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ANOTHER LOOK AT IMPORT STRUCTURE AND ECONOMIC GROWTH

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ABSTRACT

This paper looks at the impact and interrelationship between imports and economic development in selected Latin American countries during a decade and a half years, which many regard as formative in their development paths. Imports are separated into three groups: capital goods, intermediate products, and consumer goods. In general, three seems to be little link between growth in GNP and imports, although in some cases a significant relationship was found. As a rule, countries in the early stages of industrialization exhibit the fastest growth in import shares of production goods, and the more industrialized the country, the larger the share of imports going to capital intermediate goods.

Introduction

In recent years economists have investigated changes which occur in the structures of production and imports as economic growth takes place. Chenery reported that not only does industrial growth proceed in a fairly predictable manner, but imports of various types of goods also depend on per capita income. (1) Adams has analyzed what he regards as the impact of economic growth on the structure of imports. (2) The importance of imports, especially for developing countries, is justifiably based on their role in the production process. Adams divided imports into three classes—capital goods, intermediate products, and consumer goods, the latter of which is calculated as a residual. His cross-section analysis demonstrated that the share of intermediate products in imports follows the level of development, and that a negative association exists between the import share of consumer goods and per capita income. Intermediate products share increases because of the general tendency for manufacturing output to expand, and the consequent increase in import requirements of intermediate products. (3) Import substitution accounts for the smaller share of consumer goods. Adams' main difficulty was to explain why the share of
capital goods did not decline, since import substitution in this sector is also a common element of economic development.

The absence of a relation between the import share of capital goods and per capita income was caused by the fact that for large countries the share declines and for small countries the share increases as per capita income rises. Or, alternatively, the association between country size and the share of capital goods in imports is negative for developed countries and positive for underdeveloped countries. These results are commonly explained by the inability of small countries, even though developed, to obtain scale economies in production of various capital goods. In less developed countries, dependence on imported capital goods is widespread, and other things equal, because large countries tend to have smaller foreign trade ratios, a given rate of capital formation will require a larger share of imports devoted to capital goods than in smaller countries. In the time-series analysis, the previous results were duplicated for intermediate products and consumer goods, but capital goods presented a more complicated picture. For large countries the share of capital goods began at a rather low level, rose and then fell. In the small country group, there was a strong positive association between the import share of capital goods and per capita income.

We shall take Adams' article as a point of departure, and apply some of his definition and techniques to data of several Latin American countries for the years 1953-1967. Adams classified countries according to per capita incomes *circa* 1953 in U.S. dollars as follows: A (0-99), B (100-199), C (200-299), D (300-699), and E (700 and above). Since our period covers fifteen years, we have chosen to average per capita incomes to reduce possible distortions caused by year-to-year fluctuations. It will also be useful to specify terminology regarding size. An underdeveloped country—one with per capita income below 300 dollars—is large, medium-sized, or small if the population (of 1953) is over 25 million, between 10 and 25 million, or under 10 million, respectively. Developed countries are those with per capita incomes greater than 300 dollars; these countries are
considered large if the population is over 20 million small if the population is under 20 million. It is not clear why Adams selected a classification (and definition of "development") at variance with those standard in the field. For our purposes Adams' definitions are preferable as they permit a more detailed (relative) analysis of the countries studied in this paper.

**Import Shares and Trends**

In this section we shall examine import shares and trends in these shares over the period in order to determine the extent to which both shares and trends behaved as expected. This task can be simplified by grouping countries on the basis of whether actual shares are higher, close to, or lower than the expected values. Actual shares will be considered close to expected shares if t-tests indicate the two are not significantly different at a ninety-five percent confidence level. The resulting five groups are as follows, where $K_a$ and $I_a$ are the actual shares of capital goods and intermediate products imports, and $K_e$ and $I_e$ are the expected shares:

**Group**

I. $K_a$ greater than $K_e$; $I_a$ greater than $I_e$
   - Peru

II. $K_a$ greater than $K_e$; $I_a$ close to $I_e$
   - Argentina
   - Brazil

III. $K_a$ greater than $K_e$; $I_a$ less than $I_e$
   - Colombia
   - Costa Rica
   - Ecuador
   - Mexico
   - Venezuela

