

## INTERCOUNTRY COMPARISON OF EXPORT PERFORMANCE AND OUTPUT GROWTH

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### I. INTRODUCTION

THE relationship between export expansion and the process of economic growth has varied widely across countries due to differences in the domestic and international environment. These differences are often not taken into account in the indiscriminate use of bivariate tests on the statistical relationship between export performance and output growth. Making broad generalizations and drawing strong conclusions on the basis of such tests, leaving out other important explanatory variables, should be discouraged. In this paper we analyze the empirical results on the apparent positive correlation between export and output growth rates. We argue that the evidence should be interpreted with great care inasmuch as there are mixed results when other indicators of export performance are taken into consideration. In evaluating the mixed evidence, one must bear in mind the oversimplification and ahistoricism associated with the use of bivariate tests for the analysis of the relation between output growth and export performance. In Section II, which follows this introduction, we discuss the basic arguments found in the literature on the relationship between exports and economic growth. In Section III we analyze our empirical findings on the basis of rank correlation tests, regression equations, and cluster analysis. In Section IV, we present the main conclusions of the paper.

### II. THE BASIC ARGUMENTS

The heterogeneity and complexity of different historical experiences of development would indicate the need for caution regarding broad generalizations on the relationship between export performance, output growth, and economic development. This is evident in the monumental quantitative studies by Kuznets and in the critiques of the doctrine of comparative advantage elaborated by Prebisch, Myrdal, Singer, and others, who showed, *inter alia*, a certain "primary export pessimism" inasmuch as the continuing reliance on exports of primary commodities would perpetuate the structural imbalances of developing countries.<sup>1</sup>

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The views expressed in this article are those of the authors and not necessarily those of the UNCTAD secretariat.

<sup>1</sup> Kuznets showed, for instance, that for developed countries historically "the evidence is clear that there was persistent disparity between the comparative advantages that set the

The historical nature of this relationship was also shown by Nurkse [25] who argued that, contrary to what had happened in the nineteenth century, trade was not an engine of growth in the twentieth century, whereas the critique by Kravis of the "trade engine theory" showed that trade should be seen as a handmaiden of growth rather than an engine of growth in so far as "export expansion did not serve in the nineteenth century to differentiate successful from unsuccessful countries" [18, p. 850]. This author goes further and argues that: "In their direct impact, however, trade and capital movements were supplementary factors; they were handmaidens not engines of growth. The mainsprings of growth were internal; they must be sought in the land and the people, and in the system of social and economic organization" [18, pp. 858-59].

For the post Second World War period, Reynolds has pointed out the existence of cases of non-export-led growth, although, based on the experience of a few newly industrializing countries, he mentions a "tendency for a high growth rate to be associated with export success" [28, p. 975]. In this context it is worth remembering: "When all is said and done we remain unsure as to whether and when trade is the engine, the handmaiden, the brake, or the offspring of growth. Ingenious and mischievous economic historians can come up with examples of each" [7, p. 300]. Notwithstanding the heterogeneity and complexity of the real world concerning the relationship between export expansion, output growth, and economic development, since the late 1970s there seems to exist strong support for the view that a "rapid growth of exports accelerates the economy's growth" [23, p. 49], which has been based on a collection of empirical studies on the statistical association between exports and output growth.

It should be mentioned, however, that a remarkable characteristic of these intercountry comparisons of the relation between export expansion and economic growth is their restrictive nature. Thus, the empirical studies which support arguments in favor of export-led growth and/or outward-looking strategies of development have been characterized by a certain oversimplification and ahistoricism.<sup>2</sup> In addition, some of these studies also present some shortcomings, such

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pattern of manufactures exports and the forces that determined the pattern of domestic output" [21, p. 72]. As regards the seminal study by Prebisch [26], there has been a vast literature on its controversial theoretical and empirical aspects, mostly related to the thesis on the secular deterioration of the terms of trade of primary exports by developing countries; see [35] [30, Chapter 4]. Singer [33] presents a classical critique of the enclave-type of investment oriented to the export of food products and raw materials. And, for an analysis of the dynamics of plantation economies and societies, see [6]. This outstanding book is also a rare example of an excellent multidisciplinary analysis in social sciences.

