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IMPORT SUBSTITUTION AND PRODUCTIVITY GROWTH

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Import Substitution and Productivity Growth

Henry J. Bruton

A single definition of "import substitution strategy" for development is not available. In the broadest terms the expression is used to refer to all arguments to the effect that modern developing countries cannot rely on exports as an engine of growth. Consequently, development strategy must consist of "inward-looking industrialization" rather than following the dictates of comparative advantage in each given time period. In this broad sense the term encompasses the views on deteriorating terms of trade, import reducing technical advancement, monopoly power, commercial policies, etc. that have been put forward as explanations of the decline in the capacity of traditional exports to generate and sustain growth. In the narrowest terms import substitution refers simply to the take-over of an existing domestic market from the foreign producer by prohibiting his imports in one way or another. One may then say that the general argument that exports can no longer lead to sustained growth leads to the specific policy of restricting imports to encourage their domestic production.

The rationale for the specific policy, given the general argument, involves additional considerations. There is an obvious market since imports have been taking place. There is no problem of competing with foreign producers

as not only are imports curtailed but exports are not expected. Also, the expected high profits in the protected sectors may lead to additional saving and investing which facilitate continuation of the process.[1/]

Available evidence for a number of countries suggest that such a strategy has in fact produced rather hopeful rates of growth for a decade or so. Similarly, however, the more recent evidence indicates that problems appear and growth rates slow down markedly after the initial burst. Prebisch, for example, writes, "The simple and relatively easy phase of import substitution has reached, or is reaching, its limit in the countries where industrialization has made most progress."[2/] By "easy phase" he (and others) mean that the substituted sectors can employ processes requiring relatively little skill and capital and have few economies of scale. To continue the import substitution process means moving into activities with opposite characteristics: more complex technology, large initial investments, and large (relative to domestic market) minimum efficient size. So, it is argued, when the economy tries to continue indefinitely the import substitution policy, costs rise even more than in the "ease" phase, bottlenecks appear everywhere, and the rate of growth of industrial output begins to fall.

Although the distinction between "easy" and "difficult" import substitution is not without some empirical content, it does not seem to isolate

in a very meaningful way the core of the difficulty. Prebisch hints at this when he writes that a "more rational policy would have given priority to import substitution in respect of goods which could be produced under more favorable conditions than others, not only consumer goods, as has generally been the case, but also raw materials and intermediate and capital goods."[3/] In his analysis of the Colombian experience Professor John Sheahan concludes that the problem there was not that the "country pushed import substitution too fast, but that the form the process took was biased in such a way as to increase dependence on imported supplies and equipment, and then use up so much foreign exchange for current production that adequate (enough to maintain growth) imports of capital goods became impossible."[4/]

The clear implication of both statements (plus others that could be supplied) is that an import substitution program can be effective in the long run if properly devised. Part of the explanation of the fact that so many such approaches to development seem "improperly devised" is quite simple. Although the term strategy is usually applied to such protectionist policies, their origins can rarely be traced to a formalization of a development program in such terms. In almost all instances the import substitution policy has resulted from balance of payments difficulties that forced the policymakers to act. Eschewing devaluation as long as possible for many reasons and seeking to avoid internal deflation, the policymaker was left with only direct controls on imports as a

solution to the balance of payments problem. Controls were almost invariably levied against "non-essential" imports for reasons which are obvious, if not acceptable. Thus to solve a balance of payments problem non-essential imports were curtailed, and their domestic production thereby encouraged. The criteria of "non-essential", whatever else it may mean, does not mean "suitable for domestic production", and considerations of cost and input composition were only by chance relevant factors in the practice of the strategy.

If this were the only reason for the strategy leading to difficulties, there would not be much more to say. There is a more fundamental reason: what exactly are the characteristics of a "correctly devised" import substitution strategy? The answer to this question is less than well established, and indeed there exists an imposing body of thought which suggests that there is no such thing as a "correctly devised" strategy built on protection.

The purpose of this paper is an examination of one approach to the formulation of a successful import substitution strategy. "Successful" here means a policy that contributes to raising the rate of growth of output without at the same time sowing the seeds of its own failure. The basis of this approach is divergent rates of growth of productivity among the several sectors. Theoretical considerations are spelled out in Section I, and in Section II, some

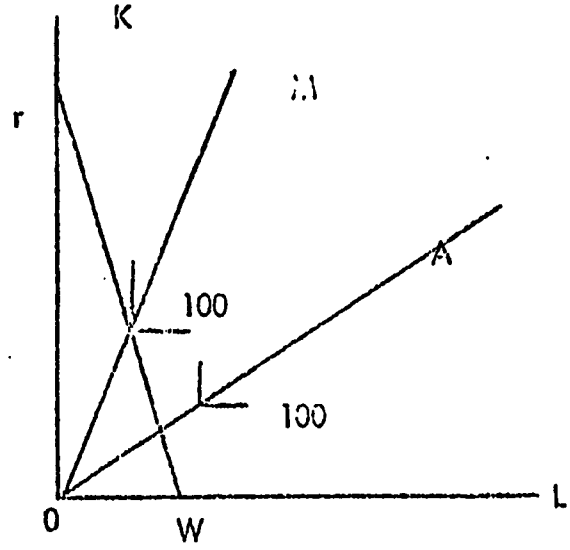
empirical evidence is reviewed for four South American countries. Section III seeks to fit the empirical results into the models of Section I to derive some further generalizations about a successful development strategy.