IV. $K_a$ less than $K_e$; $I_a$ close to $I_e$
   - Uruguay
V. $K_a$ less than $K_e$; $I_a$ less than $I_e$

El Salvador
Honduras

The t-test indicate that the intermediate products shares of Argentina, Brazil, and Uruguay are close to the averages given in Adams' study. If his hypotheses accurately describe the relations between import shares and per capita incomes and population (size), then the latter two variables could explain some of the discrepancies in actual and expected shares. For example, the per capita income figures do not coincide with the median Class values. Additional t-tests were run for countries with per capita incomes near the levels used to define the Classes. In this set of tests, countries were assigned to the income Class closest to, but not containing, the actual income level. This procedure permitted a check to determine if perhaps different income Classes should be used for capital and intermediate products import shares. The tests indicate capital goods shares of Ecuador and Peru are close to the expected values if these countries are placed in Class C; in both cases the t's for intermediate products worsened. Further, if El Salvador is placed in Class B, the t's improved and the share of intermediate products became close to the suggested value.

It may be a point of objection to compare a trend over fifteen years with those given by Adams which cover a significantly longer period. For the sake of completeness and to the extent the period used might be representative of longer-run phenomena, the results should be noted. Twenty-five of a possible thirty-three cases corresponded to the suggested trends, allowing for variations in the steepness of slope.

**Patterns of Import Requirements**

We shall now test three hypotheses commonly encountered in the literature which relate to import policy and/or economic growth. First, the growth rate in GNP has been significantly affected by levels of capital goods share in imports or the import coefficient of investment. Second, import substitution (in capital goods) has increased intermediate
goods share in imports. Third, during periods of foreign exchange shortage capital goods imports have generally increased relative to imports of intermediate products.

**Industrialization and Import Shares**

During the period several countries had high import shares of capital goods, but fairly low import coefficients of investment, e.g., Argentina, Brazil, and Mexico. This probably resulted from relatively large investment in construction and import substitution in capital goods industries. Analysis of variance test of the hypotheses that large capital goods import shares or import coefficients of investment are associated with high GNP growth rates yielded t statistics of 1.752 and .599 respectively for the period as a whole. (4) This suggests for the countries as a group, the employment of a major share of (frequently) limited foreign exchange to purchase foreign capital goods did not lead to a significantly higher growth rate.

At the same time, for most of the countries, the import share of intermediate products was somewhat less than the Adams' figures. This is surprising because in Latin America intermediate products, especially fuels, have often received the most favorable terms of any import category. Import substitution in intermediate products could account for this in countries such as Mexico and Venezuela where substantial progress has been made. Such is not the situation in countries only beginning the process of industrialization. In these, intermediate products requirements have probably been such that the local economy could largely satisfy demand for intermediate inputs in production.

Other things equal, decreases in the import coefficient of investment suggest import substitution in capital goods industries. The more stable the share of construction in investment, the stronger the implication. What effects has import substitution in capital goods had on import shares? Since capital goods imports form the numerators of both the import coefficient of investment and the share of capital goods in imports, it is not surprising these ratios tend to move in the same direction in any given year. The data indicate this pattern usually occurred for all the countries except Costa Rica. If we
aggregate over countries, the ratios changed in the same direction over two-thirds of the
time. It is frequently assumed that the import share of intermediate products moves in a
direction opposite that of the import coefficient of investment, i.e., import substitution in
capital goods increases requirements of intermediate products imports. (5) This too was
borne out by the data, although it was not true for Argentina, Costa Rica, Ecuador, and El
Salvador. We can conclude, for much of Latin America, replacement of capital goods
imports with domestic output reduced the importance of these gods, and increased that of
intermediate products, in international trade.

