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# TOTAL FACTOR PRODUCTIVITY GROWTH AND EXPORT-LED STRATEGIES: REVIEWING THE CROSS-COUNTRY EVIDENCE*

Armando Castelar Pinheiro**



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ABSTRACT

In this paper we review, examine and comment the empirical literature that relies on cross-country statistical analyses to show that export orientation has a positive and significant impact on total factor productivity growth. We comment the work reviewed along four lines. First, we address the question of properly identifying the degree of export bias of an economy and the ways by which exports and growth are related. Second, we consider the sensitivity of the results to sample and period selection. Third, we review the evidence with respect to the direction of causality between export and output growth. Finally, we extend the analysis beyond the single-equation cross-country regression model to see the relevance of specification problems. Our main conclusion is that, although adequate to search for stylized facts, the cross-country model is not the best way to examine the association between total factor productivity growth and trade orientation.

# I. INTRODUCTION

The impressive growth rates achieved by outward-oriented economies over the last two decades have led to a flourishing literature where export growth is assumed to have both a direct and an indirect impact on output expansion. Four different reasons are cited to explain this link.[1] First, external markets are larger than domestic: by exporting, the country can specialize in a few industrial sectors, exploit economies of scale, and avoid problems of indivisibilities in production. Second, exports earn needed hard currency, allowing the country to relax the foreign exchange constraint at the same time that advanced technology embodied in capital and intermediate goods can be widely absorbed. Third, by competing in external markets and liberalizing imports, the country becomes more efficient in production, with firms being pressured to increase productivity. Finally, feedbacks to economic policymakers and flexibility of the economy are enhanced in an export promotion strategy.

Many of the empirical studies that have tried to assess the impact of export expansion on output growth have focused on individual countries and have examined in detail the impact of following a specific trade strategy. Balassa (1980b) derived some evidence against inward-oriented strategies by comparing production costs in the U.S. and in a hypothetical LDC. Bergsman (1974) estimated the costs of protection as a percentage of GNP to be 7.1% in Brazil, 2.5% in Mexico, 5.9% in Pakistan and 3.6% in the Philippines. Balassa and associates (1980) estimated this figure to be 6.2% in Chile in 1966. Krueger (1966) estimated the cost of protection in Turkey to be equivalent to 7% of its GDP. Nogues (1981) found that, in Argentina, "the direct impact of removing some of the distortions would be at the minimum increase by 16 percent of the labor-value-added ratio of the manufacturing sector."[2]

However, Kubo, Robinson, and Urata (1986), working with a dynamic input-output model, showed that imposing Korea's trade structure on Turkey would actually lead to slightly lower GDP growth rates. The simulation of an inward-oriented Turkish strategy in Korea caused GDP to grow only slightly

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[1] See Keesing (1979), Bhagwati (1978), Krueger (1978, 1984a, 1985) and Balassa (1980) for a more detailed discussion.

[2] See also Little, Scitovsky and Scott (1970), Donges (1976), Balassa (1978a), Krueger (1978), Bhagwati (1978) and Schenzler (1982).

more slowly. Also, most models in Srinivasan and Whalley (1986, eds.) "report welfare impacts from trade policy that as a fraction of the gross national product (GNP) are relatively small."

In general, the simulation of open strategies on inward-oriented economies leads to very small increases in GDP, especially if one takes into account the extent of structural change assumed in these exercises. As illustrated by Bhagwati (1978), "while there are numerous microeconomic changes that accompany devaluation, liberalization, and altered bias, it was not possible to detect significant effects of those changes on growth performance."

Attention has been turned, then, to the long-run effects of changes in strategies (Bhagwati (1978)), or, as posed by Bruton (1967), after the handicapping effects of resource misallocation on productivity growth had vanished.[3] As a consequence, an increasing number of studies have tried to test the hypothesis that export orientation has a positive and significant impact on the economy's rate of total factor productivity change.

In a typical study of ten semi-industrialized countries, Balassa (1978b) concluded that if in the 1966-73 period Korea, Taiwan, India and Chile had expanded their exports at sample average growth rates, per capita GNP would have been 42.5% lower in Korea, 32.6% lower in Taiwan, while 21.8% larger in India and 21.4% larger in Chile. These numbers exemplify the more significant impact found for trade orientation when the cross-country analysis is used.

As Lal and Rajapatirana (1987) argued, however, "at best this provides a stylized fact, not a theory." In fact, it is still hard to believe that exports could be "that free lunch economists have long sought for." Of late, several qualifications have been raised in the literature questioning the evidence provided by these cross-country studies.

In this paper we analyze these studies, with two objectives in mind: first, to review the extensive, and conflicting, literature on cross-country correlation and regression analyses of growth and export orientation; second,

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[3] See Leibenstein (1966) for an elaboration of this point.

to evaluate whether this sort of methodology is adequate to test the existence and magnitude of these supply-side effects of export orientation. Our main conclusion is that it is not.

The literature review is in the next section. After that, we try to qualify the results previously reported, looking at four different types of problems: identification, sample/period selection, causality direction, and specification problems. Section 4 summarizes the main conclusions.

## II. A REVIEW OF THE EVIDENCE

### II.1 Cross-Country Correlation Analysis

Among the first to statistically test the relationship between export and output growth were Emery (1967), Maizels (1968) and Kravis (1970): they all found a positive and significant correlation between the two variables. This earlier work, however, was criticized by Michaely (1977): since exports are part of aggregate output, a positive correlation between them should in fact be expected, irrespective of any effects on aggregate supply.[4] To avoid this problem, Michaely correlated the growth rates of per capita output and of the share of exports in national product, using period (1950-1973) average values for these variables for 41 less-developed countries, and obtaining a positive and significant correlation.

Heller and Porter (1978) criticized Michaely's article -- with a later reply by Michaely (1979) -- arguing that he was in fact guilty of the same sin of his predecessors, that is, confusing an identity-based correlation with a behavioral association. Using the data from Michaely's original paper, Heller and Porter (1978) correlated the growth rates of the nonexport components of output and of exports, both in per capita terms. They found a significant Spearman rank correlation coefficient between these two rates, which they assumed to reflect indirect effects of exports on the rest of the economy.

Balassa (1978b) also estimated the Spearman rank correlation coefficient

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[4] In fact, as pointed out by Michaely (1977), Heller and Porter (1978), Taylor (1983), and others, a positive correlation between export expansion and GDP growth simply reflects a relatively constant share of exports in GDP.

between output growth and a set of different variables representing trade orientation. He limited his sample to eleven semi-industrialized countries and used average growth rates for the 1960-66 and 1966-73 periods. Balassa found reasonably high values for the correlation coefficients between export orientation and GNP growth.

Tyler (1981) criticized Balassa's article for using a small and biased sample. Tyler himself worked with a sample of 55 middle-income countries, extending the set of variables to be correlated with GDP growth and using average growth rates for the 1960-77 period. Finally, Kavoussi (1984) extended Tyler's sample to include low-income developing countries. He worked with a set of 73 countries and average growth rates for the 1960-78 period. Both authors found positive and statistically significant correlations between export and output growth.

Table 1 summarizes the results obtained by these various authors. The association between export growth and output growth is found to be always positive, even though it varies significantly depending on the variables used to represent export orientation, on the sample of countries, and on the period used in the analysis.[5]

[5] See Boggio (1988) for similar results for developed countries.

TABLE 1

SPEARMAN RANK CORRELATION BETWEEN OUTPUT AND EXPORT GROWTH

| | Emery+ (1953--63) | Michaely (1950--73) | Heller& Porter (1950-73) | Balassa (1960--73) | Tyler (1960--77) | Kavoussi (1960--78) |
|---|---|---|---|---|---|---|
| x, y-p | 0.82** | | | | | |
| x-y, y-p | | 0.38** | | | | |
| x, f | | | 0.45** | 0.77** | | |
| x, y | | | | 0.89** | 0.47** | 0.54** |
| CX/CY, y | | | | 0.81** | | |
| CX/CY, f | | | | 0.58* | | |
| x-y, y | | | | 0.78** | | |
| X/Y, y | | | | 0.70** | | |
| m, y | | | | | 0.73** | |
| i, y | | | | | 0.64** | |
| dfi, y | | | | | 0.30* | |
| xm, y | | | | | 0.43** | |

Notes: 1) + Pearson correlation, * significant at the 5% level, ** significant at the 1% level.
2)X, XM, Y, P, I, F, M, DFI stand, respectively, for exports, manufactured exports, GNP, population, gross domestic investment, nonexport components of output, manufacturing output and direct foreign investment.
3)Low-key letters stand for rates of change, and the C operator for absolute changes.