I

A. The Model

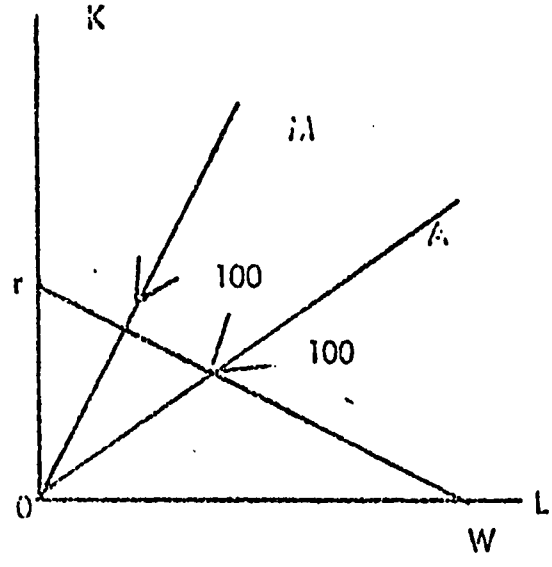
We begin with the conventional two country, two good international trade model. The capacity of the countries (identified as I and II) to produce each of the two products (A and M) is described in Diagrams 1a and 1b. The axes refer to quantities of capital (K) and labor (L) available for productive purposes. The rays identified as M in both 1a and 1b measure the quantities

Country I



1a

Country II



1b

of capital and labor required to produce a given level of output of product M. The rays marked A are similarly interpreted for product A. The slope of each ray in Country I is the same as the corresponding ray in Country II. Similarly a given distance on the corresponding rays represents the same output in both countries. The isoquants drawn on each chart also represent the same level of output measured in physical units, e.g. 100 units of M and 100 units of A. As drawn the diagrams indicate that only one technique of production is known for each commodity. More realistically several possible combinations of inputs for each product might be shown, but the presentation is simple with the present assumption and the content of the argument is not affected as long as all techniques for producing M are more capital intensive (i.e. have a higher capital labor ratio) than all techniques for producing A. Finally, the lines marked r W are the familiar iso-cost curves, and are drawn to show that capital is relatively cheap in Country I compared to the cost ratios prevailing in Country II.

The cost of production of each commodity can now be defined as follows (r is the price of a "unit" of capital, W is the wage rate, and Q is the quantity of output,):

Country I

1) $C^{I}_{M} = W_{I} \frac{L_{M}}{Q_{M}} + r_{I} \frac{K_{M}}{Q_{M}}$

Country II

$C^{II}_{M} = W_{II} \frac{L_{M}}{Q_{M}} + r_{II} \frac{K_{M}}{Q_{M}}$

(continued)

(Country I) (Country II)

$$C_A^I = W_I \frac{L_A}{Q_A} + r_I \frac{L_A}{Q_A} \qquad C_A^{II} = W_{II} \frac{L_A}{Q_A} + r_{II} \frac{K_A}{Q_A}$$

With a given equilibrium exchange rate[5/], if

$$2) \qquad \frac{C_A^I}{C_A^{II}} > \frac{C_M^I}{C_M^{II}}$$

and prices equal costs, Country I will import A and export M. Diagrams 1a and 1b show this result. With labor relatively cheap in II, $\frac{L_A}{Q_A}$ is weighted by a lower figure than in Country I. A similar argument applies to commodity M in Country I. With present assumptions the difference in the cost (and price) of a product between the two countries can be explained completely in terms of relative factor supplies which in turn produce the differences in factor prices. Here the familiar Heckscher-Ohlin basis for trade holds unambiguously.[6/]

The Heckscher-Ohlin assumption that the productivity of both capital and labor is the same in both countries is shown by the fact that a given distance on ray A (M) represents the same rate of output on both diagrams. In the case where a developing country establishes a new industry, this assumption is misleading. Indeed the theme of the present paper is that as the output and trade of countries move away from natural resource based activity, differing productivity

of the factors becomes the crucial ingredient of the explanation of trade.[7/]

To a very large extent the import substitution approach to development seeks to alter the composition of output and trade in such a way that both are less dependent on particular natural resources. It would then seem that the criteria of a successful import substitution industry should be put in terms of projected rates of growth of productivity. The argument may be put in the following way.

