An Examination of the Secular Deterioration Hypothesis

Roger L. Carothers

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AN EXAMINATION OF THE
SECULAR DETERIORATION HYPOTHESIS

by

Roger L. Carothers

A Thesis
Submitted to the
Faculty of the School of Graduate
Studies in partial fulfillment
of the
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June, 1969
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Roger L. Carothers
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THE PROBLEM

One of the most frustrating, demanding, and challenging economic tasks of the twentieth century is that of economic development. The economically advanced countries of the world are concerned about how to maintain and improve their economic growth. The economically less developed countries (LDC's) are becoming increasingly envious, concerned, and restive as a result of the gap in living standards between themselves and their more developed neighbors. This traditional problem of the "haves" versus the "have-nots" has become more volatile as a result of the end of colonial domination by the economically advanced countries and the emergence of many new independent nations. These new nations fall, almost without exception, into the classification of LDC's.

If one is not concerned about these development problems from a purely humanitarian motivation, one cannot fail to become concerned when one thinks about the disruptive effects upon society which economic stagnation would bring about. Thus, regardless of the motivation, there is legitimate cause for concern about the economic growth and development of the LDC's

The Role of Trade In Development

In any analysis of economic growth and development the role of international trade is bound to become pivotal. This is so because international trade is a convenient and practical means of exchanging scarce resources in a way which is potentially beneficial
to all parties involved. Further, international trade appears to be a very convenient means of narrowing the gap in living standards which exists between the LDC's and the more developed countries without detracting from the economic growth of the more developed nations.

This anticipated success of international trade as a tool for development, rests on the validity of a mass of traditional economic assumptions, such as theories of comparative advantage, which attempt to explain the motivation for, and value derived from, trade between nations. These traditional assumptions suggest at least three ways in which trade may be expected to benefit the trading parties. According to Weckstein the three are:

First the gains derived from the opportunity to specialize in the production of those goods in which each country is most efficient; second, the modern version of the classical theory which finds the cost differences on which specialization is based to be related to the differences in the proportions in which the factors of production are present in each country; and, third, the diverse influences trade brings which encourage by example, by temptation, and by competition, the generation and spread of improved ways of production.

The Traditional View Of The Role Of Trade In Development

This traditional view of the role of international trade in development leads us to expect that a country, by following a reasonable policy with regard to trade, should benefit from a more efficient use of its available resources due to specialization.

This "comparative advantage" theory reasons that each country has, if not a natural advantage, at least a comparative advantage in the production of certain goods because of the relatively different resource bases possessed by each country. Concentration on the production of those goods in which a country has an advantage leads to greater efficiency in the use of scarce domestic resources. This, in turn, leads to a greater real income and increases the potential for saving, thereby creating an increase in the capital stock of the country. Further, the broadening of the market for these domestic products, as a result of trade, provides a stimulus to investment and makes possible the use of more advanced techniques of production along with the benefits achieved from economies of scale which are inherent in many large operations.\(^2\)

The obvious development policy for an LDC to follow, according to traditional trade policy, is one in which the country concentrates its efforts in the production of the items in which it holds an advantage and imports the rest. Since the majority of the world's LDC's are producers of primary products, the production of which makes use of their excess in unskilled manpower, traditional theory would encourage the growth of labor intensive production. Thus the inference has been drawn that LDC's should be discouraged from involving themselves in industrialization involving manufactured goods because these kinds of production demand skilled labor and other scarce productive

resources.\textsuperscript{3}

Until recently this traditional approach has, with only occasional dissent, been largely accepted. However, within the past twenty years a very vocal opposition to these traditional views has been developing. The primary spokesmen for this dissenting group are such men as Prebisch,\textsuperscript{4} Myrdal,\textsuperscript{5} Singer,\textsuperscript{6} and Nurske.\textsuperscript{7} It is their contention that international trade may be an inhibiting factor for the economic development of LDC's rather than the growth factor which traditional theorists envisioned. Their hypothesis has been called, by Clement and Pfister,\textsuperscript{8} the secular-deterioration hypothesis because of its contention that international trade by LDC's leads to a deteriorating trade position relative to the terms of trade of the more developed nations.

\textsuperscript{3}However, this may be an erroneous inference, or perhaps too broadly drawn a generalization. It implicitly assumes that manufacturing is capital-intensive, but this obviously ignores the labor-intensive character of some manufacturing processes.