<sup>2</sup> Oversimplification and ahistoricism do not seem to be unusual in intercountry comparisons of economic growth. See, for instance, the critique by Hobsbawm [13] on Rostow's work. It is also worth mentioning Severn who in his critique of one of the much-quoted empirical works on the relationship between export growth and output growth, argues that "Emery [1968] assumes mutual causation between exports and GNP and demonstrates that the two are highly associated between countries. But he fails to examine the institutional factors which determine the direction of causation at different levels of economic development and time periods" [32, p. 548].

as a certain mis-specification of the relation between exports and output growth,<sup>3</sup> and they have been based on samples of small size owing to the exclusion of a large number of low-income and middle-income developing countries.<sup>4</sup>

Despite these shortcomings, the evidence presented in these several empirical studies has been repeatedly cited to support the critiques of import-substitution industrialization and in favor of export-oriented industrial growth [19, p. 289], and to support arguments on the superior performance of outward-looking development strategies [29, p. 71], and adjustment processes [2] [3]. In this context, the evidence has also been used to support free-market "get-the-prices-right-and-development-will-follow" principles [8] [2, p. 172].<sup>5</sup>

It is the proposition of this paper that the relationship between export expansion and economic growth is quite complex and depends on third variables. The fact that this relation depends on third variables, whose impact and significance

<sup>3</sup> Most of the studies have concentrated their analysis on the relation between the growth rates of exports and output. However, according to Michaely, "Since exports are themselves part of the national product, an autocorrelation is present; and a positive correlation of the two variables is almost inevitable, whatever their true relationship to each other." He also argues that "To be meaningful, the variable used to represent export performance must indicate the extent of export bias; that is, it must refer not to the absolute level of exports but to the proportion of exports in the product" [23, p. 50]. In his study the export performance is represented by the rate of change of the proportion of exports in the national product. On the other hand, Heller and Porter show that "Any change in the growth rate of the export share of output ( $x-y$ ) will change the output growth rate ( $y-p$ ) in the same direction even if it causes no change at all in the growth rate of the other components of output ( $f-p$ ). Since what we are interested in is knowing how the growth of exports is related to the growth of the nonexport components of output, the correct correlation is between ( $x-p$ ) and ( $f-p$ )" [12, p. 192].

<sup>4</sup> See, for example, [19, p. 271 ff.], [1, p. 187] [2, p. 164]. According to Tyler "Balassa's [1978] sample, however, was quite restrictive, consisting of only 11 countries. More important still, his sample included such obvious high performers as [the Republic of] Korea and Taiwan [Province of China] and poor performers as India and Chile. With such a choice of small sample the results of Balassa's statistical analysis provide no great surprises. His sample choice in fact guarantees his strong results" [38, p. 123]. Krueger's sample of 10 countries and the sample of Balassa [2]—24 countries—seem to have the same problems. The sample in Kravis [18, pp. 866–67] included 37 non-oil-exporting developing countries, whereas the sample in Michaely [23, p. 50] consisted of 41 developing countries. According to Kavoussi "Michaely's sample excluded a large number of both low- and middle-income economies" [17, p. 242]. The sample in Tyler [38, p. 123] covered 55 middle-income developing countries and excluded low-income countries with a GNP per capita of U.S.\$300 or less in 1977 dollars. Maizels' sample consisted of 16 countries. This author is, however, careful regarding the general positive correlation between the export and GDP growth rates, when he argues that: "However, the relationship is clearly not a close one: while it is true that the four countries with the highest growth rates of GDP were also in the top export growth group, it is likewise true that India and Ceylon, with low export growth rates, achieved much the same rate of GDP growth as Malaysia, Malawi, Australia, and Tanzania, all with very much higher rates of export growth" [22, p. 44].

<sup>5</sup> An outward-oriented strategy of development is supposed to involve not only export promotion and import liberalization, but also the encouragement of foreign direct investment. By and large, it is associated with the free-market doctrine. For a critic's view, see [36] [33] [31].

are difficult to test, should discourage the oversimplification whereby export expansion is attributed a hegemonic role in the process of economic growth. In addition, one should exercise caution regarding broader generalizations, mainly because the empirical evidence available presents several shortcomings and does not seem to be as strong and significant as alleged by the theorists and practitioners of a certain "external trade Panglossianism." This paper has a quite limited scope, in the sense that we restrict ourselves to the discussion of further empirical evidence which casts doubt on this "new conventional wisdom" concerning the relationship between export performance and economic growth.

### III. EXPORT PERFORMANCE AND OUTPUT GROWTH: FURTHER EMPIRICAL EVIDENCE

We worked with a fairly large sample constituted of all developing countries for which we could secure comparable data for the period 1960–81. Thus seventy countries having a population of more than one million in 1970 were selected. The large number of observations also gave us enough scope to compare the results of different country groupings and especially to test the hypothesis that the export-GDP link is stronger for middle-income and higher-income developing countries. We used three indicators of export performance, namely, the annual average growth rate of total export volume in 1975 prices; the average ratio of exports to GDP (both in current prices), and the increment in export/GDP ratio (the relative change in each period). As indicators of real output growth we used the growth rate of GDP and the growth rates of non-export output (both variables measured in 1975 prices).<sup>6</sup> The basic data are presented in Table I.