## II.2 Cross-Country Regression Analysis

Although of some relevance, the simple correlation between export and output growth, whatever way the variables are measured, does not provide a solid test for our hypothesis. Many other variables that affect output growth in a significant way are omitted from the analysis, including, among others, the growth of capital and labor services.

A more rigorous way of testing the impact of export growth on output expansion was developed after the pioneering work of Michalopoulos and Jay (1973). They assumed the existence of a meta-production function where exports (X) were introduced as a third factor of production (capital (K) and labor (L) were the other two). The formal derivation for a characteristic country j goes as follows:

$$Y^j = F^j( K^j(t), L^j(t), X^j(t), t) \qquad (1).$$

Taking derivatives with respect to time on both sides,

$$\frac{dY^j}{dt} = \partial Y^j/\partial t + F^j{}_k(K^j,L^j,X^j)\ dK^j/dt + F^j{}_l(K^j,L^j,X^j)\ dL^j/dt +$$

$$+ F^j{}_x(K^j,L^j,X^j).dX^j/dt \qquad (2).$$

Assuming that all countries share the same technology,

$$\frac{dY^j}{dt}\frac{1}{Y^j} = v^j + F_k(K^j,L^j,X^j)\ \frac{I^j}{Y^j} + F_l(K^j,L^j,X^j)\ \frac{L^j}{Y^j}\frac{dL^j/dt}{L^j} +$$

$$+ F_x(K^j,L^j,X^j)\ \frac{X^j}{Y^j}\frac{dX^j/dt}{X^j} \qquad (3).$$

Where I stands for investment and v is equal to $(\partial Y/\partial t)/Y$. If F(.) has constant elasticities of output with respect to its inputs, then expression (3) reduces to

$$y^j = v^j + a\ \frac{I^j}{K^j} + b\ l^j + c\ x^j \qquad (4);$$

or, assuming a constant marginal physical product of capital for all countries,

$$y^j = v^j + F_k\ \frac{I^j}{Y^j} + b\ l^j + c\ x^j \qquad (5);$$

where a, b and c are the elasticities of output with respect to each of the inputs, $F_k$ is the common marginal physical product of capital and l and x represent, respectively, relative changes in L and X.

Defining total factor productivity growth (TFPG) as the growth of output net of the expansion in total input, we see that expressions (2) to (5) imply that TFPG is a linear function of the rate of export growth:

$$TFPG^j = y^j - a\ \frac{I^j}{K^j} - b\ l^j = v^j + c\ x^j \qquad (6).$$

Empirical tests were conducted using country period averages for the growth rates of the variables as the unit of observation, since in this way one can reduce the importance of short-run demand side fluctuations. That is, output growth will closely represent the actual expansion of potential aggregate supply.[6]

Michalopoulos and Jay (1973) worked with a cross-section of 39 countries, with variables defined as averages for the 1960-66 period. Adding exports as a third factor of production raised the coefficient of determination from 0.53 to 0.71 (Table 2).

Balassa (1978b) estimated a similar sources of growth model with pooled data for ten countries, covering the 1960-66 and the 1966-73 periods. He reached results analogous to those of Michalopoulos and Jay (1973), that is, that trade orientation towards exports has beneficial effects on GNP growth "over and above the contributions of domestic and foreign capital and labor" (Table 2).

Tyler's (1981) paper is similar to Balassa (1978). He expanded the analysis to the 1960-77 period and worked with a sample of 55 middle-income developing countries. Instead of using the share of investment in GNP, Tyler uses the growth rate of gross investment (i) as a proxy for the rate of growth of the stock of capital. So, he actually estimates a regression for expression[7]

$$y = v + a\,i + b\,l + c\,x \qquad (7).$$

Tyler (1981) found "empirical evidence demonstrating a strong cross-country association between export performance and GNP growth." Tyler's results were not, however, as statistically significant as those of Balassa (1978b) and Michalopoulos and Jay (1973).

A more detailed analysis, both theoretically and empirically, was conducted by Feder (1982). He divided the economy in two sectors: one

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[6] To estimate the regressions, $v + u^j$ is substituted for $v^j$, where v is a constant and $u^j$ a normally distributed, zero mean, random error term.

[7] In the rest of this paper we will drop the country superscript j.

producing domestic goods (D) and the other only exports (X).

$$D = F( K_d(t), L_d(t), X(t) ) \quad (8),$$

$$X = G( K_x(t), L_x(t) ) \quad (9),$$

$$Y = X + D \quad (10).$$

He further assumed that the ratios of marginal physical products of capital ($G_k/F_k$) and labor ($G_l/F_l$) were constant across sectors, and that the marginal physical product of labor in the nontradable sector was proportional to output per worker in the entire economy,

$$(G_k/F_k) = (G_l/F_l) = 1 + \delta \quad (11),$$

$$F_l = \theta.(Y/L) \quad (12).$$

After taking derivatives with respect to time, introducing (10), and going through some algebra we get to

$$y = v + F_k \frac{I}{Y} + \theta\, l + (F_x + \delta/(1+\delta)) \times \frac{X}{Y} \quad (13).$$

Feder's model includes two effects of exports on economic growth: first, an output gain that results from the reallocation of resources from the low productivity nonexport sector to the high productivity export sector (for $\delta>0$); second, a positive externality generated by exports on the rest of the economy (for $F_x>0$). Equation (12) can be further manipulated to allow the identification of these individual effects. For that, one has to make the extra assumption that

$$F_x = c\,(D/X) \quad (14);$$

that is, a constant elasticity of nonexport output with respect to exports, which allows one to express the growth of GDP as

$$y = v + F_k \frac{I}{Y} + \theta\, l + (\delta/(1+\delta) - c) \times \frac{X}{Y} + c \times \quad (15).$$

As Feder (1982) noted, the work of most of his predecessors can be seen as particular cases of his tests, since before no room had been explicitly allowed for resource reallocation in the economy.[8] Assuming that marginal physical products of capital and labor are the same in both sectors ($\Sigma$=0), expression (13) becomes equivalent to (3), while also eliminating intersectoral externalities ($F_X$=c=0) (13) is reduced to the usual supply sources of growth model.

Feder (1982) worked with a sample of 31 semi-industrialized LDCs, for the 1964-1973 period. His conclusions follow the pattern: "This paper provides evidence supporting the view that the success of economies which adopt export-oriented policies is due, at least partially, to the fact that such policies bring the economy closer to an optimal allocation of resources." Finally, he tested and accepted the hypothesis that exports provoke beneficial intersectoral externalities and that social marginal factor productivities are higher in the export sector than in the rest of the economy (Table 2).

Kavoussi (1984) returned to total factor productivity growth as the liaison variable between export and output growth. Like Tyler (1981), Kavoussi used the growth rate of gross investment (i) as a proxy to I/K. He found c, in expression (7), to be positive and significantly different from zero, concluding that "export expansion enhances the growth of total factor productivity".

Balassa (1985) extended his earlier work to test the influence of exports on growth in the period between the oil shocks (1973-1978). He also enlarged his country sample to cover 43 developing countries "from the least developed countries to the newly industrializing countries." His results were similar to those of earlier articles.

Ram (1985) estimated equation (5) using data for 73 LDCs, covering the 1960-70 and the 1970-77 periods (Table 2). As before, the results suggest a significant impact of export growth on output expansion. Additional evidence in favor of exports as an engine of growth is provided by Ram(1987). He conducted an extensive empirical analysis, allowing for various specifications

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[8] Compare expressions (5) and (15). As we shall see, however, Feder's model is very similar to, and in a certain way an adaptation of, Robinson's (1972) two-sector model.

of the production function, that included (i) cross-country regressions for the 1960-72 and the 1973-82 periods, and (ii) individual country time-series regressions, basically covering the 1960-82 period. Both his cross-section and time-series results support the conclusion that rapid expansion of exports enhances the growth of GDP.