Write P^{I}_{LA} for the "productivity effect" of labor in Country II in activity A and P^{I}_{KA}, for the productivity effect of capital. P^{II}_{LA}, P^{II}_{KA}, etc. are similarly interpreted. Let Country I be the "base" country and, then the relevant definition of C^{II}_{A} is

$$3)\quad C^{II}_{A} = \frac{W_{II}\,\frac{L_A}{Q_A}}{P^{II}_{LA}/P^{I}_{LA}} + \frac{r_{II}\,\frac{K_A}{Q_A}}{P^{II}_{KA}/P^{I}_{KA}}$$

$$3a)\quad = W_{II}\left(\frac{L_A}{Q_A}\,\frac{P^{I}_{LA}}{P^{II}_{LA}}\right) + r_{II}\left(\frac{K_A}{Q_A}\,\frac{P^{I}_{KA}}{P^{II}_{KA}}\right)$$

If (say) labor productivity along ray A is less in Country II than in Country I, $P^{I}_{LA} > P^{II}_{LA}$ and costs in II are pushed up accordingly. To show this on the Diagram 1b it is necessary to assume that the productivity differentials are the same in both activities. Then the units along the axes are changed to $L\frac{P^{I}_{L}}{P^{II}_{L}}$ and $K\frac{P^{I}_{K}}{P^{II}_{K}}$.

The new axes in Diagram 1b measure the quantity of labor (capital) of a productivity equal to that in Country I. Efidently if $P_L^I > P_L^{II}$ a given outlay will buy a smaller quantity of labor services now than in the previous case, i.e. OW represents less labor input with the new axes than it did with the old.[8] Also the slope of Wr will change, except in the unusual case where $\frac{P_L^I}{P_L^{II}} = \frac{P_K^I}{P_K^{II}}$ and of course may change enough to reverse the cost conditions shown in Expression 2. More generally we may say that with a productivity effect at work, reference to factor price ratios and factor intensities of techniques of production will not indicate which country exports which product. The argument must also include assumptions about the productivity of the two factors in the two countries. It is useful to notice again that the productivity effect appears especially important as developing countries allocate an increasing proportion of their capital and labor to non-natural resource dominated activities.

Suppose that cost conditions in period one are as given in Expression 2, and

$$\frac{C_A^I}{C_A^{II}} > \frac{C_M^I}{C_M^{II}}$$

and Country I exports M and imports A. Productivity is growing however, and to determine what the relative costs are in a future period, an assumption about the rates of growth of the several relevant productivities is necessary.[9] Let P_A^{II} be the rate of growth of total productivity in the production of A in Country II, i.e.

4) $$\dot{P}^{II}_{A} = S^{II}_{L} \frac{\Delta P^{II}_{LA}}{P^{II}_{LA}} + S^{II}_{K} \frac{\Delta P^{II}_{KA}}{P^{II}_{KA}}$$

where S_L and S_K are the proportion of unit costs due to labor and capital respectively. A similar definition of $\dot{P}^{II}_{M}$, $\dot{P}^{I}_{A}$, and $\dot{P}^{I}_{M}$ also holds. Suppose finally that

5) $$1 < \frac{\dot{P}^{I}_{A}}{\dot{P}^{II}_{A}} > \frac{\dot{P}^{I}_{M}}{\dot{P}^{II}_{M}} < 1$$

so that, with unchanged exchanged rates, the cost inequality of Expression 2 will be reversed at some future period.[10/] With free trade between the two countries total output is of course greater than is possible without trade, but the rate of growth of productivity (and under present assumptions the rate of growth of output) is lower. Hence at some time in the future combined output of the two countries will be less if there is free trade in each period, than would be the case if protection resulted in each country concentrating on the production of the activity where productivity was growing more rapidly. We may then say that in the context of an import substitution development strategy, attention is diverted from comparative costs to comparative rates of growth of productivity in the analysis of the gains from trade and the gains from protection.

There is however a final complication. The productivity gains are realized over time and the costs of protection are realized currently. The costs of protection then may be looked upon as an investment the fruits of which are realized in the future. The decision to protect them cannot be made simply on the

basis of projected relative rates of growth of productivity, rather it must be made on the basis of a comparison of the returns from an investment in protection with returns obtainable from other uses of investible resources. Formally the argument is quite straight-forward.

Consider the case of Country II. In the free trade situations it specializes in the production of A and imports M, but relative rates of growth of productivity favor the production of M. A tariff is therefore imposed on M to enable it to be produced domestically. In a given period the total cost of this protection is computed as follows:

Let M_p represent the import price (c.i.f.) of M

M_Q represent the quantity of M that would be imported in the absence of trade restrictions.

M_C the average (= marginal) cost of producing M domestically (written as C^{II}_M above)

M_D the quantity of M produced domestically

Then in a given period the total cost of protection - TC_p - may be defined as

6) $$TC_p = M_p (M_C - M_D) + M_D (M_C - M_p)$$

Evidently both expressions in parentheses are positive at the beginning of the import substitution program. The Term $M_p (M_C - M_D)$ measures the cost of the reduced quantity of M that occurs as a consequence of the imposition of the tariff. Since the domestic production of M requires more resources than would be necessary for its importation, there is, consequent to the imposition of tariffs, a reduction

in the production of . in Country II.[11/] The second term on the right hand side of 6 measures this cost. The total cost of protection (the cost of the import substitution strategy) then is the present value of this series of TC_p. This present value may be written as $\sum_{i=1}^{n} \frac{TC_{pi}}{(1+r)i}$ where r is the discount factor and there are n periods during which TC_p is positive.