\textsuperscript{8}Clement, op. cit., p. 118.
The secular-deterioration hypothesis takes two specific approaches in its attack on traditional trade theory. The first approach looks at the relationship between the terms of trade for producers of primary products (LDC's) and the terms of trade for producers of manufactured goods. The conclusion is reached that the terms of trade for producers of primary products tends to worsen over time. The second approach results in the hypothesis that international trade inhibits growth in LDC's by dividing the production of the LDC into two sectors. One sector is export oriented while the other sector is largely independent, and unrelated to exports. The export sector is the developing sector and becomes more capital intensive than the other. Further, it gains all of the benefits from the exchange of trade thus becoming even more efficient and more capital intensive. This results in wages and welfare, in the export sector, becoming increasingly better. Next, an inflow of foreign capital, seeking profitable investment opportunities, finds its way into this growth sector leading to even more use of capital. If demand elasticities are low, so that demand does not rise significantly, the increase in capital leads to a decrease in employment opportunities for labor in the export area. The increased population growth in this advanced export sector is

\[9\text{loc. cit., pp. 159-161.} \]
then forced back into the under-developed sector where variable input coefficient operations apply. It should be noted that it is vital to the logic of this argument that the two sectors are completely distinct from one another. The export sector must not become involved in production for domestic use and is assumed not to return the benefits of increased efficiency to the domestic market in the form of reduced prices.

It is perhaps easier to see the tenents of the secular-deterioration hypothesis if one looks at the hypothesis in the context of traditional trade theory. The first of the ways in which traditional theory expects trade to benefit LDC's is through specialization in the production of the products in which they have a comparative advantage.

According to modern versions of resource allocation based upon comparative advantage, the optimum pattern of production and trade should be determined by a comparison of the opportunity cost of producing a good domestically with the price at which it can be imported. No good should be produced domestically which can be imported at a lower cost, and no good should be imported which can be domestically produced at a lower cost. The assumption made is that the comparative advantage held by a country results from its peculiar distribution of productive resources, and that a country will benefit from this advantage if it produces goods which

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make use of its relatively abundant factors of production. Thus a
country should export products which make use of these abundant
resources while importing goods which would otherwise have to be
produced by means of its scarce productive factors.

In the case of the LDC's this policy would dictate that they
specialize in the production of goods requiring intensive use of
labor, as labor of an unskilled nature, is relatively more abundant
than capital. Past history has assigned to the LDC's the production
of raw materials, or primary goods. Traditional theory finds no
fault with this as it assumes that demand for the relatively scarce
resources (raw materials) produced by the relatively scarce means
(labor) would tend to cause prices of raw materials, or primary
products, to rise thus helping to close the economic gap between
the LDC's and the more developed countries.\footnote{One is lead to believe that, during the 19th century, perhaps
the LDC's abundant productive factor was land instead of labor as
it seems to be, in most cases, in the 20th century.}

Problems of Primary Producers

Those who propose the secular-deterioration hypothesis claim
that LDC's are, contrary to traditional thinking, doing themselves
a disservice if they produce primary products. Singer\footnote{Singer, op. cit., p. 473-475.} and
Nurske\footnote{Nurske, op. cit.} claim that what actually occurs, in the case of producers
of primary products, is that the terms of trade move against them. This results, according to Singer\textsuperscript{15}, from the oligopolistic structure of the markets in which the producers of capital-intensive goods sell their products. This allows them to pass on gains from technology to owners and employees in the form of higher money incomes instead of resulting in lower product costs which would be passed on to all purchasers of the goods domestic or foreign. The primary product market however is not oligopolistically structured but instead operates competitively. As a result of the competitive market, gains from technology are passed on to foreign buyers in the form of lower prices. Thus the capital-intensive nations benefit both from the lower cost of primary products and from the increased productivity resulting from changes in domestic technology. Further, these lower prices for primary products are of little benefit to LDC's since their domestic demand for these goods is negligible.

Production possibilities for producers of primary products are further limited by competition from capital-intensive production methods. Thus a product produced in a labor-intensive industry may be forced to compete with the same product produced by the use of capital-intensive methods when they arrive on the world market. Further, an excellent substitute for a good which has been produced by labor-intensive means, may be found which can be produced by capital-intensive methods and compete favorably on the world market.

\textsuperscript{15}loc. cit., p. 477

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Such an example is rubber for use in automobile tires.\textsuperscript{16}

Further arguments against LDC's concentrating on the production of primary products are: (1) Primary goods production cannot provide employment for a large enough portion of the population to warrant the cost to the LDC in terms of scarce factors of production. The usual reasons given for this inability are the competition from other producers, substitute goods and an inelastic demand curve for primary products which does not respond favorably to changes in product price. (2) Primary goods production, unlike much manufacturing, does not provide throw-off industries resulting from industrial research. (3) Because of the inelastic demand for primary products, increased production yields diminished returns in real income.\textsuperscript{17}

For these reasons the adherents of the secular-deterioration hypothesis suggest that LDC's should not concentrate on international trade as a tool for economic growth. In addition, they feel that the best course for LDC's is to avoid becoming trapped by production of primary goods.

Validity of The Secular-deterioration Hypothesis

Most economists concerned with growth and development agree that international trade is not efficiently fulfilling the role which

\textsuperscript{16}Weckstein, op. cit., p. 8.