Although the above indicators have been used currently in previous empirical studies, one should keep in mind the limitations and possible biases that are implied by the use of these indicators. As a matter of fact, growth rates and the incremental ratios are influenced by the situation in the initial year. Thus, for instance, there is a certain bias in favor of countries having a small value of exports and/or low export/output ratios in the initial year. With respect to the average export/output ratio, there is another problem in so far as large countries hardly reach a high export/output ratio and, therefore, it can be said that this indicator is biased against large countries. However, one cannot say much about the effect of this bias inasmuch as there is no a priori argument or empirical evidence which shows a systematic positive or negative relationship

<sup>6</sup> The growth rate of real non-export output ( $g$ ) was calculated according to the following:

$$g = \left( y - \frac{x}{y}x \right) / \left( 1 - \frac{x}{y} \right),$$

where

$y$  is the growth rate of real GDP;

$x$  is the growth rate of export volume; and

$\frac{x}{y}$  is the average export/GDP ratio.

TABLE I  
LISTING OF THE DATA USED IN THE ANALYSIS

Country	Cluster	Y/N	Y	YD	X	X/Y	XC
Algeria	1	863	4.9	6.0	1.2	23.6	0.9
Bolivia	1	439	4.8	5.3	2.0	17.1	-0.1
Burma	1	112	5.0	5.7	-3.0	7.8	-0.3
Colombia	1	467	5.4	5.7	2.4	10.3	-0.2
Dominican Rep.	1	511	5.6	6.5	1.4	17.2	-0.4
Ecuador	1	442	6.7	7.9	1.1	17.2	0.2
Egypt	1	316	6.4	7.0	1.2	10.6	-0.1
Iran	1	982	5.1	7.8	-2.9	24.9	-0.2
Kenya	1	233	4.9	5.6	1.8	19.0	0.2
Morocco	1	465	6.5	7.3	1.4	14.6	-0.1
Nigeria	1	488	4.8	5.1	3.0	16.2	0.9
Panama	1	1,000	6.7	7.5	0.4	11.0	0.1
Peru	1	908	4.4	4.7	2.6	14.8	-0.2
Sierra Leone	1	222	4.1	5.7	-1.2	22.5	-1.3
Sri Lanka	1	258	4.8	5.7	0.9	19.9	-0.0
Syrian Arab	1	472	7.8	9.1	-0.5	13.7	-0.0
Tanzania U.	1	153	4.7	6.1	-0.9	19.7	-0.8
Togo	1	264	4.9	5.0	4.1	19.1	0.4
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Argentina	2	1,457	2.9	2.7	5.3	7.6	-0.0
Chile	2	916	3.7	3.6	4.7	13.4	-0.0
Congo	2	625	3.7	3.9	3.2	27.5	3.6
El Salvador	2	394	3.9	3.7	4.4	25.4	0.1
Ethiopia	2	108	3.4	3.4	3.5	7.6	0.1
India	2	139	3.3	3.3	3.9	4.4	0.0
Mali	2	99	2.2	1.9	5.3	8.7	0.6
Nicaragua	2	610	3.7	2.9	6.0	24.7	0.1
Somalia	2	139	2.3	1.6	6.0	15.4	-0.3
Upper Volta	2	130	3.0	2.8	7.4	5.4	0.2
Uruguay	2	1,176	2.2	2.0	3.9	11.3	-0.0
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Angola	3	714	0.5	1.0	-2.1	15.2	-0.8
Bangladesh	3	112	3.1	3.2	1.4	2.3	0.3
Benin	3	169	2.2	2.4	-0.5	7.5	-0.5
Central Africa	3	219	1.0	0.6	3.4	14.5	0.1
Chad	3	159	-0.6	-0.7	0.9	9.3	0.3
Ghana	3	524	1.2	1.4	0.2	17.6	-1.2
Iraq	3	1,117	1.5	4.2	-2.7	38.8	1.6
Jamaica	3	1,509	2.6	2.8	1.8	25.1	0.4
Madagascar	3	267	1.6	1.6	1.3	14.6	-0.1
Mozambique	3	444	2.0	2.4	-3.8	6.8	-0.4
Senegal	3	397	1.5	2.0	-0.8	19.0	0.1
Sudan	3	330	2.9	3.3	-0.5	10.8	-0.4
Trinidad and Tobago	3	2,750	3.2	9.7	-1.2	59.1	0.0
Uganda	3	298	3.2	4.1	-1.6	16.8	-0.7
Venezuela	3	2,785	2.9	5.1	-2.8	27.9	-0.0
Zaire	3	166	1.7	3.9	-4.1	28.4	-1.4
Zambia	3	461	2.4	5.0	0.2	54.3	-3.0
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Brazil	4	837	6.9	6.9	8.0	6.6	0.0
Cameroon	4	384	5.0	4.8	6.0	16.4	0.9

TABLE I (Continued)