Under present assumptions as to productivity growth the expression in parentheses in 6 will turn negative at some future date, and the costs of protection will turn to gains from protection, TG_p. These gains will be realized over all succeeding periods, and it is the present value of the stream of gains that constitute the return on the investment in protection. Thus the rate of return on the investment is

$$7) \qquad \frac{\sum_{i=n+1}^{\infty} \frac{TG_{pi}}{(1+r)^i}}{\sum_{i=1}^{n} \frac{TC_{pi}}{(1+r)^i}}$$

where it is assumed that gains from protection begin in the $n+1^{st}$ period and continue indefinitely thereafter.[12/] If the discount factor used were the "shadow price" of capital, then a value for this ratio in excess of unity would indicate the acceptability of the investment in protection. If the discount factor were other than the shadow price of capital, then the rate of return shown by Expression 7 would have to be compared with rates of return on alternative uses of resources. Where several products are being protection to spur domestic production, it is obviously possible to sum the TC_p's and arrive at an estimate of the entire cost of the import substitution program.[13/]

Expression 6 indicates several useful points. The greater is M_Q in a given period the greater, ceteris paribus, is TC_p in that period. Over a sequence of periods with hypotherized values for M_C, M_p, and M_D, an import substituted commodity with a low income elasticity of demand and high price elasticity (if M_p is rising) will impose lower costs on the society than would a commodity with the opposite conditions of demand. Similarly (again cet. par.) a commodity whose domestic costs of production differ little from the imported price will impose a lower cost than one where this difference is large. Of course both of these considerations can be offset in the selection of commodities to be protected by the effect of the rate of growth of productivity , i.e. the rate of fall in M_C. Given this basic formulation one might approach the task of giving empirical content to these empty boxes in several ways. Before doing this however it is useful to call attention to a number of other aspects of the preceding formulations.

B. Some Conceptual Problems

There are three points in particular that merit comment.

In the first place the obvious question arises as to the appropriateness and practicality of including productivity changes as a variable in an analysis of this type. It may be noted that the free trade-in-every-period approach implies

an assumption about productivity growth. It seems to imply one (or more) of the following: (1) productivity growth occurs at the same rate (possibly zero) in both activities. This assumption is indeed implied in the Heckscher-Ohlin formulations, (2) productivity grows randomly, and in particular is unrelated to the rate of investment or of output in a sector (3) productivity growth will occur in a manner that favors the current export activity rather than the current import activity. Items 2 and 3 are pretty much ignorance assumptions, while 3 implies a rather specific point of view as to productivity growth: namely, the sector in which costs are currently lower is also the sector in which productivity growth is higher. Any one of these assumptions may well be true in a particular case, but can hardly be defended as a generalization to support policy. The main point here is that the introduction of productivity growth into a trade model is simply making explicit what is implicit in the customary formulations of Ricardo, Heckscher-Ohlin Haberler, and others. The hazards of projecting productivity growth in a given sector are of course great, but perhaps no greater than those associated with projecting the demand for a given product at various prices.

The second aspect of the argument of the preceding section to which attention should be called has to do with the sources of productivity growth. Of this general question we of course know very little and even less about why productivity growth rates differ among sectors in a particular country or among several countries.[14/] Nevertheless, the argument of the previous section indicates that the more this question is understood, the more likely will be the import

substitution policy to succeed. Especially does it seem clear that decisions to protect certain activities must not be made independently of assumptions about productivity growth. One general point of great relevance can be made with assurance even now. The form the trade restriction takes must be such that it will not adversely affect the rate of growth of productivity in the protected activity.[15/] Indeed if one could show that a protected activity failed to achieve growth of productivity because it was protected (due say to lack of compeition), then an import substitution strategy will necessarily fail.[16/]

A final point has to do with indirect costs and benefits that may be associated with the creation of a new activity. Expression 6 includes only those costs and returns that are due directly to the protected activity. That external benefits result from investment in manufacturing and do not inhere in agricultural activity has been often argued, but never convincingly demonstrated. There is however little doubt that some activities do have external benefits--a labor training effect, a technological spillover effect, etc.--and a complete analysis should include them. An import substitution strategy does, as noted above, reduce real income in the early stages, and it is quite likely that such a reduction would be accompanied by a reduction in the quantity of resources available for investment. Also the form of trade restriction employed - e.g. overvalued exchange rate, subsidized loans to industries, etc.- may impose distortions on the system that cause

the economy to suffer a larger reduction in output than is implied in Expression 6 or than is necessary.

The simplest assumption to make is that indirect costs and benefits cancel each other out, leaving gains from trade and protection as previously defined. This is the assumption necessarily employed in the empirical work of the following section.

We seek now to examine some aspects of import substitution policies in some Latin American countries in terms of these constraints.