\textsuperscript{17}loc. cit., pp. 3-4.
the traditional theorists anticipated. However, those who explain its failure by the secular-deterioration hypothesis are definitely a minority. It is apparent that trade is not producing the desired or anticipated results. Many questions remain to be answered which could help us explain why it is not functioning as expected.

The response of traditional theorists to the challenge of the secular-deterioration hypothesis revolves around the following:

1. The evidence that there is, in fact, a deterioration in the terms of trade of primary producers is unclear and not conclusive.
2. If the national incomes of LDC's have not improved significantly, the source of the problem may be failures in supply on the part of LDC's.

The evidence that there is a long range trend toward deterioration of the terms of trade for primary good producers is suspect on many counts. Johnson's view is that when one takes into account the main influences on the terms of trade, it becomes very questionable as to whether there is any ground to anticipate any long range trend which would be disadvantageous to the LDC's.

If there is actually such a trend it is entirely possible that it can be explained on the supply side rather than the demand side. At least some of the competition from capital-intensive production methods may be shown to result from failures in supply on the part

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17loc. cit., pp. 3-4.

of the LDC's. Specific supply problems include: (1) Inability by the primary good producer to meet the demand thus making it profitable for capital-intensive production means to be developed. 
(2) Poor quality of goods or wide variations in their quality.
(3) Large price increases which would induce potential purchasers to seek other means of supply or substitute products. (4) Failure of producers of primary products to adapt these natural products to the changing needs and opportunities resulting from changing technology.\(^{19}\) (5) Lastly, but of a highly significant nature, is domestic price inflation which encourages a shift from export production to production for domestic use.

Deliberate government policy may inhibit supply.\(^{20}\) The internal political policy and conditions of LDC's frequently lead to the implementation of practices which inhibit the ability of the LDC to compete by failure to encourage the use of the most abundant resources. For example, governments in an effort to gain popular support frequently place artificial controls on wages setting them too high and thereby reducing the effective use of this most abundant resource. Another mistake made by the governments of LDC's is to build showcase industries which use the best of their scarce resources and are unable to compete in international markets because

\(^{19}\)Weckstein, op. cit., p. 8.
\(^{20}\)loc. cit., pp. 4-5.
of the high cost of these scarce resources. Another factor which inhibits the effectiveness of trade as a tool for growth is tariff restrictions. The policy of nations generally is to place trade restrictions on the items which have the greatest price differences between foreign and domestic prices. For example, the United States tends to restrict trade which competes favorably with unskilled and semi-skilled labor.

It is apparent that both sides in the debate have logical arguments. Since each view generates testable hypothesis, empirical research methods can be used to judge the relative validity of the alternative approaches. The need for this research is obvious as the two approaches are incompatible. According to traditional theory trade is beneficial and should be encouraged, whereas the secular-deterioration hypothesis assumes it to be detrimental to the economic well-being of LDC's. It is the purpose of this paper to shed some light on this problem.

TESTING PROCEDURE

The suggestion made by the secular-deterioration supporters that the long-run terms of trade of LDC's has deteriorated is not

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21 ibid.
22 loc. cit., pp. 9-10.
23 The effectiveness of the protection offered by these tariffs may be much greater than the nominal tariff rates suggest according to Johnson. See Johnson, op. cit. pp. 16-18.
at all clear. However, the failure of LDC's to develop satisfactorily along with an export lag, in the case of some LDC's, suggests that trade may not be as powerful a generator of economic growth as anticipated by the traditional thinkers.

The object of this study is to test a shorter-run hypothesis; that regardless of the long-run trends, the postwar trends have been unfavorable to export earnings, and that the worsening prices have caused a deterioration in export volume. Several steps are involved in subjecting this short-run hypothesis to testing. These include:

1. Examination of the export performance of a selected sample of LDC's;
2. examination of the trends in export and domestic price trends; and
3. regression estimates of the relationship between export volume and prices.

With respect to the regression relationship, four variables are used to obtain ratios reflecting export performance and price behavior. Export performance is measured by the ratio of the physical volume of exports ($V_x$), to the physical volume of domestically produced goods ($V_H$). Price behavior is comprised of the ratio of export prices ($P_X$) to the prices of domestically produced goods ($P_H$). By examining the relationship between these two ratios we are seeking to determine if we can explain the volume ratio $\frac{V_x}{V_H}$ by the relative price variable $\frac{P_X}{P_H}$. That is, we wish to determine if fluctuations in export volume relative to domestic output is a function of international market prices or government policy (e.g. domestic price inflation).
Selection of The Countries

For the purpose of this study the following LDC's were chosen because of their geographical locations, their relative political stability and reasonable access to data: Bolivia, Brazil, Chile, Columbia, India, Pakistan, Malaya, Nigeria, and the Union of South Africa. Chile and Malaya were subsequently dropped from the sample because of data difficulties.