Country	Cluster	Y/N	Y	YD	X	X/Y	XC
Costa Rica	4	848	5.4	4.9	7.1	22.6	1.0
Guatemala	4	516	5.4	5.2	6.4	15.5	0.2
Honduras	4	381	4.7	4.4	5.8	26.3	0.5
Indonesia	4	171	5.9	6.2	4.7	18.3	0.6
Israel	4	3,080	6.7	5.9	11.2	16.0	0.8
Ivory Coast	4	534	6.6	6.8	6.2	30.6	0.1
Jordan	4	398	6.0	5.1	13.4	11.3	0.6
Liberia	4	411	4.7	-0.8	7.9	63.4	0.5
Malawi	4	96	6.4	6.2	7.2	15.3	0.8
Malaysia	4	632	7.2	9.7	4.3	47.6	-0.7
Mauritania	4	318	4.3	-3.7	22.4	31.0	1.5
Mexico	4	1,270	6.9	7.0	5.8	5.3	0.1
Niger	4	182	5.2	4.1	14.0	10.8	0.9
Pakistan	4	181	6.3	6.3	5.8	7.7	-0.0
Paraguay	4	465	6.9	7.1	5.1	10.3	-0.2
Philippines	4	317	5.8	5.9	5.2	13.2	0.3
Rwanda	4	103	5.3	4.9	9.1	9.6	0.3
Saudi Arabia	4	3,478	9.8	12.8	8.1	64.6	1.1
Thailand	4	289	7.8	7.8	7.9	15.5	0.2
Korea, Rep.	5	416	8.5	5.1	27.8	14.8	1.5
Tunisia	5	534	6.3	0.9	33.6	16.6	0.7
Libyan Arab	6	8,240	15.3	8.7	21.3	52.4	2.4

Sources: Export and GDP growth rates in constant 1975 U.S. dollars and GDP per capita were derived from UN data sources; for the export share figures we used data from IMF, *International Financial Statistics*, various issues.

Notes: Explanation of column headings:

Y/N=GDP per capita in 1970 in U.S. dollars.

Y=GDP, compound annual growth rate (1960-81).

YD=GDP minus exports compound annual growth rate (1960-81).

X=Exports, compound annual growth rate (1960-81).

X/Y=Exports to GDP ratio (average 1960-81).

XC=Change of export to GDP ratio (average annual 1960-81).

between size and output growth. Another qualifying remark is related to the correlation between non-export output and exports. In this case the ideal procedure would be to subtract from both components of total output the value of the corresponding imports. This type of procedure would imply knowledge of the import intensity of exports and non-export output in the initial and final years of the period under consideration. Of course, the lack of detailed information from input-output tables for a large sample of developing countries has prevented the application of such procedure.

#### A. The Rank Correlation Coefficients

The Spearman rank correlation coefficients are presented in Table II. Looking at the results for the whole sample (Table II, column 1) we find that the export

TABLE II  
SPEARMAN RANK CORRELATION COEFFICIENTS BETWEEN OUTPUT AND  
EXPORT PERFORMANCE FOR SEVENTY DEVELOPING COUNTRIES  
ACCORDING TO INCOME GROUPS, 1960-81

	Total	Low-income Countries	Middle-income Countries	High-income Developing Countries
GDP growth rates and export growth rate	0.494 (0.0001)	0.454 (0.007)	0.347 (0.075)	0.721 (0.018)
Non-export-output growth rates and export growth rates	0.006 (0.957)	0.030 (0.868)	-0.207 (0.298)	0.357 (0.310)
GDP growth rates and average ratio of exports to GDP	0.024 (0.838)	0.064 (0.721)	-0.236 (0.235)	0.284 (0.425)
GDP growth rates and increments in export/ GDP ratio	0.299 (0.011)	0.356 (0.041)	0.302 (0.125)	0.345 (0.328)
Number of observations	70	33	27	10

Source: UNCTAD data bank.

Note: Levels of significance are shown in parentheses.

growth rate and the change in the export/GDP ratio are significantly correlated with GDP growth. If we look at non-export output growth and export growth the correlation does not show any significance at all. The same holds if we take the average ratio of exports to GDP.<sup>7</sup>

The fact that export growth is significantly correlated with GDP growth but not with non-export output growth, indicates that the domestic economy does not seem to benefit much from an improved export performance. In other words, the reason for superior output growth outside the export sector has to be found elsewhere,<sup>8</sup> in the sense that the significant linkage between export growth and GDP growth may be attributed to the accounting relationship between the two variables rather than to growth linkages from the export sector to the non-export sector. This empirical analysis was also extended so as to deal with exports of goods and non-factor services. The result is similar to the one above, that is, the rank correlation coefficients between non-export-output growth and export

<sup>7</sup> We also tested for the relation between GDP growth in the period 1960-81 and the export/GDP ratio in 1970, and we found a negative correlation coefficient for the whole sample. However, according to Kavoussi an important drawback of the export/output ratio as an indicator of export performance is that "it is biased against those economies where the ratio of exports to GNP was high in the initial year of the period over which export performance is to be measured" [17, p. 243].