II

A. Empirical Problems

One might approach an empirical investigation of the arguments of Part I directly in terms of Expression 6 and 7. To do so requires estimates of magnitudes and projections which are frequently made in development plans. Perhaps the most troublesome estimates would be that of the M_C (the quantity of M that would be imported in the absence of trade restrictions), for the several periods that are involved. A rough and ready method of making such projected estimates is to estimate income and price elasticities of M in Country II and, with an assumption about rates of growth of income and the behavior of the import price of M, an estimate of M_C in each period is obtainable.[17/] Estimates of M_C over time

require of course the projection of productivity growth as discussed in Part I. The other variables of Expression 6 impose no less demands, but at least demands that are more commonly satisfied. From estimates made along these lines one may arrive at a not meaningless estimate of the rate of return on the investment in import substitution. Such an approach to quantification has the merit of following the theoretical argument exactly, and telling us precisely what we wish to know. One may however approximate the theoretical argument to a satisfactory degree with a slightly more manageable approach.

One may assume that when $M_C = M_P$ the costs of protection are zero. If the domestic costs of producing a unit of M equal the cost of importing that unit, then Country II can produce the same quantity of M as it obtained through trade without imposing sacrifices on other sectors of the economy. In this case empirical evidence on the success of import substitution would be the extent to which $M_C - M_P$ declined. This approach does not permit an estimate of TC_P for a given period or its total over the sequence of periods. It does permit one to estimate the number of periods that TC_P is positive.

At the outset of the import substitution program $M_C > M_P$. If prices follow costs in both countries, then the equality of M_C and M_P will be achieved when

$$8) \qquad \frac{M_P}{(1+\dot{p}^{I}_{M})^{n}} = \frac{M_C}{(1+\dot{p}^{II}_{M})^{n}}$$

Given M_p and M_c in the initial period (i.e. the period when the import substitution begins), estimated values of $\dot{P}^{I}_{M}$ and $\dot{P}^{II}_{M}$ Expression 8 may be solved for n, the number of periods during which the costs of protection are positive.[18/] Obviously $\dot{P}^{II}_{M}$ must exceed $\dot{P}^{I}_{M}$ or the import substitution activity must fail. With this estimate of n plus some notion of the value of the discount factor to be applied to future gains from protection, we have a guide to the profitability of investment in protection.

Expression 8 may be modified slightly to eliminate the assumed equality between costs and prices in Country I. It is of course actual import prices that is of concern to Country II, and many of the arguments justifying the industriolization policies assume that M_p is rising over time irrespective of what happens to costs. Write i as the rate of growth of M_p and Expression 8 becomes

$$8a) \qquad (1+i)^n \; M_p = \frac{M_C}{(1+\dot{P}^{II}_{M})^n}$$

which is perhaps a more realistic form than 8.

One may ask the same question in a slightly different way. On the basis of general considerations (involving political as well as economic factors) we may take n as a policy datum, and then ask what difference in M_p and M_C is consistent with the removal of protection (given the estimates of i and $\dot{P}^{II}_{M}$) in this interval of time.

It should be emphasized that neither of the last two methods enables us to arrive at an estimate of the ratio defined by Expression 7. It should also be evident however that to fix n as a policy datum does require an implicit assumption about the total costs and gains of protection and the appropriate discount factor, all of which are explicitly called in Expressions 6 and 7. Expression 8 (or 8a) also has the advantage of focussing attention on $\dot{P}^{I}_{M}$ (or i) and $\dot{P}^{II}_{M}$, the key parameters of the model.

B. An Empirical Effort: The Latin American Case

The assumptions of the preceding argument enabled us to employ average productivities in comparisons of costs between the countries. A further empirical assumption is helpful and is supported by considerable evidence, namely that the average product of capital is about the same for a given manufacturing sector in the two countries. More accurately the empirical evidence is consistent with the assumption that variations is K_M/Q_M among countries is much smaller than the variations in L_M/Q_M. [19] Of equal relevance is the fact that K_M/Q_M is neither consistently higher or lower in rich countries than it is in countries which are just initiating the import substitution strategy, while L_M/Q_M is always higher in the latter countries than in the former. That the average product of capital is about the same from rich country to industrializing country in a particular manufacturing sector is perhaps explained simply by the fact that almost all of the

capital equipment of the industrializing country is imported and little or no adjustments or modifications are made in this equipment by the importing country. We may conclude then that the assumption of the equality (not necessarily the constancy through time) of K_{iM}/C_{iM}'s is realistic enough to introduce into an empirical investigation.

If this assumption is accepted then attention can be concentrated on the rate of growth of labor productivity in Country II relative to that in Country I. There remains however one further complication. Will $C^{II}_{iM} = C^{I}_{iM}$ when $P^{I}_{LiM} = P^{II}_{LiM}$? The answer depends on the wage rate/cost of capital ratio in the two countries, and nothing in the preceding analysis tells us what this will be. The empirical evidence indicates clearly that capital's share of total costs is considerably greater in manufacturing activity in newly industrializing countries than in the old rich countries. For whatever reason one may offer for this, it is necessary to weight $\dot{P}^{II}_{LiM}$ and $\dot{P}^{I}_{LiM}$ by labor's share of unit costs (see Expression 4 above) in each country. The rate at which M_C and M_P (assuming prices follow costs) approach equality then is $s^{II}_{L}\,\dot{P}^{II}_{LiM} - s^{I}_{L}\,\dot{P}^{I}_{LiM}$ where S^{II}_{L} and S^{I}_{L} are the proportion of unit costs due to labor in Country II and I respectively. There values could then be used in Expression 8 in place of $\dot{P}^{I}_{iM}$ and $\dot{P}^{II}_{iM}$.