TABLE 2
EXPORTS AS A SUPPLY SOURCE OF GROWTH: EVIDENCE FROM CROSS-COUNTRY REGRESSIONS

| SOURCE | a | I/Y $S_{ex}/Y$ | $S_{nx}/Y$ | l | x | xm | ...(X/Y) | $R^{2*}$ |
|---|---|---|---|---|---|---|---|---|
| Michalopoulos & Jay(1973) | * | 0.25 (7.81) | 0.20 (3.35) | 0.66 (2.44) | | | | 0.53 |
| | * | 0.24 (9.62) | 0.12 (2.33) | 0.60 (2.81) | 0.04 (4.82) | | | 0.71 |
| Balassa (1978) | ** | 0.18 (3.23) | 0.30 (2.42) | 1.09 (1.74) | | | | 0.58 |
| | ** | 0.15 (3.33) | 0.23 (2.40) | 0.97 (1.99) | 0.04 (3.57) | | | 0.77 |
| Tyler (1981) | 1.991 | 0.284 (7.077) | | 1.060 (2.739) | | | | 0.66 |
| | 1.997 | 0.254 (5.921) | | 0.981 (2.576) | 0.057 (1.694) | | | 0.69 |
| | 1.745 | 0.236 (5.272) | | 1.014 (2.704) | | 0.045 (2.227) | | 0.71 |
| Feder (1982) | -0.010 (-0.554) | 0.284 (4.311) | | 0.739 (1.990) | | | | 0.37 |
| | 0.002 (0.180) | 0.178 (3.542) | | 0.747 (2.862) | | | 0.422 (5.454) | 0.69 |
| | 0.006 (0.596) | 0.124 (3.009) | | 0.696 (3.399) | 0.131 (4.239) | | 0.305 (4.571) | 0.81 |
| Kavoussi (1984) | 2.14 (3.93) | 0.291 (6.87) | | 0.440 (1.71) | | | | 0.49 |
| | 2.01 (4.00) | 0.241 (5.84) | | 0.400 (1.69) | 0.105 (3.72) | | | 0.57 |
| Balassa (1985) | -10.067 (-0.721 ) | 0.181 (3.458) | | 1.128 (1.625) | | | | 0.21 |
| | -2.094 (-0.154) | 0.114 (2.013) | | 0.920 (1.394) | 0.182 (2.457) | | | 0.30 |
| Ram(1985) | | | | | | | | |
| 1960-70 | -0.685 (-0.80) | 0.161 (4.06) | | 1.104 (4.17) | 0.094 (2.53) | | | 0.46 |
| 1970-77 | -1.034 (-0.31) | 0.130 (3.04) | | 1.071 (2.51) | 0.124 (3.20) | | | 0.46 |
| Ram(1987) | | | | | | | | |
| 1960-72 | ** | 0.090 (3.25) | | 0.515 (2.20) | 0.180 (4.59) | | | 0.38 |
| 1973-82 | * | 0.134 (3.95) | | 0.457 (1.51) | 0.302 (6.17) | | | 0.44 |

Note: See Table 1 for description of variables.
* No constant term reported.

## III. EXPORTS AND ECONOMIC GROWTH: CONTRADICTORY EVIDENCE

The studies reviewed here have shown that a positive and statistically significant correlation exists between export expansion and GDP growth, even when controlling for the increase in the stock of factors of production. The regularity of these results has led Boggio (1988) to call them an "empirical law." As Lal and Rajapatirana (1987) argued, however, "at best this provides a stylized fact, not a theory." In fact, it is still hard to believe that exports could be "that free lunch economists have long sought for."

The results discussed above can and have been disputed in several ways, some of which will be considered here. In order to organize the text, we have grouped our considerations in four different categories: identification, sample/period selection, causality direction, and specification problems.

### III.1 Identification

The first identification problem we address has to do with the question of "correctly" defining the degree of export-orientation of an economy: "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."[9] A positive association between export expansion and GDP growth simply reflects a relatively constant share of exports on GDP. As Fishlow (1985) has argued, to test the hypothesis that a bias in favor of exports enhances growth rates "requires the calculation of the relationship between aggregate performance and the extent to which the rate of growth of exports exceeds overall growth."[10]

These qualifications have been disputed by several authors (Balassa

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[9] Michaely (1977).

[10] Note that the Michaely/Fishlow measure captures the disequilibrium nature of a biased strategy. The growth of exports can exceed that of GDP only for a period, whereas a positive growth of exports can go on forever. Furthermore, their measure makes the impacts of export promotion and import substitution comparable - import growth, too, can fall short of GDP growth only for some time.

(1978), Tyler (1981), Kavoussi (1984) and Ram (1985)). Kavoussi (1984) summarized their counterarguments in a passage fully quoted below:

> Growth of GNP can only be caused by the growth of factors of production and technical progress. In a country where resources have not been growing rapidly and technical progress has been slow, RY (growth rate of output) cannot be very high regardless of the level of RX (growth rate of exports). In such a situation, a high RX will simply cause a very low RF (rate of growth of domestically produced final demand). That is, a high rate of growth of exports can be accomplished only through a slowdown of import competing sectors. A positive correlation between growth rates of exports and GNP will occur, if and only if export expansion is accompanied with a rapid growth of resources and/or major gains in factor productivity. Although there are ample a priori reasons why a high rate of export growth may stimulate capital accumulation and technical progress, contrary to Michaely's assertion, the correlation between export growth and economic performance is by no means automatic simply because exports are themselves part of GNP.

An interesting point about Kavoussi's argument is that it applies equally in full to any component of aggregate demand, be it exports, government consumption, private consumption or investment.[11] According to this argument, there are no a priori reasons why, in the long run, the correlation between output expansion and, for instance, consumption growth should be significant.

In Table 3 we report the values obtained for correlations between output growth and a set of macroeconomic aggregates. Three observations deserve special remarks. First, as should be expected, correlations for the growth of shares are smaller and less significant than for the growth of the variables themselves. Second, the correlation between the growth of the share of exports and of GDP is not statistically significant for three of the six periods examined. Third, if one were to decide with respect to economic policy based on these correlations, consumption and not exports should be encouraged.

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[11] In fact, Ram (1987) included both exports and government expenditure as factor inputs in his production function . He obtained not only a statistically significant coefficient for this last variable but also a higher value for $R^2$ than when exports alone were considered.

TABLE 3

ESTIMATED PEARSON CORRELATION COEFFICIENTS BETWEEN GROWTH OF OUTPUT AND OF EXPORTS, IMPORTS, INDUSTRIAL AND MANUFACTURING OUTPUT, INVESTMENT, AND GOVERNMENT AND PRIVATE CONSUMPTION

| VARIABLE | 1960-70 | 1965-73 | 1970-77 | 1965-80 | 1973-84 | 1980-86 |
|---|---|---|---|---|---|---|
| x | 0.678** | 0.549** | 0.426** | 0.471** | 0.433** | 0.62** |
| m | 0.485** | 0.513** | 0.468** | 0.72** | 0.599* | 0.665** |
| INDG | | 0.789** | | 0.844** | 0.872** | 0.872** |
| INVG | 0.623** | 0.559** | 0.569** | 0.724** | 0.741** | 0.623** |
| GOVG | 0.397** | 0.662** | 0.400** | 0.497** | 0.567** | 0.603** |
| PCG | 0.774** | 0.829** | 0.773** | 0.872** | 0.875** | 0.751** |
| x - y | 0.457** | 0.106 | 0.034 | 0.432** | 0.020 | 0.594** |
| m - y | -0.162 | 0.041 | 0.153 | 0.696** | 0.185 | 0.638** |
| INDG - y | | 0.332** | | 0.398** | 0.526** | 0.497** |
| INVG - y | 0.601** | 0.524** | 0.547** | 0.702** | 0.721** | 0.600** |
| GOVG - y | 0.347** | 0.623** | 0.361** | 0.439** | 0.513** | 0.556** |
| PCG - y | 0.728** | 0.795** | 0.738** | 0.843** | 0.850** | 0.693** |

Source: Pinheiro (1989).
Note: See text and footnote 12 for description of variables.
* Significant at 10%, ** significant at 5%.

In Table 4 we extend the analysis of Table 3 to the regression models. The first seven rows summarize the results obtained when incorporating the effects of capital and labor, as in equation (5). We see that any "third input" will be highly correlated with output growth in the meta-production function.[12] In fact, including industrial growth in the usual supply sources of growth model leads to a corrected $R^2$ much superior to that obtained from estimating (5) with exports.