In the case of Chile, it was found that the available data was not quoted in national currency because of the frequent devaluations which her currency has experienced. These devaluations result from a very severe inflationary problem which she has been experiencing in the decade of the 1960's.

Malaya was dropped because of the problems of conversion which became necessary as a result of her membership in the Confederation of Malaysia. Prior to 1963, the data is given separately for the various components of the Confederation. However, from 1963 on, the data for the old federation of Malaya must be derived from the combined data for the Confederation. Although this data is available, I believe it to be suspect because we have no way of knowing, from readily available sources, what volume of exports Malaya exported to the other members of the Confederation from 1963 to the present. Thus the export figures are not easily or accurately comparable. In addition, prior to 1955 national income is not available for Malaya.

Political stability was considered essential because lack of
political stability, in itself, could severely influence the opportunities of the country to engage in effective international trade. A further limitation on the choice of countries was the problem of finding reasonably reliable data which would cover a long enough period of time to be meaningful. If there is a tendency toward deterioration of the terms of trade for LDC's, as long a period as possible is desirable in hope of identifying whether the trend is a long range trend or a short term trend which is not a direct response to their production of primary products.

The Data

The data for this study, where possible, was taken from the United Nations Statistical Yearbooks, The United Nations Yearbook of National Accounts, or the International Financial Statistics published by the International Monetary Fund. These sources provided reasonably comparable data using relatively uniform


\[^{26}\text{United Nations, Department of Economic and Social Affairs, Statistical Office of the United Nations, Yearbook of National Accounts Statistics.}\]

\[^{27}\text{International Monetary Fund, Statistics Bureau, International Financial Statistics.}\]
reporting methods. Specific problems pertaining to individual
countries and specific sources will be presented with the data for
the individual countries.

Data pertaining to the volume ratio

The figures for the export volume \( (V_x) \) represent the physical
volume of exports at 1958 base prices; expressed as a quantum index
showing the changes in volume of aggregate merchandise exports when
1958 = 100.

The figures for the volume of domestically produced goods
\( (V_H) \), represent, where possible, the gross national product of the
country expressed in constant 1958 market prices, and divided by
the 1958 gross national product, in order to yield a quantum index
showing the changes in the volume of domestically produced goods
when 1958 = 100. This figure was, in many cases, difficult to
obtain. In some cases the gross national product was not available
and some other measure of national income had to be substituted.
Further, in a good number of cases, this quantum figure was not
available and had to be derived by the author. The procedure
followed in such cases involved: (1) Deflating gross national
product (in current prices) by the consumer price index to 1958
prices. (2) Once converted to constant 1958 monetary units, this
figure was divided by the 1958 figure to yield a quantum figure.
Occasionally a wholesale price index was used because consumer
price index figures were unavailable. In most cases both the
officially derived quantum figure and the one derived by the author

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are cited.

**Data pertaining to the price ratio**

These figures, with the exception of the domestic consumer price index were easily obtained. The export price series \((P_X)\) represent aggregate export price indexes expressed on a 1958 base year. The domestic price figure \((P_H)\) represents the aggregate wholesale price index where available. In cases where the wholesale price index was unavailable, the retail consumer price index is used. In either case the figures are expressed in index form with 1958 being the base year.

**Definition of terms**

Uniform measures of total output are not available, however broadly similar aggregates can be found. Three of the most usual measures are:

**Gross national product at market prices** is the market value of the product, before deduction of provisions for the consumption of fixed capital, attributable to the factors of production supplied by normal residents of the given country. It is identically equal to the sum of consumption expenditure and gross domestic capital formation, private and public, and the net exports of goods and service plus the net factor incomes received from abroad.

**Gross domestic product at market prices** is the market value of the product, before deduction of provisions for the consumption of fixed capital, attributable to factor services rendered to resident producers of the given country. It is identically equal to the sum of consumption expenditure and gross domestic capital formation, private and public, and the net exports of goods and services of the given country. It differs from the gross national product at market prices by the exclusion of net factor incomes received from abroad.
Gross domestic product at factor cost is the value at factor cost of the product, before deduction of provisions for the consumption of fixed capital, attributable to factor services rendered to resident producers of the given country. It differs from the gross domestic product at market prices by the exclusion of the excess of indirect taxes over subsidies.28

These definitions are included as it is the $V_H$ figure which is most troublesome. The national income figures from the years before 1960 are scarce and made selection of countries more difficult.

RESULTS

Pattern of Export Performance

The first question to be answered is whether there is a consistent pattern of poor export performance among these sample LDC's. In an attempt to gain an insight with regard to the issue, the average annual change in export volume ($V_x$) was determined and converted into average percentage changes over the period of the sample years. These percentages were then converted to an average annual percentage change in export volume. The results of this study are found in Figure 1.