If 8a is used then the assumption of equal capital output ratios in a given sector in the two countries does not help. With 8a we have to look at what happens to total costs in Country I. The more extreme assumption of constant capital

countries. Finally we use the United States as the "first" country and the particular South American country as the "second". This assumes, in effect, that (say) Brazil would import all of its import substituted commodity from the United States, i.e. it is replacing U.S. imports. This of course is not literally correct, but is a reasonable approximation to that which is.

With all these assumptions and the estimated values for S_L^{II} $\dot{P}_{LM}^{II}$ and S_L^{I} $\dot{P}_{LM}^{II}$ we can determine the difference between M_P and M_C that is consistent with the 10 years limit on positive costs of protection. The estimates of the growth rates of productivity (of $\dot{P}_{LM}$) are calculated from actual data for a four or five year period in the 1950's and then extrapolated. Thus the kind of question we answer is this: If labor productivity in Countries I and II continues to grow over the whole 10 year period at the same rate that it did over the first four (or five in some cases) years, then M_C can exceed M_P bó X% and Country II will still find that it is profitable (in the sense defined earlier) to produce commodity M.[21/]

The basic data are given in Table I and the results of the computations in Table II. The numbers of Table II answer the question asked at the end of the preceding paragraph. For example the 114.7 in SITC category 20-22 in Brazil's column means that had the domestic costs of production been 114.7 per cent of costs of imports at the beginning of the import substitution policy, then at the end of 10 years these costs would be equal. Under the assumptions previously cited

TABLE 1: RATES OF GROWTH OF LABOR PRODUCTIVITY

SITC category	United States			Brazil			Colombia			Chile			Venezuela		
	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
20-22	.41	2.5	1.0	.22	11.1	2.4	.19	6.8	1.3	.19	--	--	.32	3.9	1.2
23	.60	4.7	2.8	.39	4.5	1.7	.37	8.4	3.1	.31	4.2	1.3	.44	7.0	3.1
24	.60	3.6	2.1	.38	8.8	3.3	.46	9.1	4.2	.33	8.6	2.8	.43	8.0	3.4
25-26	.61	-1.9	-1.1	.36	13.6	4.9	.51	7.4	3.8	.30	4.9	1.5	.45	-.6	-.3
27	.49	3.2	1.5	.27	4.7	1.3	.37	6.3	2.3	.29	11.8	3.4	.43	-4.8	-2.0
28	.56	1.6	.9	.43	4.7	2.0	.47	5.5	2.6	.41	-.8	.3	.56	7.2	4.0
29	.59	2.8	1.6	.33	4.1	1.3	.40	2.5	1.0	.34	4.9	1.7	.36	14.0	5.0
30	.52	4.7	2.4	.31	3.3	1.0	.41	2.0	.8	.23	11.1	2.6	.26	6.0	1.5
31-32	.34	8.1	2.7	.20	24.6	7.4	.28	7.6	2.1	.21	2.0	.4	.30	12.5	3.7
33	.47	.1	0	.31	5.8	1.8	.44	3.2	1.4	.33	10.4	3.4	.40	.7	.3
34	.54	.7	.4	.31	7.9	2.4	.53	14.2	7.5	.22	3.8	.8	.46	15.3	7.0
35-38	.58	1.5	.9	.31	46.9	14.5	.51	5.3	2.7	.36	5.4	1.9	.51	2.7	1.4
TOTAL	.52	1.8	.9	.30	9.4	2.8	.32	5.9	1.9	.27	4.7	1.3	.38	9.3	3.5
	1958	1954-1958		1958	1954-1958		1958	1954-1958		1957	1957-1962		1953	1954-1958	

a s_L = share of labor costs in total costs b P_{LM} = rate of growth of labor productivity

c $s_L \; P_{LM}$ = rate of reduction in costs due to increased labor productivity

Sources: data underlying the computations for all countries except Chile are from United Nations, The Growth of World Industry 1938-1961 National Tables, New York 1963. For Chile data taken from La Economia de Chile en el Periodo 1950-63. Instituto de Economia, Universidad de Chile, Santiago 1963.