There are at least two interpretations for this result. First, as pointed out in so many studies, the growth rates of macro aggregates are not good measures of strategy bias because their ratios to GDP are relatively stable. Otherwise, one would have to believe that output could be enhanced -- in the long run -- just by fostering private consumption. Second, it is the expansion of output itself that explains variations in TFP growth: output growth leads to increases in TFP and to a virtuous cycle in the development process -- this relation is known as Verdoorn's law. Irrespective of the

[12] INDG, MFGG, INVG, GOVG and PCG stand for the growth rates of, respectively, industrial and manufacturing output, investment expenditures and private consumption.

explanation, however, it is clear that export orientation, as defined in the models reviewed earlier, has no superior explanatory power whatsoever for why TFP growth rates vary across countries.

The use of alternative definitions for export bias can lead to results that are less remarkable than those of the last section. Michaely (1977), for instance, found that by associating the proportion of exports on GDP with GDP growth we reach a correlation coefficient that is negative (-0.326) and significant at the 2.5% level. A negative correlation between the two variables was also found by Helleiner (1986).[13] Fishlow found no statistically significant relationship between the Michaely/Fishlow export bias measure and the growth of GDP. Moreover, Michaely also found a correlation close to zero between output growth and deviations of export ratios from their expected values, where the latter had been estimated by Chenery and Syrquin (1975), using data on each country size of population, per capita income, and size of capital inflow.

[13] An illustrative example of how sensitive the results are to the definition one adopts for export bias is given by Michaely (1977), footnote 5, where the author reports a positive correlation between export shares and economic growth when using end-of-period, in place of average, values for that variable.

TABLE 4

COEFFICIENTS FOR DIFFERENT VARIABLES EXPLAINING TOTAL FACTOR PRODUCTIVITY GROWTH: A SUMMARY OF THE MAIN RESULTS +

| ROW | VARIABLE | 1960--1970 | 1965--1973 | 1970--1977 | 1965--1980 | 1973--1984 | 1980--1986 |
|---|---|---|---|---|---|---|---|
| 1 | x | 0.125** | 0.190** | 0.153** | 0.162** | 0.159** | 0.247** |
| 2 | m | 0.177** | 0.195** | 0.120** | 0.246** | 0.249** | 0.234** |
| 3 | INDG | 0.232** | 0.359** | 0.339** | 0.437** | 0.493** | 0.512** |
| 4 | MFGG | | 0.451** | | 0.489** | 0.410** | 0.474** |
| 5 | INVG | 0.191** | 0.242** | 0.178** | 0.269** | 0.230** | 0.195** |
| 6 | GOVG | 0.128** | 0.220** | 0.055 | 0.351** | 0.458** | 0.388** |
| 7 | PCG | 0.633** | 0.395** | 0.294** | 0.741** | 0.834** | 0.748** |
| 8 | x - y | 0.087** | 0.051 | 0.028 | 0.069 | 0.010 | 0.145** |
| 9 | m - y | 0.094* | 0.021 | 0.026 | 0.103 | 0.129* | 0.074 |
| 10 | INDG - y | 0.104** | 0.233** | 0.055 | 0.337** | 0.554** | 0.722** |
| 11 | MFGG - y | | 0.120 | | 0.067 | 0.266** | -0.087 |
| 12 | INVG - y | 0.158** | 0.105* | 0.137** | 0.152** | 0.171** | 0.073 |
| 13 | GOVG - y | -0.066 | -0.068 | -0.100* | -0.104 | -0.035 | -0.020 |
| 14 | PCG - y | -0.355** | -0.017 | -0.241** | -0.443** | -0.462* | -0.658** |
| 15 | X/Y | -0.013 | -0.036* | -0.030 | -0.048** | -0.036* | -0.054** |
| 16 | M/Y | 0.010 | -0.048* | -0.050** | -0.031 | -0.048* | -0.025 |
| 17 | IND/Y | -0.034 | 0.022 | -0.015 | 0.015 | 0.022 | -0.050 |
| 18 | MFG/Y | | 0.061 | | 0.049 | 0.061 | -0.005 |
| 19 | GOV/Y | 0.005 | -0.037 | -0.019 | -0.035 | -0.091* | 0.039 |
| 20 | PC/Y | 0.057** | 0.127** | 0.033 | 0.073** | 0.020 | 0.019 |
| 21 | x . X/Y | 0.622** | 0.489** | 0.572** | 0.791** | 0.526** | 0.682** |
| 22 | m . M/Y | 0.564** | 0.551** | 0.266** | 1.000** | 0.544** | 0.825** |
| 23 | INDG.IND/Y | 0.301 | 1.026** | 1.507** | 1.084** | 1.467** | 1.272** |
| 24 | MFGG.MFG/Y | | 1.526** | | 0.885** | 2.566** | 2.609** |
| 25 | INVG.I/Y | 0.951** | 1.097** | 0.742** | 1.130** | 0.952** | 0.898** |
| 26 | G.GOV/Y | 0.387 | 1.453** | 0.530 | 1.110** | 2.186** | 2.387** |
| 27 | PCG.PC/Y | 0.744** | 0.574** | 1.164** | 0.904** | 1.222** | 1.076** |

Source: Pinheiro (1989).

Notes: + In rows 1 to 20, results are estimates of parameter c of equation (5), with different variables explaining differences in TFPG, as in equation (6). In rows 21 to 27, results are estimates of $F.+\Sigma/(1+\Sigma)$, as in equation (13) (Feder's model), with different two-sector disaggregations. Complete results can be obtained from the author upon request. See text for description of variables.
* and ** significant at 10% and 5%, respectively.

Balassa (1985) also measured trade orientation by the difference between actual and predicted values of per capita exports. The size of capital inflow variable, used by Chenery and Syrquin (1975), was replaced by the ratio of mineral exports to GDP. Balassa found that "economic growth in the 1973-79 period was favorably affected by the country's trade orientation in the initial year."

Kavoussi (1985) and Singer and Gray (1988) defined the degree of export orientation of the trade policy as the growth of exports due to competitiveness and diversification; that is, the growth of exports net of variations in the volume of traditional exports due only to expansion or contraction of world demand. In both studies the authors came to the conclusion that "export-oriented trade policies enhance economic growth only when external demand conditions are favorable."

Kormendi and Meguirre (1985) used the Michaely/Fishlow measure in an expanded version of equation (5) and found a positive and significant coefficient for this variable. Export bias, however, explained only 4% of the variance in output growth rates across their country sample.[14]

In fact, quite a different picture arises when the strategy bias is defined in the Michaely/Fishlow way (Table 4, rows 8 to 14). As one would expect, emphasis on consumption, either public or private, has a long-run negative effect on output growth. Also, as one would anticipate, industry or investment biased strategies have a very positive impact on growth of output.

Export bias, however, does not appear to have consistently fostered output growth: for only two of the six periods considered was the export-bias variable statistically significant. Furthermore, the bias towards exports produced much less expressive results than industrial bias (row 10).

Rows 15 to 20 of Table 4 illustrate the problem of defining strategy bias using shares on output, otherwise a very sensible definition.[15] Two

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[14]Look particularly at their Table 1 and regression (5). Note that Kormendi and Meguirre's (1985) sample includes both developed and developing countries and covers the 1950-77 period.

[15]The share of exports in output was in fact used by Voivodas (1973) to measure export orientation.

observations are noteworthy. First, relatively few regressions present a significant coefficient for the share variables. Second, countries that export a large share of their GDPs tend to grow less rapidly than more closed economies. In fact, the share of exports is negatively associated with GDP growth rates for all six periods -- and in a statistically significant way in four of them -- reflecting the fact that many slowly growing primary-oriented countries are relatively open economies.[16]

In rows 21 to 27 of Table 4 we analyze Feder's model in some detail. First, we extend his empirical analysis to other periods, to find out that the results are robust for changes in the period covered (row 21). Externalities or resource re-allocation gains seem to have been present also in the post-1973 period.[17] Next, we examined what the model tells us when we use other sector dichotomies of the economy: import consuming x non-import consuming sectors (row 22), industry x nonindustrial sectors (row 23), manufacturing x nonmanufacturing sectors (row 24), investment x noninvestment sectors (row 25), government x nongovernment consumption goods sectors (row 26), and private consumption goods x non-private-consumption sectors (row 27).[18]

The results in the last six rows of Table 4 support the two main

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[16]Note that this explanation is consistent with the results obtained by Michaely (1977) and by Balassa (1985). In Voivodas's (1973) analysis, "dummy variables for each individual country were introduced to allow for inter-country differences in trade and growth experiences", which explains the positive correlation he obtained between share of exports and growth of GDP.