<sup>8</sup> The possibility of a non-linear relationship was not tested, but the visual inspection of a scatter diagram of export growth and non-export-output growth did not give any hint of such a relationship.

growth are not significant for the whole sample and for different groups of countries classified according to GDP per capita.<sup>9</sup>

As regards the influence of the level of income on the relationship between export performance and output growth, the hypothesis put forth by some authors is that "some basic level of development is necessary for a country to most benefit from export-oriented growth, particularly involving manufactured exports" [38, p. 124]. To test this hypothesis we split our sample into three different groups according to their GDP per capita level in 1970. As low-income countries we defined a group of thirty-three countries having a GDP per capita below U.S.\$400. Middle-income countries are those having a per capita income of U.S.\$400–1,000. High-income countries are those countries with a per capita income above U.S.\$1,000. The disaggregated results do not show a very different picture from the results for the whole sample (see Table II, columns 2–4). Noteworthy is perhaps the fairly strong correlation between GDP and export growth in the high-income developing countries, but even for this group, there is no significant correlation between non-export output growth and export growth, and GDP growth rates and the average and incremental export/GDP ratios. The incremental export/GDP ratio is only significant in the case of low-income countries.<sup>10</sup> This mixed evidence only reflects the oversimplification involved in bivariate tests of the relation between export and economic growth.

In connection with this point it is worth noting that a recent study by Ballance et al. [4, pp. 152–54] showed that the Spearman rank correlation coefficients between exports and output growth in developing countries in the period 1968–74 were mostly negative or nonsignificant for some specific industries, namely, wood products, textiles, clothing, footwear, and furniture. This result brought the

<sup>9</sup> The Spearman rank correlation coefficients were the following:

Whole sample=0.058 (0.631);

33 low-income countries=-0.157 (0.380);

27 middle-income countries=0.139 (0.486); and

10 high-income countries=0.260 (0.467).

The coefficients between parentheses refer to the levels of significance. In this case, the growth rate of non-export output was calculated directly. The values of exports of goods and non-factor services, and GDP, are expressed in constant U.S. dollars at 1975 prices.

<sup>10</sup> Here it is worth mentioning the results of Kavoussi [17, pp. 244–45], who divided his sample of 73 developing countries into two groups: low-income countries and middle-income countries (below and above U.S.\$360 [in 1978 dollars] per capita GNP in 1960, respectively). He found a positive and significant Spearman rank coefficient between growth rates for both groups of exports and GNP. However, when he redefines his sample according to 1978 income levels and uses the U.S.\$360 benchmark, he finds a positive and significant correlation coefficient for a group of 43 middle-income countries, but a nonsignificant correlation coefficient for a group of 30 low-income countries. In addition, the empirical study by Helleiner found "no evidence to support the proposition that the degree of export orientation is associated with growth performance either in Africa or in poor countries more generally" [11, p. 12]. On the other hand, this last study shows that slower GDP growth rates were associated with greater import volume instability in poor countries during the period 1960–80.



authors to the conclusion that there is, at best, a very weak, and perhaps even a negative relationship between export performance and output growth.

Our results at an aggregate level also show the difficulty of establishing a link between export performance and output growth outside the context of specific historical experiences of development and their relations with the international economic system. Besides, it should be said that, although it may occur that export expansion and GDP growth are statistically correlated (if for no other reason than that export is a component part of GDP), it does not imply that an export-led growth, as indicated by, for instance, a higher "trade openness," is associated with superior output performance, neither does it imply a direction of causality. As has been pointed out by Batchelor et al.: "Even where fast export growth and fast domestic growth are found to have been closely associated, it does not necessarily follow, of course, that the latter has been generated by the former; the direction of causation could have been the other way round, and in some cases it probably was" [5, p. 13]. In this regard, it is worth mentioning that in a recent paper Jung and Marshall, who perform causality tests between exports and output growth, come to the conclusion that "the statistical evidence in favour of export promotion is not as unanimous as was previously thought" [16, p. 11].

#### B. *The Regression Equations*

At this juncture, it is worth addressing the analysis to the following question: given the positive correlation between the ranks of countries that seems to exist between export and output growth, what can be said about the direct contribution of export growth to income growth? A paper by Emery [9] based on data for a sample of fifty developed and developing countries in the period 1953–63 found as a "rule of thumb" that a 2.5 per cent increase in exports would lead to a 1 per cent expansion of the per capita real GNP. Other studies showed that the coefficient ( $b$ ) of exports growth ( $x$ ) to income growth ( $y$ ) in a simple model ( $y = a + bx$ ) would vary negatively with the share of food products in total exports [37], and it would vary significantly according to the period of analysis and the sample nature and size.<sup>11</sup>

We estimated ordinary least squares regressions of growth in GDP on growth in exports for our sample of seventy developing countries according to income groups. The results are shown in Table III, in which we note that for the whole sample the coefficient relating export growth to income growth is positive and significant (+0.18), but the explanatory power of the model is rather low ( $R^2 = 0.254$ ). When we look into the equations disaggregated by the income level, we see that the correlation between exports and output growth is much higher for higher-income developing countries. Both regression coefficients and  $R^2$  values are considerably lower for the two groups of middle-income and low-income developing countries. This means that with rising income levels the capacity

<sup>11</sup> See the differences in the coefficients of the regression of growth of output on growth in exports, as shown in Table 7.4 in Batchelor et al. [5, p. 205].