Foreign Exchange Shortages and Import Shares

Brunton has suggested that in periods of foreign exchange shortage intermediate
products share of imports can be expected to decline relative to the share of capital goods.
(6) Analysis of variance tests comparing changes in the ratio of intermediate products
imports to capital goods imports and the level of the foreign exchange constraint for the
years 1956, 1960, and 1964 provide t values of .620, -1.024, and 1.320. It seems doubtful,
therefore, that intermediate products imports were constrained relatively more than
capital goods during periods when import restrictions were necessarily severe. Two other
points should be mentioned. First, opposite directional movements in the shares of capital
and intermediate goods occurred more often than not, suggesting the foreign exchange
made available from various sources was not sufficient to increase capital and
intermediate products imports, thereby necessitating a choice between the two. This
would be especially true during periods of severe foreign exchange shortage. Second, in
eight countries fluctuations in the shares of capital goods imports were wider than those
of intermediate products, which may indicate the use of the former import group to
reduce disequilibria in the balance of payments.
Summary and Conclusions

From the data it appears the more industrialized the country, the larger the share of imports going to capital or intermediate goods, and countries in the early stages of industrialization.

Table 3: Average Import Shares
(Percentages)

<table>
<thead>
<tr>
<th>Income Class</th>
<th>Capital Goods</th>
<th>Intermediate Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>35.5</td>
<td>13.5</td>
</tr>
<tr>
<td>C</td>
<td>25.9</td>
<td>13.6</td>
</tr>
<tr>
<td>D</td>
<td>39.4</td>
<td>21.2</td>
</tr>
<tr>
<td>All Countries</td>
<td>36.2</td>
<td>18.4</td>
</tr>
</tbody>
</table>

Source: Table 1

exhibit the fastest growth in import shares of production goods. In most of the countries which have not really experienced industrialization, the shares of imported inputs were fairly low, but increased over the period. Limited manufacturing development or low per capita incomes lessened demand for imports, and export earnings were usually sufficient to pay for the desired levels of foreign goods.

It is difficult to make a general evaluation of Adams' theory as applied to the Latin American countries under study here. Neither the absolute shares nor the trends conformed exactly to the hypotheses in each instance, but obviously it would not be necessary that they do so for the theory to be useful. It may be that if other figures were employed for the income and population groupings the results would be altered somewhat; Adams' sample was large and varied making it necessary for him to use rather wide categories. Adams pointed out that the share of capital goods in developing countries tends to be greater than was true of the more industrialized countries at a similar stage in their development. Of the countries studied here, only El Salvador, Honduras, and Uruguay had capital goods shares below the suggested figures. Today machinery and equipment usually represent a larger percentage of capital formation vis-a-vis construction than in the past, and the former are more susceptible to trade. In addition,
Notes


(8) The Impact on Output of Raw Material and Intermediate Product Shortages in Brazil is Discussed by Leff, "Import Constraints . . ."

many developing countries have adopted modern capital intensive technology and the production of these capital goods is possible only in industrially advanced nations. Finally, development and trade policies operate to stimulate growth through a system of preferences which make foreign capital (or intermediate) goods relatively cheap in local currency.

Import substitution policies have clearly affected import shares. Argentina, Brazil, and Uruguay emphasized replacement of imported consumer and capital goods with domestic output, and exhibited the highest import shares of intermediate products. Import restrictions on intermediate products were mild, thereby discouraging domestic production of these inputs. Mexican import substitution included basic industries and intermediate products, which accounts for the relatively low share of intermediate products imports vis-a-vis Argentina, Brazil, and Uruguay. Countries which achieved significant import replacement only in consumer (durable) goods experienced increased dependence on foreign supplies of capital and intermediate goods.

Import substitution and import policies may well have increased the costs of economic development. Tariffs which restrict particular imports with the aim of promoting domestic production of these goods yield two separate types of costs: reductions in availability, and higher costs associated with domestic production, of the previously imported commodities. Increases in productivity can overcome these costs. Using a Cobb-Douglas production function, Bruton effectively demonstrated that "pure" productivity growth in much of Latin America has been virtually zero. (7) Shortages of raw materials and intermediate products plus policies reducing competition and stimulating imports of equipment have led to under utilization of capacity. (8) Schylowsky has suggested excess capacity may have kept industrial output fifty percent below potential output, thereby increasing industrial costs. (9) Furthermore, he argued if industrial output is thirty percent of total output, national income could have been fifteen percent higher with ninety percent capacity utilization.