[17]It is interesting to note that, as suggested by Feder, the coefficient of I/Y in (13) was found to be lower than in (5). However, the same should happen to the coefficient of 1 , and it did not for all periods(this is because $b=MP_L.Y/L$, were $MP_L$ is the economy-wide marginal physical product of labor. As $F_L < MP_L < G_L$, b should be larger than $\theta$). In fact, even for some of Feder's (1982 and 1986) results this contradiction between model and estimates arose.

[18]Note that Feder (1986) extended his model to isolate both industry and manufacturing. For those two the regression to be tested is derived in the way described for exports in section 2.2. To be able to isolate sectors producing consumption goods demanded by both the public and the private sectors, the only extra assumption is that of a constant share of domestic production in total domestic supply. Finally, a very similar model can be built dividing the economy into sectors that consume and others that do not consume imports. All one has to assume in addition is that there is no substitution between imported and domestically produced inputs and that producion goods have a constant share on total imports. All these extra assumptions are at least as realistic as the others in Feder's model.

conclusions derived before. First, the models reviewed in section 2.2 have no power against equally reasonable alternative explanations for the differences in TFP growth across countries.[19] Second, if one were to rely on this cross-country statistical analysis to design a country's development strategy, expanding exports would not be the best way to foster growth.

A second important identification problem is whether it is the growth of imports and not of exports that is related to output expansion. After all, as characterized in Chenery and Strout's (1966) two-gap model, imports, and not exports, are related to the tightness of the foreign exchange constraint and the ability to invest when the substitution between imported and domestically produced machinery is limited. Moreover, imports of capital and intermediate goods embody technology that might be determinant in explaining TFP growth. Empirically the distinction is important because imports can be financed by different sources of foreign exchange.

The literature presents at least five pieces of evidence concerning this argument.[20] Robinson (1972), using a model similar to Feder's, but with a different sector split, concluded that his "regression results generally support the view that foreign exchange can be considered as a scarce factor limiting growth." Voivodas (1973) found that "trade exercises a beneficial effect on growth through the ability of countries with high exports receipts to import the capital goods necessary for development." Michaely (1977) noted that in his sample the countries that enjoyed more rapid export growth "were [also] the beneficiaries of a large capital inflow from abroad." Fishlow (1985) showed that a better fit and more significant results are obtained by regressing growth rates with imports rather than with exports. Finally, Helleiner (1986) concluded that for poor countries, and especially in Africa, "greater import volume instability is associated with slower growth."[21]

One can introduce imports in the usual sources of growth model in the

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[19] As a matter of fact, Feder (1986, 280-282) himself did point that out in his final remarks. Note also that similar empirical evidence led Kaldor (1967) to identify manufacturing as an engine of growth. See Thirlwall (1983) for a discussion on Kaldor's growth laws.

[20] See Boggio (1988, 206-207) for some countervailing results for the case of developed countries.

[21] See also Feder (1986, pp 281-282) for empirical evidence in favor of foreign exchange as a source of output growth.

same way, and for even stronger reasons, that exports were included in the production function of equation (1). Empirically, the preference for imports also seems correct. In Table 3 we see that in four of the six periods considered the correlations for imports exceeded those for exports, both for the level and the shares of the variables. In Table 4 (row 2) we have that as a third factor of production imports have a larger impact on TFPG than exports in four of the six periods considered. Bias towards imports, however, does not seem to have favored growth any more than export bias (Table 4, row 9). Also, countries with large import shares grew less than more closed but otherwise "similar" economies (Table 4, row 16). This highlights the fact that the degree of openness of a country is often determined by its economic structure rather than its development strategy.[22]

Finally, one has to take into account whether there are relevant variables omitted from the analysis. It may well be the case that a common variable is affecting both export and output expansion and/or that the export variables are in fact reflecting, at least in part, the effect of these omitted variables. After all, successful countries followed development strategies that involved much more complexity than simply expanding exports.

In the case of labor, for example, one has to take into account the significant improvement in the quality of the service provided during the period of analysis for several countries included in the samples utilized. Education, in particular, played a major role in the economic development of East Asian and other successful countries. Mosley (1987), for instance, found a positive and significant impact from the growth in adult literacy on GNP growth for LDCs in general in the 1960-70 period. Inasmuch as it affects TFPG, and it happened in countries where exports grew significantly, omission of a variable reflecting changes in labor quality may be biasing the results.

The analytical framework reviewed here provides a way to introduce other variables in the analysis. It is reasonable, following Kavoussi's (1984) line of reasoning, to relate TFP growth to other variables besides export growth: industrialization, government intervention (measured by public expenditures),

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[22] In part, therefore, that answers the question posed by Krueger (1985, p23): openness itself does not seem to be sufficient (or even necessary) to foster output growth. On the other hand, as we shall see, slower growth of world trade can thwart the benefits of export orientation.

and so on.

In Table 3 we see, for instance, that output growth is highly correlated with the growth of industrial output and with its share in GDP. A similar result is obtained for government consumption and gross investment. In Table 4 we see that emphasis on industrial and manufacturing output, as well as government and investment expenditures, all had a larger impact on output than exports. Moreover, industry and investment-biased strategies were found to have a significantly larger impact on growth than export orientation.

It is also possible to replicate Feder's model dividing the economy in different sectors. As shown by Robinson (1972), the industrial sector is more productive and generates positive externalities to the rest of the economy. It may be the case, therefore, that industrialization and not export promotion was the leading cause of superior economic performance in some countries.[23] In Table 4 we see that we can line up alternative explanations of why some countries performed better than others, all supported by empirical results, and none of them related in any way to trade strategies.

III.2 Sample/Period Selection

In the last subsection, we tried to show that the results previously defined did not reject alternative explanations for why growth was faster in some countries than in others. In other words, although the tests reviewed could not reject an association between exports and output, they had no power against alternative explanations such as the relaxation of the foreign exchange constraint, industrialization, or the simple expansion of private and public consumption. After analyzing problems with the variables considered, we turn now to the question of the data set used in the analyses.

Since the earlier work of Michaely (1977), it has been noticed that the significance of the impact of export expansion on GDP growth is affected by the specific set of countries included in the statistical analysis. This evidence has led Heller and Porter (1978) to ask whether Michaely's and their

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[23] Feder's model is in many senses similar to Robinson's (1972) model. In this earlier two-sector model productivity differentials were found between the agricultural and the industrial sectors. Feder's (1986) results also support this assertion.

results were "just telling us that the growth rates and development patterns since World War II of Greece, Israel, Portugal, South Korea, Spain, Taiwan and Yugoslavia are very different from the other 34 countries in the sample."

Thus, it is not surprising that Balassa (1978) argued that some of Michaely's results were biased because his sample was too heterogeneous, or that Tyler (1981) claimed that Balassa's sample was small and "too homogeneous" and therefore biased: "With such a choice of the small sample the results of Balassa's statistical analysis provide no surprises. His sample in fact guarantees his strong results."

The strength of the relationship between export orientation and economic performance seems also to depend on the income level of the countries included in the sample. Michaely (1977), for example, found that "growth is affected by export performance only once countries achieve some minimum level of development." Heller and Porter's (1978) analysis supported "Michaely's finding that a minimum treshold is needed before export growth and economic growth are associated."[24]

Having Michaely's results in mind, Tyler (1981) worked only with middle-income countries. It is interesting to notice, though, that when OPEC countries are excluded from Tyler's sample, his results turn out to be less significant (the t-statistic for the export variable drops to 1.6).

Tyler's sample selection was, in turn, criticized by Kavoussi (1984), who argued that the problem is not one of a minimum threshold for the level of income, but that countries should be classified according to their incomes at the beginning and not at the end of the period under study. Kavoussi (1984) found a significant correlation between export and GDP growth for low-income countries, but one that was less significant than that obtained for middle-income countries.

In a study of low-income (especially African) countries for the 1960-80

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[24]Michaely (1977) found a correlation coefficient of -0.04 between the growth of per capita GNP and the growth of the share of exports in GNP for low income countries. For the same sample, Heller and Porter (1978) found a correlation coefficient of 0.097 between the growth rates of exports and of the nonexport components of output.

period, Helleiner (1986) found no statistically significant correlation between (Michaely/Fishlow) export bias variable and growth of GDP. Ram (1985), Mosley (1987), and Singer and Gray (1988) also found evidence that the association between exports and economic performance, although usually positive and significant, is weaker for low-income countries than for middle-income countries.[25]

Evidence of the sensitivity of the results to country sample has also been found when countries are divided according to the composition of exports and output (Balassa (1978), Tyler (1981), Kavoussi (1984,1985), Balassa (1985), Singer and Gray (1988)), the impact on exports of world demand (Kavoussi (1985), and Singer and Gray (1988)) and geographical situation (Helleiner (1986), Mosley (1987) and Singer and Gray (1988)).