TABLE III  
 ORDINARY LEAST SQUARES REGRESSIONS OF GROWTH IN GDP ON GROWTH  
 IN EXPORTS OF SEVENTY DEVELOPING COUNTRIES  
 ACCORDING TO INCOME GROUPS, 1960-81

Income Group	Number of Observations	Constant	Coefficient on Export Growth	$\bar{R}^2$
Developing countries	70	0.038 (12.553)	0.181 (4.816)	0.254
Low-income countries	33	0.034 (8.967)	0.130 (2.234)	0.138
Middle-income countries	27	0.046 (11.380)	0.102 (2.354)	0.181
High-income countries	10	0.026 (3.346)	0.534 (5.754)	0.805

Source: UNCTAD data bank.

Note: The figures in parentheses are the  $t$  values.

of the export sector to affect growth of the whole economy increases. If one looks at the average export/GDP ratio it becomes obvious that most of the exports-to-GDP link is due to a higher share of exports in total GDP. The share of exports in GDP is 31 per cent in the group of high-income developing countries, whereas it is 15 and 21 per cent for the groups of low-income and middle-income developing countries.

It is worth emphasizing that the estimated regression coefficient is, in the case of high-income developing countries, about four and five times that of the low-income and middle-income countries, respectively. Thus, whereas an increase of 2 per cent of exports is associated with an increase of 1 per cent in GDP of the highest income group, this same result is only achieved for the low-income and middle-income countries with an increase of 8-10 per cent in exports. It should be noted that in our sample the two poorest groups include sixty countries, that is, about 86 per cent of the total sample. At this juncture it is interesting to mention that the projections made by the International Monetary Fund for the period 1985-90 and by the World Bank for the period 1985-95 indicate average growth rates of export volume for developing countries in the range of 4-6 per cent.<sup>12</sup> This would mean that in the next ten years or so, assuming that the relationship between export growth and income growth does not change, a growth of export of approximately 5 per cent would indicate an overall growth

<sup>12</sup> See [15, p. 220] [14, p. 36]. In the former, the projected annual average growth rate of export volume of all non-oil developing countries is 5.4 for the period 1985-90, but this rate varies from 2.8 per cent for net oil exporters to 6.0 per cent for net oil importers, whereas the projected rate for major exporters of manufactures is 6.7 per cent, and for low-income countries the projected rate is about 4.4 per cent. The World Bank projections for the period 1985-95, on the other hand, show a range of 4.7-6.4 per cent for all developing countries.

of developing countries' GDP of approximately 1 per cent, which is about half of the estimated projected population growth rate for the years ahead.<sup>13</sup>

With respect to the changes in the differential impact of export growth over time, it is worth pointing out that, in a recent paper, Ram [27] showed that the relationship between exports and output growth improves during the period 1970–77 in comparison with the 1960s. In addition, he found that the differential in the impact of exports growth in the low-income and middle-income developing countries almost disappears in the period 1970–77. We also carried out a comparative analysis of the relation between export and output growth in the periods 1960–70 and 1970–81, and our results concerning the OLS regressions of growth of GDP on growth of exports confirm the conclusions of Ram, who found an improvement of the coefficients of export growth for the low-income and middle-income developing countries between the 1960s and the period 1970–77. While for these two groups of countries no significant relationship between growth of exports and growth of GDP has been found in the 1960s, the situation changes completely in the 1970s, so that in both cases the estimated coefficients proved to be significant. Nevertheless, the impact of exports on GDP growth remains much stronger in the group of high-income developing countries. In addition, the tests of rank correlation showed no clear pattern in terms of a significant improvement or deterioration in the relation between the other indicators of export performance and output growth.<sup>14</sup> This difference in the findings does not seem to be simply the result of the use of different periods of time, data, methodologies, and indicators of export performance or output growth. As a matter of fact, it reflects the fragility of the export promotion hypothesis itself.