It can be seen that the average annual percentage change in export volume was greater than the world average in two instances, relatively close in one instance, and well below the world average

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in four cases. Thus the data clearly does not demonstrate a uniformly adverse export performance. However, caution must be used to avoid drawing any broad inferences, from this diversity in export performance, because of the limited number of countries involved in the sample.

Fig 1
PERCENTAGE CHANGE IN EXPORT VOLUME FOR SELECTED COUNTRIES

<table>
<thead>
<tr>
<th>Country</th>
<th>Time Period</th>
<th>Average % Change in Export volume</th>
<th>Average annual % change in Export volume</th>
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</thead>
<tbody>
<tr>
<td>Bolivia</td>
<td>1950-1967</td>
<td>-22.0</td>
<td>-1.6</td>
</tr>
<tr>
<td>Brazil</td>
<td>1950-1967</td>
<td>30.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Columbia</td>
<td>1950-1967</td>
<td>25.3</td>
<td>1.5</td>
</tr>
<tr>
<td>India</td>
<td>1950-1966</td>
<td>31.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1950-1965</td>
<td>113.3</td>
<td>6.0</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1950-1965</td>
<td>41.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Union of South Africa</td>
<td>1950-1966</td>
<td>145.0</td>
<td>6.6</td>
</tr>
<tr>
<td>World*</td>
<td>1952-1965</td>
<td>53.0</td>
<td>3.9</td>
</tr>
</tbody>
</table>

*Note: The world figure is exclusive of Albania, Bulgaria, Mainland China, Czechoslovakia, East Germany, Hungary, North Korea, Mongolia, Poland, Romania, U.S.S.R., and North Vietnam.


How can these diversities in export performance be explained?
One possibility is a deterioration in export markets. An alternative explanation can be found in the diversionary effects of domestic inflation on export supply. Figure two shows the trends in export

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prices, domestic prices and the ratio of export prices to domestic prices. In five of the seven cases it is clear that domestic price inflation dominates the price ratio movement. In three of these five cases poor export performance occurs. In the other two (Nigeria and the Union of South Africa) the export performance was considerably above the world average. However, in the case of the Union of South Africa this change in domestic prices is a negative change which would tend to encourage exports.

In an attempt to determine if a more specific relationship exists between export performance and prices, the regression relationship between \( \frac{V_X}{V_H} \) and \( \frac{P_X}{P_H} \) was examined in detail. That is, export performance is being measured in terms of an elasticity of substitution. This elasticity of substitution, it is assumed, would result from fluctuations in the relationship between the price variables \( \frac{P_X}{P_H} \).

As a means of testing the foregoing hypothesis, that \( \frac{V_X}{V_H} = f\left(\frac{P_X}{P_H}\right) \), regressions of the form \( \frac{V_X}{V_H} = a + b \frac{P_X}{P_H} \) were run for all of the countries. In the formula "a" equals the "Y" intercept and "b" equals the slope of the regression line. Correlation analysis was then run to obtain \( (r) \) and \( (r^2) \). The results of these calculations are reported in Figure three.

Significant coefficients are found for four of the seven countries and in six of the thirteen regressions calculated. These results yield no simple, broad generalizations. Some tentative conclusions do emerge, however, from examining the groupings in Figure three.
Fig. 2

RELATIVE CONTRIBUTION
OF DOMESTIC AND EXPORT PRICES

<table>
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<td>103.5</td>
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<td>53.75</td>
<td>171.00</td>
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<td>101.50</td>
<td>127.00</td>
<td>79.95</td>
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Percent change:
- BOLIVIA: +66% +61% +2%
- BRAZIL: +249% +287% -17%
- COLUMBIA: +256% +261% 1%
- INDIA: -12% +22% -27%
- NIGERIA: -9% +47% -38%
Fig. 2 (Continued)

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<th>$P_H$</th>
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<td>+ 53%</td>
<td>- 31%</td>
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Source: See Appendix A
# SUMMARY OF RESULTS OF REGRESSION ANALYSIS

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<th>Regression Coefficient (b)</th>
<th>Correlation r²</th>
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<td>.697</td>
<td>-.835**</td>
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</table>

*V* data derived by author as described under "data" section, p. 16 of this manuscript.

* Significant at the 5% level

** Significant at the 2% level
In this table the countries are ordered by increasing ratio of export growth from the lowest (Bolivia) to the highest (Union of South Africa). For slower countries, no relationship is apparent between prices and export performance. Apparently the causes of deterioration are to be found elsewhere than in prices, example in political instability, seizure of mines, or restrictions on trade.

For Bolivia and Pakistan, significant results are obtained with exports linked to prices. As we saw in Figure two, both countries showed a positive change in both domestic and export prices, with the \( \frac{P_X}{P_H} \) ratio largely due to domestic price inflation. The highest growth countries (Nigeria and Union of South) yielded significant but negative coefficients. In the case of the Union of South Africa, export performance improves as prices decline. This result reflects the large gains in productivity in export industries with falling prices serving to expand market opportunities. These observations are based on broad impressions suggested from Figures two and three. A clearer explanation of the results on a country by country basis yield additional insights.