Results also tend to vary depending on the period covered by the analysis. Balassa (1978), for instance, found a more significant correlation between exports and growth in the 1966-73 period than in the 1960-66 period. Ram (1985), by his turn, concluded that "the effect of export growth is clearly larger in the 1970-77 period than in 1960-70." Diaz-Alejandro (1980) pointed out that results very different from those reported in the last section would probably be reached for Latin American countries during the depression years. By the same token, most studies that cover recent periods have shown a less significant relation between exports and economic performance.

Balassa (1985) tested how the changes in world market conditions from the 1960-73 to the 1973-79 period affected the relationship between exports and economic performance. He found that the numerical magnitude of this effect increased [in 1973-79] compared to the earlier period. Rana (1988), however, showed that Balassa's (1985) results were biased by the choice of sample: "Using a balanced sample from 45 developing countries we find that the contribution of export orientation, although significant, has fallen in the post-1973 period and that presently there is a need to reassess alternative development strategies."

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[25] See also Moschos (1989) for some interesting evidence regarding the sensitivity of the parameters of (5) to variations in the income level of the countries included in the sample.

The issue of period sensitivity was addressed by Kavoussi (1985), who related these differences to the changes that took place in the international environment. External demand, which had been strong in the 1967-73 period, slackened in the 1973-77 period with negative effects on the relation between export orientation and output growth. He goes on to acknowledge that "when international markets are depressed, export-oriented policies are not apt to produce extraordinary results."[26]

Singer and Gray (1988) extended Kavoussi's (1985) analysis to the 1977-83 period and reached similar conclusions, namely, that "under unfavorable world market conditions, the relationship between export orientation and economic performance is consistently weakened."[27] Mosley (1987) found that "for the even more unfavorable period 1980-83," the relation between exports and economic growth, although not significant, becomes negative both for the poorest and the middle-income countries.

III.3 Causality Direction

By establishing a correlation between export and output growth one is not showing that export growth has any impact on output growth. The fact that a variable is related to or correlated with another does not imply any cause and effect relationship. Recently, however, Granger and Sims causality tests have been used to check the order of precedence between the two variables.

Jung and Marshall (1985) applied Granger causality tests to 37 developing countries, with time-series running from 1950 to 1981. Their results "cast considerable doubt on the validity of the export promotion hypothesis," which was found to be relevant only for Costa Rica, Ecuador, Egypt, and Indonesia, that is, for none of the countries usually identified with export promotion strategies. These results led the authors to speculate that it might be the case that instead of export-led growth the relation between these variables would be better defined as output-led export

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[26] Notice that such a description also applies to the 1930's, and, in this way, Diaz-Alejandro's and Kavoussi's "results" are very consistent.

[27] See Boggio (1988) for some evidence that the correlation between export and output growth has been weakening over time also for developed countries.

growth.[28]

Darrat (1986) conducted a similar test for Korea, Hong Kong, Singapore, and Taiwan covering the 1960-82 period. He concluded that for the first three countries "neither exports cause economic growth nor economic growth causes exports." For Taiwan the test shows that "economic growth unidirectionally causes exports."[29]

Chow (1987) reached very different results for the manufacturing sector when applying Sims causality tests. He found that "the growth of exports and development of manufacturing industries had bidirectional causalities in Brazil, Hong Kong, Israel, Korea, Singapore, and Taiwan. In Mexico, the causality runs from exports to the development of manufacturing industries."

III.4 Specification Problems

Although not conclusive in itself, the analysis of causality direction leads us to a very important point: there are serious problems of simultaneity in the relation between exports, growth, and investment that cannot be examined in a single-equation, partial equilibrium model. Salvatore (1983) addressed this problem by estimating "a simultaneous equation model that captures the most important quantitative aspects of the relationship between international trade and economic development."

In Salvatore's model, exports and growth are related in different ways. He made the rate of growth of per capita income a function of the investment ratio (I/GDP), of the degree of industrialization (industrial output as a percentage of GDP), and of the growth in the ratio of exports to GDP. Thus, although the model does not allow for resource reallocation, it has a supply source of growth equation, and it allows for a direct impact of export orientation (defined in the Michaely/Fishlow sense) on productivity growth.

The indirect influence of exports on growth, pointed out by Balassa (1978), Tyler (1981) and others, and which would act by means of a positive

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[28] See Helpman and Trajtenberg (1987) for a more detailed analysis of this hypothesis. See also Teitel and Thuomi (1986).

[29] See also Darrat (1987).

impact on investment rates and levels of industrialization, was also included in Salvatore's model.[30] Thus, the investment rate was estimated as a function of the level and the rate of growth of per capita income, of the rate of capital inflow (net imports of goods and services as a percentage of GDP), and of the ratio of exports to GDP. By the same token, the degree of industrialization is a function of the same variables except for the level of per capita income.

Finally, the ratio of exports to GDP was modeled as a function of the ratio of the country's consumer price index to the consumer price index of all market economies, the GDP of all market economies, and the degree of industrialization.

Salvatore tried to control for differences in the economic structure of different countries by dividing his sample, using Chenery and Syrquin's (1975) classification, in small primary-oriented, small industry-oriented, and large countries, and estimating a different model for each of them. Changes in world market conditions in the 1962-65, 1966-69, 1970-73 and 1974-77 periods were controlled for by means of dummy variables. He used pooled data for 52 developing countries, covering the 1962-77 period, and estimated the model by the full information maximum likelihood method.

Perhaps the most interesting result of Salvatore's analysis, at least for our purposes, is a counterfactual simulation where he increases by 25 percent the growth rate of the ratio of export to GDP for the three groups of countries. For the small industry-oriented countries, the annual rate of growth of per capita income goes from 3.88% to 3.90%, for small primary-oriented it goes from 1.88% to 1.89%, while for large countries there is no variation at all.

Those results describe a picture very different from that suggested by Balassa (1978) and referred to in the introduction to this paper. In fact, they seem more in agreement with Kravis's (1970) statement that "the term 'handmaiden of growth' better conveys the notion of the role that trade can play."

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[30] Note that regression (6) in Kormendi and Meguirre (1985) rejects the hypothesis of a positive impact of export bias on investment rates.

But simultaneity is not the only specification problem in the models reviewed. The unlikelihood of the assumptions needed to go from (2) to (4) or (5) should not have escaped one. In a sample that includes countries with such disparities in development level, industrialization strategies, size, and other economic characteristics, the assumption of a common production function seems extreme.

The problem is further complicated by the unavailability of data for the rate of growth of the capital stock. To overcome this problem, one is forced to use a proxy as the rate of growth of gross investment (Tyler (1981) and Kavoussi (1984)), which is a poor surrogate.[31] Alternatively, some authors have used expression (5) -- also a dangerous shortcoming. Now one is not only assuming that all countries share the same constant elasticity production function but also that they actually operate with the same value for the marginal physical product of capital ($F_k(K^j, L^j, X^j)$). These strong assumptions are not easily relaxed with the data sets usually available.

By the same token, due to lack of data, the impact of higher utilization of the factor inputs has been neglected.[32] Another strong assumption inherent in the regressions is that of cross-country homogeneous inputs. Especially for the case of labor, it is important to take into account the significant differences in the qualifications of workers among countries in the samples utilized.

All these questions lead to the conclusion that we should estimate the sources of growth models derived in section 2 using time series data for each country instead of relying on cross-country estimates. This alternative way to approach the problem was originally followed by Ram (1987), who estimated time-series regressions, using both Michalopoulos and Jay's (1973) and Feder's (1982) models, for 88 different countries. His results make clear the

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[31] Ram (1985) called attention to the results obtained by Kendrick (1976) who had shown "that for the period 1929-69 the correlation coefficient between annual rates of growth of capital stock and investment is of the order of only 0.2".

[32] It is interesting to note, in this respect, that, as estimated by Kim and Kwon (1977), "the rise in the utilization rate is shown to have contributed nearly as much as investment has in the growth of manufacturing output" in South Korea in the 1961-1971 period.

disparity in the value of the parameters of the production functions from one country to another.