### C. *Cluster Analysis*

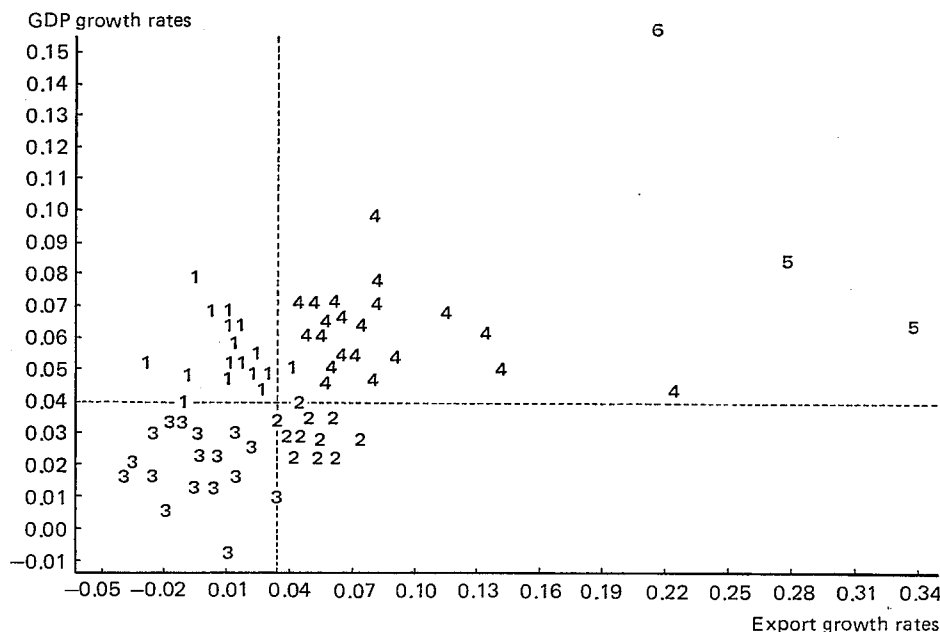
To complement the above analysis we estimated ordinary least squares regressions of growth of GDP on growth of exports for groups of developing countries which were formed according to their past export and GDP growth performances. The grouping of countries was done with the cluster analysis taking export growth and GDP growth for the whole period 1960 to 1981 as variables. This cluster analysis was based on Ward's method of clusters formed by hierarchical fusion.<sup>15</sup> The aim of the regression analysis according to clusters is to find out whether the strength of the empirical relationship between export and GDP is mainly due to between-group variation—groups of “good” and “bad” performers—or whether in addition it is also possible to explain within-group variations.

<sup>13</sup> Of course, this kind of simple “extrapolation” is not supposed to be a realistic forecasting exercise since it neglects other variables which influence GDP. Besides, the stability of this kind of regression is not necessarily to be expected. Our objective is just to call attention to the risks and flaws of overly optimistic views about the impact of export-led strategies.

<sup>14</sup> Details concerning the statistical tests are available from the authors.

<sup>15</sup> See [10] for a discussion of the clustering techniques. Besides Ward's minimum variance hierarchical cluster method, we also applied the centroid method and the average linkage hierarchical method. However, the results were not very different from those of Ward's method.

Fig. 1. GDP Growth versus Export Growth Rates, 1960-81



- Notes: 1. Symbol is value of cluster.  
2. One observation hidden.

In the scatter diagram (Figure 1) we have plotted the data for our sample of seventy developing countries, and each is represented by the number of the cluster in which the country is classified. The diagram is also divided into quadrants in order better to distinguish the groups of countries' clusters.<sup>16</sup> In the southwest quadrant we find cluster 3, that is, countries which had a poor export and output performance; in the southeast quadrant we have cluster 2, which includes countries which had a high export performance, but a poor output performance; the northeast quadrant consists of clusters 4, 5, and 6, which include countries which had a high export and output performance; and, finally, in the northwest quadrant, we have cluster 1 formed by countries which had a poor export performance but a high output performance. The results of the regressions (see Table IV), which were done for the individual clusters, are all nonsignificant. It is thus evident that the hypothesis of export-led growth does not give any guidance when it comes to explaining GDP growth differentials for countries which have had similar past economic performances. Accordingly, the positive relationships between export and output performances that have been reported seem to be due mostly to variations between countries with high growth rates and other countries with low growth rates.

<sup>16</sup> The horizontal and vertical axes in the diagram were placed at 4.0 per cent and 3.3 per cent for GDP growth rates and export growth rates respectively.

TABLE IV  
ORDINARY LEAST SQUARES REGRESSIONS OF GROWTH IN GDP ON GROWTH  
IN EXPORTS OF SEVENTY DEVELOPING COUNTRIES  
ACCORDING TO CLUSTERS, 1960-81

Cluster	Economic Characteristics of Clusters				OLS Regressions			$\bar{R}^2$
	Average Per Capita Income	Average Annual Growth Rate of Exports	Average Annual Growth Rate of GDP	Average Export/GDP Ratio	Number of Observations	Constant Term	Coefficient of Export Growth	
1	477	0.8	5.4	16.6	18	5.436 (20.732)	-0.040 (-0.313)	0.006
2	527	4.9	3.1	13.8	11	3.818 (4.713)	-0.142 (-0.888)	0.080
3	731	-0.6	1.9	21.6	17	1.897 (6.990)	-0.064 (-0.501)	0.016
4	709	8.2	6.2	21.8	21	6.890 (11.563)	-0.089 (-1.377)	0.090
5	475	30.7	7.4	15.7	2	—	—	—
6	8,240	21.3	15.3	52.4	1	—	—	—

Source: UNCTAD data bank.