TABLE II: PERCENTAGE DIFFERENCES IN DOMESTIC AND IMPORTED COSTS CONSISTENT WITH A SUCCESSFUL IMPORT SUBSTITUTION STRATEGY

SITC Category	Brazil	Colombia	Chile	Venezuela
20-22	114.7	103.0	n.a.	102.0
23	X	102.9	115.8	102.9
24	112.4	122.7	107.1	113.5
25-26	180.0	162.0	129.5	108.3
27	X	108.2	120.4	105.0
28	111.5	118.2	X	135.4
29	X	X	101.0	138.9
30	X	X	102.0	X
31-32	156.4	X	X	110.2
33	119.5	114.9	139.7	102.1
34	121.8	198.0	104.0	169.1
35-38	354.1	119.3	110.4	105.1
TOTAL	120.6	110.4	104.0	129.0

n.a. indicates data not avaliable

X indicates United States productivity growth more rapid than that of the South American country.

Source: Computed from data given in Table I .

this would mean that import substitution "pays", i.e. the investment yields on acceptable return. A similar interpretation is applied to the other results shown in Table II.

III

Attention has already been called to the fact that the data underlying the calculations of Tables I and II are not exactly what the argument calls for. Especially important is the large groupings employed. Within each SITC category there doubtless are a range of products whose values would differ significantly from those shown in the Tables. Further, the projections of the rates of growth of labor productivity have been made in a purely mechanical manner, while in the discussion of the model emphasis was placed on the importance of explaining productivity growth and projecting on the basis of the explanation.

Despite these difficulties the empirical material is not without merit, and it is useful to use the results as the basis for some further implications of the argument for the import substitution strategy of development.

1. There is considerable variation within each column of Table II. This variation indicates that it is meaningful to distinguish among sectors on the basis of their relative rates of productivity growth.[22/] This variation of course reflects the variation in labor productivity growth in the combination of countries

considered. Evidently a high rate of growth of labor productivity in a given sector is not a sufficient condition for protection. It must be high relative to that occurring in the same sector in the "other" country. Explanatory hypotheses about the source of productivity growth then become an important part of the process of reaching policy conclusions.

2. Also there is considerable variation in a given category among the four countries in Table II. In categories 31-32 for example Brazil shows a very strong prospect, Chile and Colombia show an impossible situation, and Venezuela an unlikely prospect. In category 33 on the other hand Chile appears relatively strong compared to the other countries. Similar variation appears in Column b of Table II.

3. The task facing the South American countries in their import substitution strategy is made more difficult by the fact that labor's share of costs is much less in these countries than in the United States. In all categories the weights used (S_L) reduce the permitted difference between M_p and M_C below that which would have prevailed if weights were equal in the two countries. Obviously the opposite would be the case if the labor productivities could be assumed constant from country to country and capital's productivity growing. This particular aspect of the production function is therefore quite important, and suggests a further policy implication: namely, that changes in the nature of the production function

(in contrast to increased labor productivity with the same form of function) may be economic.[23/]

4. In many instances the ratios shown in Table II seem "low". Although "low" cannot be given specific content without comparison to actual values of domestic costs and costs of imports, we can be reasonably sure that differentials of no more than 5 per cent or so are almost always less than actual differences. To protect such activities then represents a misallocation of resources in the sense defined in Part I of this paper.

5. A final point has to do with a more generalized statement of the successful import substitution strategy referred to in the introduction. A country may protect those activities in which evidence is convincing as to the profitability of the protection. As these activities grow in strength, their protection is reduced and eliminated. At all times as new evidence on productivity growth in other activities appears then these too become candidates for claims on investible resources. In this event the country is always moving toward a composition of production consistent with that dictated by cost considerations. On the other hand protection of any and all activities irrespective of their prospects for achieving "success" means that the costs of protection continue indefinitely. As more such activities are protected (in response, say, to balance of payments difficulties) other sectors of the economy are handicapped and distortions created that can indeed impede the growth of productivity in all sectors.[24/] The data of Tables I and II suggest that

it is an easy matter to err in this fashion. Along with the importance attached to understanding and measuring productivity growth, another aspect of the successful import substitution approach has to do with the capacity of a country to "de-protect" an activity. When the evidence becomes clear that a mistake has been made, in the choice of an activity to protect, then the elimination of the protection must be part of the import substitution strategy. 25/

FOOTNOTES

1. For further elaboration on the rationale of import substitution, narrowly defined, see John H. Power "Import Substitution as an Industrialization Strategy" paper presented at the World Conference of the Society for International Development, New York 1966.

2. Towards a New Trade Policy for Development, Report by the Secretary - General (Raul Prebisch) of the United Nations Conference on Trade and Development, United Nations, New York 1964, p. 21.

3. Ibid., p. 22.

4. John B. Sheahan, "Imports, Investment, and Growth: Colombian Experience Since 1950" forthcoming in the collection of papers presented at the Bellagio Conference of the Harvard Development Advisory Service.

5. Equilibrium here means simply a rate that results in exports and imports being equal in value terms in both countries. We have further assumed zero transportation costs, similar tastes, in both countries and constant costs to simplify the presentation.

6. With constant costs and no demand complication each country will specialize completely. Thus Country II will produce only A after trade begins between the two countries. If before trade both M and A were produced, and there was full utilization of capital and labor then trade will necessarily result in idle capital (in Country II) since there is not enough labor to use all the available capital along Ray A. Allowing more than one technique for the production of A would tend to prevent this underutilization.