This fact is also apparent in our own time-series country regressions.[33] In Table 5 we try to illustrate the diversity of estimates obtained for the parameters of the sources of growth models discussed in section 2.2. As is easy to conclude, the assumption of a common technology for all countries is not sustained by the individual country regressions.

The results for time-series regressions also suggest that imports are as related to GDP growth as exports and actually seem to have a superior explanatory power in the usual supply sources of growth model. Three observations are noteworthy. First, for 31 countries the coefficient of imports was larger than of exports, while for 21 cases the opposite was true. Second, for 35 countries the coefficient of imports was statistically more significant than that of exports, with the opposite situation arising in 20 cases. Finally, the coefficient of determination for regressions with imports was higher than those for exports for 34 countries, while for 23 the $R^2$ of export equations exceeded those of imports.[34]

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[33] See Pinheiro (1989). In the time-series regressions, growth of population was substituted for growth of the labor force.

[34] Countries for which either coefficient was negative were not included in the comparisons.

TABLE 5

SUMMARY STATISTICS FOR THE COEFFICIENTS IN THE TIME-SERIES REGRESSIONS
(Number of Countries in Various Ranges of Coefficient Values)

| | Y = F(K,L) | | Y= F(K,L,X) | | Y = F(K,L,M) | |
|---|---|---|---|---|---|---|
| | OLS | AR1 | OLS | AR1 | OLS | AR1 |
| **Constant (a)** | | | | | | |
| < -10.0 | 10 | - | 8 | - | 9 | - |
| -10.0 - -5.0 | 3 | 3 | 6 | 6 | 6 | - |
| -5.0 - 0.0 | 15 | 6 | 13 | 7 | 11 | 4 |
| 0.0 - 5.0 | 15 | 4 | 14 | 2 | 12 | 6 |
| 5.0 - 10.0 | 4 | - | 6 | 1 | 8 | 2 |
| > 10.0 | 6 | 2 | 5 | - | 8 | 1 |
| **Capital (I/Y)** | | | | | | |
| < 0.0 | 14 | 3 | 16 | - | 19 | 2 |
| 0.0 - 0.1 | 6 | 2 | 16 | 1 | 13 | 5 |
| 0.1 - 0.2 | 9 | - | 6 | 2 | 6 | 3 |
| 0.2 - 0.3 | 11 | 7 | 8 | 5 | 8 | 1 |
| > 0.3 | 13 | 3 | 13 | 8 | 8 | 2 |
| **Labor (l)** | | | | | | |
| < 0.0 | 21 | 8 | 20 | 5 | 19 | 9 |
| 0.0 - 0.5 | 4 | 1 | 4 | 4 | 5 | - |
| 0.5 - 1.0 | 6 | 2 | 7 | 3 | 9 | 2 |
| 1.0 - 2.0 | 8 | 2 | 6 | 3 | 2 | 1 |
| > 2.0 | 14 | 2 | 15 | 1 | 19 | 1 |
| **Exports (x)** | | | | | | |
| < 0.0 | | | 7 | - | | |
| 0.0 - 0.1 | | | 25 | 12 | | |
| 0.1 - 0.2 | | | 15 | 2 | | |
| 0.2 - 0.3 | | | 3 | - | | |
| > 0.3 | | | 2 | - | | |
| **Imports (m)** | | | | | | |
| < 0.0 | | | | | 5 | 1 |
| 0.0 - 0.1 | | | | | 23 | 7 |
| 0.1 - 0.1 | | | | | 16 | 2 |
| 0.2 - 0.3 | | | | | 9 | 2 |
| > 0.3 | | | | | - | 1 |

Note: AR1 - Obtained using SAS's AUTOREG procedure.
Source: Pinheiro (1989).

## IV. FINAL REMARKS

In the last two decades, an increasing number of studies have tried to show that export promotion can work as an engine of growth for developing countries. Positive impacts from export orientation would derive from diverse factors, such as opportunities to exploit economies of scale or beneficial effects of competitive pressures in large international markets.

Supporting these theoretical developments, a body of empirical literature has arisen in which open strategies are simulated on inward-oriented economies. Those exercises, which rely on detailed individual country studies, have shown that very small increases would be achieved by attaining optimal resource allocation in these economies.

These results, in a certain sense very frustrating, have led to a shift in attention from allocative to X-efficiency, or, more generally, to changes in productivity. In this second strand of empirical studies, cross-country statistical analyses are substituted for meticulous country studies. Very significant results were obtained both with correlation and regression analyses, leading to the conclusion that cross-country differences in output growth rates could be largely explained by the degree of export orientation. Those results seem to vindicate empirically the idea that export growth could work as an engine of growth for developing economies.

In this paper we tried to achieve two different objectives: (1) to provide a review of this often conflicting empirical literature -- for what we went into some lengthy description of models and results -- and (2) to analyze the methodology and evaluate the conclusions of the studies reviewed.

Our first step was to discuss whether the growth of exports properly defines a country's degree of export orientation. We showed that the growth rate of any macro aggregate, when included in the usual supply sources of growth model, is statistically significant and enhances the coefficient of determination substantially. In short, our empirical evidence supported the arguments of Michaely (1977) and Fishlow (1985) that a preferred measure is the difference between the export and the output growth rates, that is, the growth rate of the share of exports in GDP. Defined in this way industry- and

investment-biased strategies enhance growth, whereas strategies biased towards public and private consumption reduce growth. Export biased strategies were seen to improve economic performance, in a statistically significant fashion, in only two of the six periods considered.

Even after correctly defining export bias, an identification problem remains. If import, industry, or investment bias are used, equally or more significant results are obtained. This suggests that export orientation has a positive effect if it leads to industrialization (as opposed to relying on exports of primary goods), if it enhances investment rates, and if it permits the country to relax the foreign exchange constraint (rather than, for instance, use export earnings to pay foreign debt).

Our second major qualification hinged on the problem of sample selection. We saw that the results are sensitive to the set of countries included in the sample and to the period covered by the analysis. Two major results were observed. First, the link between output growth and export orientation is weaker for low-income countries. A possible explanation would be that these countries tend to export primary rather than manufactured goods. Second, when international markets are depressed, export orientation is less effective to foster output growth. Together with the negative association of export and import shares with GDP growth, these results suggest that (i) openness of the economy is not enough, and (ii) the gains from export orientation are not as great with slower growth of world trade as with more rapid growth.

Causality direction between export and output growth is another topic of this subject that has not yet been satisfactorily clarified. The empirical evidence reviewed is very contradictory. Probably the most we can say is that the relation between the two aggregates is simultaneous.

We showed, then, that in a model that takes into account simultaneity effects and inter-country and period differences, the impact of exports on output growth is significantly reduced and almost negligible. In this simultaneous-equation model, export bias results in a handmaiden rather than an engine of growth.

Finally, we looked at the question of whether cross-country regressions

provide an appropriate model to test the hypothesis that concerns us. We saw that when country-specific time-series regressions were estimated, we found (i) great cross-country variability in the values of the regression coefficients, (ii) a coefficient for export growth that was in general inferior to the one in the cross-country regression, and (iii) an equally good or even better adjustment with imports in place of exports as a third explanatory variable.

All in all, three main conclusions can be derived from our analysis. First, that supply-side effects of export orientation on output growth are probably less important than suggested in most of the literature reviewed. Second, that this indirect influence of exports, to be effective, may have to lead to increases in import volumes and to rapid industrialization.

Finally, we have concluded that the cross-country production function model is not the best way to study the links between trade orientation and the supply sources of output growth. Three reasons led us to that conclusion. First, these models are built in an excessively aggregate form. Second, by neglecting the simultaneous nature of the relationship between export and output growth, the single-equation model significantly overestimates the impact of export bias on output expansion. Finally, these models provide tests that have almost no power against alternative hypothesis to explain differences in output growth across countries -- this lack of power was observed even for the more elaborate Robinson/Feder two-sector models.

## V. BIBLIOGRAPHY

BALASSA, B., 1970, Growth strategies in semi-industrialized countries, Quarterly Journal of Economics, v84, n1, 24-47.

BALASSA B., and associates, 1971a, The structure of protection in developing countries, Baltimore, Md., John Hopkins University Press.

BALASSA, B., 1971b, Industrial policies in Taiwan and Korea Weltwirtschaftliches Archiv, v.106.