Note: The figures in parentheses are the *t* values.

The question therefore remains to be answered. What are the relevant structural features of a country with a superior GDP performance? Greater export growth alone does not seem to explain why a given country has a higher output growth in relationship to other countries which had a similar export and GDP growth record. The nonsignificant results that we obtained for all of the cluster groupings make it clear that one has to look for other than simple relationships in order to understand better the growth differentials between developing countries. In this regard, if we look at the different characteristics of our clusters we note two important aspects.

First, a comparison of the clusters with a high output performance (i.e., clusters 1 and 4) shows that the difference between average annual growth rates of exports was 1 to 10 (i.e., the average exports growth rates of 0.8 per cent and 8.2 per cent for clusters 1 and 4 respectively), whereas the difference in average annual growth rate of GDP was approximately 15 per cent (i.e., average GDP growth rates of 5.4 per cent and 6.2 per cent respectively). In other words, for the period 1960-81 a group of eighteen countries had quite a poor performance; whereas another group of twenty-one countries had a high export performance; however, the difference in the output performance of these two groups was not markedly significant in this period.

Second, when comparing the clusters of countries which had a relatively poor output performance (i.e., clusters 2 and 3) one notes that it is precisely the cluster with the second highest average export/output ratio (cluster 3) which had the poorest export and output performance for the whole sample. The average

trade-openness ratio of cluster 3 is almost 60 per cent higher than the trade-openness ratio of cluster 2. At this juncture, it is worth noting that twelve out of seventeen countries in cluster 3 are Sub-Saharan African economies whose trade openness reflects their degree of dependence and vulnerability vis-à-vis the world economy. Indeed, the most prominent among the common features of Sub-Saharan economies is, in addition to their small size, the fact that two or three primary commodities account for most of their export revenue.

What this evidence shows is that, although at the aggregate level there apparently may exist a positive statistical correlation between export expansion and GDP growth, the evidence also points to the fact that experiences have varied from country to country, so that taking into account the complexity and heterogeneity of the historical processes one should avoid broader generalizations regarding the relationship between export and output performance. This does not mean that one should not carry out comparative analysis of different experiences of export expansion and economic growth. On the contrary, the argument is that it is important to compare the historical processes of different countries. (How fruitful would it be, for instance, to compare specific experiences of development of countries in the northwest quadrant with those in the northeast quadrant?) However, one should avoid the bias involved in comparing, at the aggregate level, high export and output performers with poor export and output performers, and based on that, drawing strong conclusions concerning the "superiority" of the export-led growth model.

#### IV. CONCLUSION

Bivariate tests on the statistical significance of the relationship between export performance and output growth seem to conceal much more than they reveal. It is the argument in this paper that the experiences of countries regarding the relationship between export expansion and the process of economic growth have varied widely, so that one should exercise extreme caution concerning broad generalizations. The fact that this relationship depends on third variables whose measurement is difficult should discourage the indiscriminate use of bivariate tests and the drawing of strong conclusions on that basis. Thus, although foreign trade in general, and exports in particular, are elements in the growth process, their relations and effects should be judged on a case-by-case basis. The argument put forth by Kravis concerning the experiences of the nineteenth century may be applied for the twentieth century: "It is not so clear to what degree... was export expansion by periphery countries the differentiating factor determining the extent and quality of their growth" [18, p. 858].

The empirical analysis presented in the paper shows that, although at the aggregate level there apparently may exist a positive statistical rank correlation between the growth rates of export and GDP, this is not so evident when one takes into account other indicators of export performance. Indeed, the mixed evidence only reflects the oversimplification and ahistoricism involved in bivariate tests of the relation between export performance and output growth. Through

a combination of simple regression and cluster analysis it is possible to show, for instance, that the hypothesis of export-led growth does not give any guidance when it comes to explaining GDP growth differentials for countries which have had similar past economic performances. As far as the cluster analysis is concerned, our results show that the coefficients of the regressions of GDP growth on exports for any cluster is not statistically significant. In addition, our findings show that for the clusters characterized by a high output performance the difference between export growth rates is not remarkable, whereas the difference between export growth rates is enormous. Also, the cluster of countries characterized by a poor export and output performance consists mostly of economies of small size, a low level of capital accumulation, great structural problems, and a high degree of dependence and vulnerability vis-à-vis the world economy.

To conclude, in so far as the effects of export performance on economic development depend on the structure of the economy and on its specific relations with the international economic system, one may conclude that attempts to identify direction of causation between exports and output growth through bivariate tests yield misleading results, which are even more unacceptable if they are cited to support broad and strong generalizations regarding adjustment and development strategies.

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