**Bolivia**

It can be seen, from Fig. 1, that Bolivia has had, since 1959, a very rapid growth in real gross national product. However, at the same time its annual percentage change in the volume of exports has been negative (Fig 1 ). The scatter diagrams (Figs. 5,6) show no obvious relationship between the price and volume ratios, and the results of the regression analysis (Fig. 3) verify that there is no

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BOLIVIA

Gross National Product at Constant 1958 Prices.

$1958 = 100$

Source: See Appendix A
Fig. 5

BOLIVIA

Scatter Diagram of Price Ratio to Volume Ratio.*

1958 = 100

*V_H data derived by author.

Source: See Appendix A
Fig. 6

BOLIVIA

Scatter Diagram of Price Ratio to Volume Ratio.*

1958 = 100

*\( V_H \) data as published by source.

Source: See Appendix A
Fig. 7

BOLIVIA

Export Volume and Relative Prices

1958 = 100

Source: See Appendix A
Fig. 8

BOLIVIA

Scatter Diagram of First Differences

Source: See Appendix A
significance to the relationship. Further, there appears to be no pattern with respect to the volume of exports and the price ratio (Fig. 7). Therefore, it appears that in this case the poor export performance cannot be explained by means of the relative price hypothesis.

Brazil

Brazil also has experienced a consistent growth in her G.N.P. (Fig. 9) except for 1953-1954 and 1958-1959. With respect to trade experience (Fig. 1), although it has shown positive growth, it is well below the world average and thus could be called a poor export performance. With respect to the scatter diagrams (Figs. 10,11), it should be noted that, except for the years 1950, 1951, 1954, 1955, and 1964 (Fig. 10) a fairly close pattern develops. The relationship between change in the price ratio and in the volume of trade is well portrayed by the years 1952-1956 (Fig. 12). This relationship is supported by the significance test (Fig. 3) which shows the relationship to be significant at the second and fifth percent levels. Thus there seems to be a reasonable possibility that some of Brazil's poor export performance can be explained by means of a supply oriented elasticity of substitution, with domestic price trends shifting resources from export to domestic production.

Columbia

Columbia has a sharp and consistently rising G.N.P. with the exception of the years 1962-1963 (Fig. 14). The scatter diagrams

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Fig. 9

BRAZIL

Gross National Product at Constant 1958 Prices.

1958 = 100
Fig. 10

BRAZIL

Scatter Diagram of Price Ratio to Volume Ratio. *

1958 = 100

*\( \frac{V_x}{V_H} \) data derived by author.

Source: See Appendix A
Fig. 11

BRAZIL

Scatter Diagram of Price Ratio to Volume Ratio.*

1958 = 100

*Data as published by source

Source: See Appendix A
Fig. 12
BRAZIL
Export Volume and Relative Prices
1958 = 100

Source: See Appendix A

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Fig. 13

BRAZIL

Scatter Diagram of First Differences

Source: See Appendix A
Fig. 14

COLUMBIA

Gross National Product at Constant 1958 Prices

1958 = 100

Source: See Appendix A
Fig 15

COLUMBIA

Scatter Diagram of Price Ratio to Volume Ratio*.

1958 = 100

*V_H data derived by author

Source: See Appendix A
Fig. 16

COLUMBIA

Scatter Diagram of Price Ratio to Volume Ratio.*

$1958 = 100$

*Data as published by source.

Source: See Appendix A
Fig. 17

COLUMBIA

Export Volume and Relative Prices

Source: See Appendix A
Fig. 18

COLUMBIA

Scatter Diagrams of First Differences

Source: See Appendix A
(Figs. 15, 16), show no pattern. They are clustered around the 1960, 1961, and 1962 figures. The trade experience of Columbia (Fig. 1) has shown a poor, but positive, rate of growth. The relationship between the price ratio and export volume (Fig. 17) appears to suggest the possibility of a slight negative relationship between export volume and prices. However, the regression analysis (Fig. 3) tends to show no correlation which could be considered significant, and the calculated coefficients are positive. Thus, it would appear, that the relationship of \( \frac{V_x}{P} \) to \( \frac{P_x}{P} \) is inadequate as an explanation of Columbia's poor export performance. First difference analysis was attempted in an effort to determine if there was a hidden relationship. This was also futile (Fig. 18) as again the data is grouped around zero.

India

In India, net national product figures had to be used as they were the only available national income data. There has been some growth in N.N.P. However, it is not very steep until the post 1959 period (Fig. 19). India's export performance has also been less than spectacular during this period, being well below the world average for this period (Fig. 1). With respect to the scatter diagrams (Figs. 20, 21), there is no apparent relationship between the ratios. The first difference method (Fig. 23) reinforces the belief that there is no relationship between the ratios as the data is clustered around zero. Regression analysis further supports the contention as the level of significance is below a significant level (Fig. 3).
Fig. 19

INDIA

Net National Product at Constant 1958 Prices.