7. This point is emphasized by Staffan B. Linder, An Essay on Trade and Transformation, John Wiley and Sons, New York 1961.

8. The "productivity effect" is measured in terms of actual average products. Thus in 3a $P^{I}_{LA} = \frac{C_a}{L_a}$ in Country I, etc.

9. To keep attention on the role of productivity growth we ignore other sources of growth or, alternatively, assume that capital and labor grow at the same rate so that there is no change in relative factor supplies from those prevailing at the outset of the import substitution program. A more complete analysis would have to include these as variables in the argument.

10. It is evident that now we cannot show both products on the same isoquant diagram.

11. Such a reduction in the quantity of A that is available is not logically necessary as all the costs of the tariff could be in the form of reduced supply of A. This seems unlikely however and we ignore it here.

12. One may introduce changing terms of trade into the argument quite easily. If declining terms of trade are projected then evidently the cost of protection will be less than that shown here and if terms of trade are expected to rise, the cost will be less.

13. The argument in the text is similar to that worked out by Bastable in terms of the infant industry arguments for tariffs. See Murray C. Kemp, "The Mill-Bastable Infant Industry Dogma," The Journal of Political Economy, February 1960. Kemp emphasizes in this same paper that if the gains from productivity--what

he calls the "learning process"--is internal to the firm, tariffs are not necessary as the maximizing firm would be willing to sustain losses at the outset because later gains will offset these losses. The key point, how ever, is that the economy must sacrifice output in the early periods for productivity growth in M depends on it being produced in Country II. It does not matter if this production is being subsidized by the firm sustaining losses or by society paying higher prices for the product due to protective tariffs. Since tariffs are much more likely, it is suitable to put the analysis in terms of "protection".

14. There is a considerable literature on the alleged superiority of productivity growth in the manufacturing sector relative to the agricultural sector, but this literature is rarely characterized by empirical evidence. And in the manufacturing versus agriculture debate there are no arguments as to why one or two specific manufacturing activities should enjoy higher productivity growth rates than other manufacturing activities.

15. That import substitution policies may have the effect of reducing the rate of growth of productivity is argued in the larger paper to which reference was made in the first footnote.

16. Import substitution"failing" means --as noted earlier--that industries are created that never reach the point where there is a positive rate of return on the costs of the protection.

17. One might also estimate M_Q on the basis of actual imports of similar commodities into another economy which was maintaining a relative free import policy.

18. When we say the number of periods until costs of domestic production equal costs of imports, we are obviously implying something about the exchange rate. The most ideal situation would be one in which the exchange rate remain constant throughout the period included in the analysis or was changed only to correct for changes in the general price level. The analysis in the text then assumes that the exchange rate does not alter in a manner to qualify the argument.

19. This empirical fact has been noted by a number of people. See especially Bela Balassa, "An Empirical Demonstration of Classical Comparative Cost Theory," Review of Economics and Statistics, Aug. 1963 and W. Leontief, "An International Comparison of Factor Costs and Factor Use (Review Article)", The American Economic Review, June 1964. The evidence is even more convincing if capital is limited to plant and equipment and compared to full capacity output.

20. We have some data for Mexico and Argentina, but much less than for the other countries and less reliable as well. It seemed better therefore to omit these two countries even though they are large and important. The incomplete data for Mexico suggest that productivity there is growing more rapidly than for the countries considered here. For Argentina the available data suggest the productivity is growing considerably less rapidly than in other countries.

21. The basic formula is Expression 8,

$$\frac{M_P}{(1 + P_M^I)^n} \qquad \frac{M_C}{(1 + P_M^{II})^n}$$

we have assumed n = 10 to be given exogeniously, and have justified the use of $s_L^{II}\,\dot{P}_{LM}^{II}$ and $s_L^{I}\,\dot{P}_{LM}^{I}$ for $\dot{P}_M^I$ and $\dot{P}_M^{II}$ respectively. We have calculated the weighted growth of labor productivity for a part of the 10 years and assumed it will continue for the remainder. Then it is a simple matter to compute M_P and M_C.

22. "Relative rates of productivity growth" refers to the rate of reduction in costs in Country II ($s_L\,\dot{P}_{LM}^{II}$) relative to that in Country I ($s_L\,\dot{P}_{LM}^{I}$).

23. This point is much more complicated than implied here. Some further elaboration of the issue may be found in the larger study referred to in the first footnote.

24. The point noted here--that long lived "unsuccessful" import substitution projects create distortions the effect of which are to reduce the rate of growth of productivity--is elaborated upon in the larger study refered to earlier.

25. An important difficulty of the import substitution approach outlined in this paper has not been discussed but must be mentioned. Suppose activity M is protected and becomes competitive while using imported inputs of Y and Z. Now suppose that it appears that Y and Z are good candidates for the application of protection on the grounds discussed in the text. If they are protected then the costs

of M will of course rise again, and it (M) will require continued protection thus defeating the original undertaking., There are many sides of this issue, but the simplest policy implication is that the import substituting activities turning out products used widely as inputs in other activities may better be facilitated by subsidies than by protection.