth and considered the inherent difficulties in carrying through an agricultural revolution to be the reason that "industrialization for domestic markets appears as a much more formidable task."²⁹

In addition he argued that: "When industrialization for the home market has taken root, it becomes easier to increase exports of manufactured goods to the more advanced economies."³⁰ It follows, I think, that he would have opposed measures that unnecessarily penalize such exports. Nevertheless, he was not sanguine about their prospects and I confess that I somewhat share his view.

The reason is that the distorted pattern of protection, described above, that tends to magnify greatly the total rate of protection for industries adding the final values to products is not a phenomenon peculiar to less developed countries. It is rather the rule for most countries.³¹ Thus there is a strong general bias in the world against trade in finished manufactures

²⁹Ibid., p. 315.

³⁰Ibid., p. 320.

³¹Harry G. Johnson, "The Theory of Tariff Structure, with special reference to World Trade and Development," Etudes et Travaux de l'Institut universitaire de hautes Etudes internationales de Geneve, Vol. IV, (1965), pp. 17-18.

the end of the production line at which less developed countries typically start.

But Nurkse suggested another escape route -- one which has by now achieved a popularity in principle far beyond its realization in practice. He wrote: "Manufacturing for home markets in the less developed countries must include also production in these countries for export to each other's markets."³² This is clearly one way of resolving the Nurkse dilemma. What would appear to each individual country as new exports would represent a more rational pattern of import substitution for the group of countries. More stress on vertical balance within each country would be combined with some horizontal balance for the group.

Whether this is a first-best or second-best solution to the trade problems of developing countries is a question that I won't attempt to answer here. Let me simply register my opinion that the less developed countries trade (proportionally) more with the developed countries and (proportionally) less with each other than is optimal from their standpoint. I hope to elaborate this point at some future date.

³²ibid., p. 318 (Italics are Nurkse's).

A P P E N D I X

ESTIMATION OF THE TOTAL RATE OF PROTECTION

1. The total rate of protection is defined as the proportion by which actual value added could exceed free trade value added when the partial rates of protection of both outputs and inputs are evaluated at the margin of competition with foreign supply. Foreign supply is assumed to be infinitely elastic and its price is the landed cost of imports.

2. Let W represent actual value added under protection and V , the value added that would be allowed by world prices under free trade. Then $W - V$ is the amount by which the system of protection permits greater value added.

3. $W - V$ could be put as a proportion to either V or W .

$$\text{Let } T = \frac{W - V}{V} \text{ and } U = \frac{W - V}{W}$$

$$\text{Then } T = \frac{U}{1 - U} \text{ and } U = \frac{T}{T + 1} .$$

4. If we start with world prices we could find T_i in the following way:

$$T_i = \frac{W_i}{V_i} - 1$$
$$= \frac{Y_i(1 + t_i) - \sum_j a_{ji} Y_j(1 + t_j)}{V_i} - 1$$

$$\begin{aligned}
 &= \frac{Y_i + t_i Y_i - \sum_j a_{ji} Y_i - \sum_j a_{ji} Y_i t_j}{V_i} - 1 \\
 &= \frac{W_i + t_i Y_i - \sum_j a_{ji} Y_i t_j}{V_i} - 1 \\
 &= \frac{t_i - \sum_j a_{ji} t_j}{V_i/Y_i}
 \end{aligned}$$

where a_{ji} represents the input coefficients as they would be measured if world prices prevailed. The t 's represent partial rates of protection applying to the outputs of particular industries. Y_i is output at world prices.

5. But the data we usually have is for the input coefficients as measured with actual prices. Since these are

$$\frac{I_j(1 + t_j)}{Y_i(1 + t_i)} \quad \text{while}$$

$$a_{ji} = \frac{I_j}{Y_i} \quad (\text{where } I_j \text{ is an intermediate input valued at world prices})$$

the measured input coefficients

$$c_{ji} = a_{ji} \frac{1 + t_j}{1 + t_i}$$

6. T can also be derived from actual prices and measured coefficients.

$$\begin{aligned}
 T_i &= \frac{W_i - V_i}{V_i} = \frac{W_i}{V_i} - 1 = \frac{W_i/X_i}{V_i/X_i} - 1 \\
 &= \frac{W_i/X_i}{\frac{1}{1 + t_i} - \sum_j \frac{c_{ji}}{1 + t_j}} - 1
 \end{aligned}$$

7. The T measure has some advantages -- e.g., if all goods are protected at rate t, $t = T$ for all. It has one important disadvantage, however. If V is negative T cannot be measured. For this reason we need another measure of the total rate of protection.

$$U_i = \frac{W_i - V_i}{W_i} = 1 - \frac{V_i}{W_i} = 1 - \frac{V_i/X_i}{W_i/X_i}$$

$$= 1 - \frac{\frac{1}{1+t_i} - \sum_j \frac{c_{ji}}{1+t_j}}{W_i/X_i}$$

8. The t's are partial rates of protection on the outputs of particular industries. They include tariffs plus other indirect taxes on foreign goods. For goods that are imported an indirect tax is an offset while one on its domestic suppliers is ignored, since both are assumed to be absorbed, unless matched by a tax on the foreign supply.

Hence $t_i = t'_i + f_i - d_i$ while

$$t_j = t'_j + f_j$$

where t' refers to the tariff rate and d and f are indirect tax rates on goods of domestic and foreign origin, respectively.

9. If a good is exported we assume that $t_i = 0$ and that $t_j = d_j$ since taxes on foreign products are irrelevant while domestic taxes are passed on to the buyer.

10. Moreover, if a good is neither exported nor imported (in any substantial volume), t_i could range from 0 to $(t'_i + f_i - d_i)$ and t_j from d_j to $(t'_j + f_j)$.

11. The standard/^{assumption}is that domestic price = world price $(1 + t)$ for any good. If domestic price is greater than this, the presumption is that either a scarcity premium has arisen from import restriction, or some element of t has been left out or mis-estimated.

If domestic price is less than this, either domestic competition has prevented the industry from taking full advantage of protection from foreign competition, or it is efficient enough even with monopoly pricing not to need it (assuming t has not been mis-estimated).

12. It has been assumed above that foreign and domestic goods are of the same quality. Often, however, the latter is priced at a discount for quality-- or imagined quality -- reasons. In this case the value derived for the world price is a hypothetical one that would be appropriate to like quality world goods if they existed; and what is protected is inferior quality rather than high price. But what if the discount for the domestic product is not justified by quality differences?

What if, for example, the foreign is able to sell in some volume only because a certain class of people place snob value on foreign goods? It could be argued that the industry is being "protected" from a bias against domestic products, but the welfare implications are quite different in this case.

13. Values for U greater than unity imply negative value added in world prices. While this may reflect inaccurate estimates of the relevant variables, there are other possibilities that could explain such a result:

- (1) Higher transport costs for the parts shipped separately than for the finished product (though more often the reverse would probably be true).
- (2) Monopoly power of the foreign supplier of parts, especially where the investment is foreign and the activity is simply assembling. (Why shouldn't a part of the gain from protection be taken in the form of higher prices and profits for the home branch of the firm?)

- (3) Failure to use wastes, scrap, etc. to the same extent as in advanced countries.
- (4) Higher incidence of theft, breakage, etc.
- (5) Higher relative costs of non-traded inputs.

While it is unlikely that any one of these by itself could render value added negative, a combination of them might easily do so.

x x x