1958 = 100

Source: See Appendix A
Fig. 20

INDIA

Scatter Diagram of Price Ratio to Volume Ratio.*

$\frac{P_x}{P_h}$

1958 = 100

130

120

110

100

90

80

70

60

50

40

30

20

10

0

$\frac{V_x}{V_h}$

1951

1952

1955

1954

1956

1953

1957

1960

1961

1958

1962

1959

1963

1964

1950

*V_h data derived by author

Source: See Appendix A
Fig. 21

INDIA

Scatter Diagram of Price Ratio to Volume Ratio.*

$1958 = 100$

*Data as published by source.

Source: See Appendix A
Fig. 22

INDIA

Export Volume and Relative Prices

1958 = 100

Source: See Appendix A
Fig. 23

INDIA

Scatter Diagram of First Differences

Source: See Appendix A
The relationship between the price ratio and the volume of exports appears to be relevant as the direction of the change in the price ratio and the volume of exports is consistent. Thus, although the poor export performance cannot apparently be explained by means of an elasticity of substitution, there appears (visually) to be a positive relationship between changes in the $\frac{P_X}{P_H}$ ratio and changes in the volume of exports.

Nigeria

Nigeria is a case where there has been a very favorable export performance (Fig. 1), and, at the same time, an erratic growth pattern with respect to its gross domestic product (Fig. 24). The scatter diagrams for Nigeria show a strong relationship between the two ratios (Figs. 25, 26), which is supported by a very highly significant coefficient (Fig. 3). A strong positive relationship between the price ratio and the export volume (Fig. 27), is also substantive. In this case, it appears that an identifiable relationship does exist and there is a strong likelihood that the export performance can be explained by means of elasticities of substitution. This relationship, however, is a demand rather than a supply relationship since larger volume ratios are associated with lower price ratios.
Fig. 24

NIGERIA

Gross Domestic Product at Constant 1958 Prices

1958 = 100

Source: See Appendix A
Fig. 25

NIGERIA

Scatter Diagram of Price Ratio to Volume Ratio.*

$1958 = 100$

* $V_H$ data derived by author

Source: See Appendix A
Fig. 26

NIGERIA

Scatter Diagram of Price Ratio to Volume Ratio.*

1958 = 100

*Data as published by source.

Source: See Appendix A
Fig. 27

NIGERIA

Export Volume and Relative Prices

1958 = 100

Source: See Appendix A
Fig. 28

NIGERIA

Scatter Diagrams of First Differences

Source: See Appendix A
Pakistan

Pakistan's export performance (Fig. 1) has been below the world average, but it is in the middle ground between those countries with very poor export experience and those, in this sample, having unusually good export performance. Its G.N.P. also shows itself to be erratic with strong growth and poor growth periods intermixed.

The scatter diagrams (Figs. 30, 31) yield differing impressions about export performance. Fig. 30 shows a positive correlation, significant at the five percent level, whereas Fig. 31 shows no significant correlation. This results from the fact that the series for \( V_H \) are arrived at by the use of different data in the two cases. Since this data came from different collection agencies, the compatibility of the data is open to question. The first difference analysis (Fig. 33), shows some linear correlation except for the years 1951-1953.

Union of South Africa

The Union of South Africa has had a particularly good export experience which is well above the world average. At the same time it has shown consistent and rapid growth in G.N.P. (Fig. 34) with the exception of 1951-1952. The scatter diagrams (Figs. 35, 36) show, with the exception of the years 1950-1953, the likelihood of a strong negative correlation. This is substantiated by the regression analysis (Fig. 39) which shows a two percent level of significance. A negative relationship between the price ratio and the volume of
exports is also noted in Fig. 37. As in Nigeria, supply shifts dominate demand shifts; therefore, the measured substitution is a demand relationship.
Fig. 29

PAKISTAN

Gross National Product At Constant 1958 Prices

1958 = 100

Source: See Appendix A
Fig. 30

PAKISTAN

Scatter Diagram of Price Ratio to Volume Ratio.

1958 = 100

*V_H data derived by author

Source: See Appendix A
Fig. 31

PAKISTAN

Scatter Diagram of Price Ratio to Volume Ratio.*

1958 = 100

*Data as published by source

Source: See Appendix A
Fig. 32

PAKISTAN

Export Volume and Relative Prices

1958 = 100

\[ V_x, \frac{P_x}{P_w} \]

Source: See Appendix A
Fig. 33

PAKISTAN

Scatter Diagram of First Differences

Source: Appendix A
Fig. 34

UNION OF SOUTH AFRICA

Gross National Product at Constant 1958 Prices

1958 = 100

Source: See Appendix A
Fig. 35
UNION OF SOUTH AFRICA

Scatter Diagram of Price Ratio to Volume Ratio. *

1958 = 100

* $V_H$ data derived by author

Source: See Appendix A

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Fig. 36

UNION OF SOUTH AFRICA

Scatter Diagram of Price Ratio to Volume Ratio.*

1958 = 100

*Data as published by source

Source: See Appendix A
Fig. 37

UNION OF SOUTH AFRICA

Export Volume and Relative Prices

1958 = 100

Source: See Appendix A
Fig. 38

UNION OF SOUTH AFRICA

Scatter Diagrams of First Differences

Source: See Appendix A

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CONCLUSION

It is not at all evident that the export performance of LDC's has been uniformly poor. Further, in the cases where poor export performance was experienced, the reason for the poor performance is not as described by the adherents of the secular-deterioration hypothesis. In the case of Brazil, there is a strong correlation to support the thesis that relative price variances are the reason for its poor export performance. This variance, however, is dominated by internal price movements rather than changes in export prices. In the case of Pakistan, although results are mixed, there appears to be a relationship between relative export performance and export price variations. In the cases of the countries which showed good export volume, there was a consistent and strong relationship between the volume of exports and the relative price ratio. The price ratio, however, fell with export-price reductions serving to expand their respective markets substantially.

It would appear that those who support the secular-deterioration hypothesis may need to do more research than they have in the past in an effort to determine how, if at all, they can explain these correlations. Perhaps the poor export performance is a product of various restrictions centering around the price mechanism which would be corrected if artificial restrictions were removed and the natural price influences were allowed to function. This study would seem to suggest that there is no certainty that exports are not a good means to encourage economic growth. Further, poor export
performance is not necessarily a result of consequences over which a country has no control. They may be a result of conscious or unconscious price policy on the part of the government. In any case, it does not appear that there is enough evidence, at this time, to encourage a country to reject exports as a means of growth especially when the alternatives may be less satisfactory.
APPENDIX A

All data for the various graphs and charts comes from the same data in the following charts for the particular country.
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*V_H figured by author as described under "data", p. 16. G.N.P. at factor cost was inflated by means of the consumer price index.

**Data as published by source.
Source:

Column 1


Column 2


Column 3


Column 4

The ratio of column 1 to column 2.

Column 5

The ratio of column 1 to column 3

Column 6


Column 7


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Column 8

The ratio of column 6 to column 7.
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* $V_H$ figured by author as described under "data", p. 16. G.N.P. at factor cost was inflated by means of the wholesale price index.

** Data as published by source
Sources:

Column 1


Column 2

G.N.P. and Wholesale price index (P<sub>i</sub>) are found in


Column 3


Column 4

The ratio of column 1 to column 2

Column 5

The ratio of column 1 to column 3.

Column 6


Column 7


Column 8

Ratio of column 6 to column 7.
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* $V_H$ figured by author as described under "data", p. 16. G.N.P. at factor cost was inflated by means of the consumer price index.

** Data as published by source.
Sources:

Column 1


Column 2


Column 3


Column 4

The ratio of column 1 to column 2.

Column 5

The ratio of column 1 to column 3.

Column 6


Column 7


Column 8

Ratio of column 6 to column 7.
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*VH figured by author as described under "data", p. 16. N.N.P. at factor cost was inflated by means of the wholesale price index.

**Data as published by source.
Sources:

**Column 1**


**Column 2**


**Column 3**


**Column 4**

Ratio of column 1 to column 2.

**Column 5**

Ratio of column 1 to column 3.

**Column 6**


**Column 7**


**Column 8**

Ratio of column 6 to column 7.
## NIGERIA

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* $V_{H*}$ figured by author as described under "data", p. 16. G.D.P. at factor cost was inflated by means of the consumer price index.

** Data as published by source.
Sources:

Column 1


Column 2


Column 3


Column 4

Ratio of column 1 to column 2.

Column 5

Ratio of column 1 to column 3.

Column 6


Column 7


*Column 8*

Ratio of column 6 to column 7.
## PAKISTAN

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**Data as published by source.
Sources:

Column 1


Column 2


Column 3


Column 4

Ratio of column 1 to column 2.

Column 5

Ratio of column 1 to column 3.

Column 6


Column 7


**Column 8**

The ratio of column 6 to column 7.
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*$V_H$ figured by author as described under "data", p. 16. G.N.P. at factor cost was inflated by means of the wholesale price index.

**Data as published by source.
Sources:

Column 1


Column 2


Column 3


Column 4

Ratio of column 1 to column 2

Column 5

Ratio of column 1 to column 3.

Column 6


Column 7


Column 8

Ratio of column 6 to column 7.
BIBLIOGRAPHY

I. BOOKS


II. PERIODICALS


III. PROJECTS