BALASSA, B., 1971c, Trade policies in developing countries, American Economic Review, Papers and Proceedings, v61, 55-77.

BALASSA, B., 1975a, Reforming the system of incentives in developing countries, World Development, 3, 365-382.

BALASSA, B., 1975b, Latin American trade policies in the 1970s: a comment, Quarterly Journal of Economics, 89, 483-486.

BALASSA, B., 1978a, Export incentives and export performance in developing countries: a comparative analysis, Weltwirtschaftliches Archiv, v114, n1, 24-61.

BALASSA, B., 1978b, Exports and economic growth: further evidence Journal of Development Economics, v.5, 181-189.

BALASSA, B., 1980a, The process of industrial development and alternative development strategies, Essays in International Finance, Princeton University.

BALASSA, B., 1985, Exports, policy choices and economic growth in developing countries after the 1973 oil shock, Journal of Development Economics, v.18, 22-35.

BERGSMAN, J., 1974, Commercial policy, allocative efficiency, and "X-efficiency", Quarterly Journal of Economics, v87, n3, 409-433.

BHAGWATI, J, 1978, Foreign trade regimes and economic development: anatomy and consequences of exchange control regimes, Cambrigde, Massachussets.

BOGGIO, L., 1988, Export expansion and economic growth: an "empirical regularity" and its explanations, Empirica, v15, n1, 205-226

BRUTON, H.J., 1967, Productivity growth in Latin America, American Economic Review, v57, n5, 1099-1116.

CHENERY, H.B., S. Robinson and M. Syrquin, 1986, Industrialization and growth: a comparative study, Oxford University Press, London.

CHENERY, H.B. and A. Strout, 1966, Foreign assistance and economic development, American Economic Review, v56, 680-736.

CHENERY H.B. and M. Syrquin, 1975, Patterns of development, 1950-1970, Oxford University Press, London.

CHOW, P.C.Y., 1987, Causality between export growth and industrial development, Journal of Development Economics, v26, 55-63.

DARRAT, A.D., 1986, Trade and development: the Asian experience, Cato Journal, v6, n2, 695-699.

DARRAT, A.D., 1987, Are exports an engine of growth? Another look at the evidence, Applied Economics, 277-283.

DIAZ-ALEJANDRO, C.F., 1980, Discussion, American Economic Review, Papers and Proceedings, v70, 299-300.

DONGES, J.B., 1976, A comparative survey of industrialization policies in fifteen semi-industrialized countries, Weltwirtschaftliches Archiv, v11, n2, 627-659.

DONGES, J.B. and J. Riedel, 1977, The expansion of manufactured exports in developing countries: an empirical assessment of supply and demand issues, Weltwirtschaftliches Archiv, v13, 58-87.

EMERY, R., 1967, The relation of exports and economic growth, Kyklos, 20,470-486.

FEDER,G., 1982, On exports and economic growth, Journal of Development Economics, v12, 59-73.

FEDER,G., 1986, Growth in semi-industrialized countries: a statistical analysis, in Chenery, Robinson and Syrquin (1986), 263-282.

FISHLOW, A., 1985, The state of Latin American economics, Occasional Papers in Latin American Studies, Stanford-Berkely Joint Center for Latin American Studies, n11.

HELLEINER, G.K., 1986, Outward orientation, import instability and African economic growth: an empirical investigation, in S. Lall and F. Stewart, eds., Theory and Reality in Development. London: Macmillan.

HELLER, P. and R.C. Porter, 1978, Exports and growth: an empirical re-investigation, Journal of Development Economics, v5, 191-193.

HELPMAN, E. and M. Trajtenberg, 1987, Dynamic comparative advantage and the hypothesis of export-led growth, mimeo.

JUNG, W.S. and P.J. Marshall, 1985, Exports, growth and causality in developing countries, Journal of Development Economics, v18, 1-12.

KALDOR, N., 1967, Strategic factors in economic development, Cornell University Press.

KAVOUSSI, R., 1984, Export expansion and economic growth: further empirical evidence, Journal of Development Economics, v14, 241-250.

KAVOUSSI, R., 1985, International trade and economic development: the recent experience of developing countries, Journal of Developing Areas, v19, 379-392.

KEESING, D.B., 1979, Trade policy for developing countries, World Bank Staff Working Paper 353, Washington, D.C.

KENDRICK, J.W., 1976, The formation and stocks of total capital, NBER, New York.

KIM, Y.C. and J.K. Kwon, 1977, The utilization of capital and the growth of output in a developing economy: the case of South Korean manufacturing, Journal od Development Economics, v4, 265-278.

KORMENDI, R.C. and P.G. Meguirre, 1985, Macroeconomic determinants of growth: cross-country evidence, Journal of Monetary Economics, v16, n2, 141-164.

KRAVIS, I.B., 1970, Trade as a handmaiden of growth: similarities between the $19^{th}$ and the $20^{th}$ centuries, Economic Journal, n 320, 850-872.

KRUEGER, A.O., 1966, Some economic costs of exchange control: the Turkish case, Journal of Political Economy, 74, 466-480.

KRUEGER, A.O., 1978, Foreign trade regimes and economic development: liberalization attempts and consequences, Cambridge, Massachussets.

KRUEGER, A.O, 1984, Comparative advantage and development policy twenty years later, in Economic Structure and Performance: Essays in Honor of Hollis B. Chenery, M. Syrquin, L. Taylor and L. Westphal (ed)., Academic Press, N.Y.

KRUEGER, A.O., 1985, Import substitution versus export promotion, Finance and Development, v22, n2, 20-23.

KUBO, Y.S., S. Robinson and S. Urata, 1986, The impact of alternative development strategies: simulations with a dynamic input-output model, Journal of Policy Modelling, v8, n4, 503-529.

LAL, D. and S. Rajapatirana, 1987, Foreign trade regimes and economic growth in developing countries, Research Observer, n2, 189-217.

LEIBENSTEIN, H., 1966, Allocative efficiency versus X-efficiency, American Economic Review, 56, 392-415.

LITTLE, I., T. Scitovsky amd M. Scott, 1970, Industry and trade in some developing countries: a comparative study, Oxford University Press,

London.

MAIZELS, A., 1968, Exports and economic growth in developing countries, Cambridge University Press, London.

MICHAELY, M., 1977, Exports and growth: an empirical investigation, Journal of Development Economics, v4, 49-53.

MICHAELY, M., 1979, Exports and growth: a reply, Journal of Development Economics, v6, 141-143.

MICHALOPOULLOS, C. and K. Jay, 1973, Growth of exports in the developing world: a neoclassical view. AID Discussion Paper n28, Agency for International Development, Madison, Washington D.C.

MOSCHOS, 1989, Export expansion, growth and the level of economic development: an empirical analysis, Journal of Development Economics, v30,n1, 93-102.

MOSLEY, P., Overseas aid: its defense and reform, Wheatsheaf Books, Brighton.

NOGUES, J.J., 1985, Distortions, factor proportions and efficiency losses: Argentina in the Latin American scenario, Weltwirtschaftliches Archiv, v121, n2, 280-303.

PINHEIRO, A.M.R.C., 1989, An inquiry into the causes of total factor productivity growth in developing countries: the case of Brazilian manufacturing, 1970-1980, Ph.D. dissertation, University of California, Berkeley, Department of Economics.

RAM, R., 1985, Exports and economic growth: some additional evidence, Economic Development and Cultural Change, v33, 415-425.

RAM, R., 1987, Exports and economic growth in developing countries: evidence from time-series and cross-section data, Economic Development and Cultural Change, v36, n1, 51-72.

RANA, P.B., 1988, Exports, policy changes, and economic growth in developing countries after the 1973 oil shock: comments, Journal of Development

Economics, v28, 261-264

ROBINSON, S., 1972, Sources of growth in LDCs:a cross-section study, Quarterly Journal of Economics, v85, 391-428.

SALVATORE, D., 1983, A simultaneous equations model of trade and development with dynamic policy simulations, Kyklos, v36, n1, 66-90.

SCHENZLER, C., 1982, An empirical investigation in the relationship between growth of gross national product and exports in Chile, India and South Korea, unpublished master thesis (Vanderbilt University, Nashville, TN).

SINGER, H.W. and P. Gray, 1988, Trade policy and growth of developing countries: some new data, World Development, n3, v16, 395-403.

SRINIVASAN, T.N. and J. Whaley (eds.), 1986, General equilibrium trade policy modeling, MIT Press, Cambridge, MA.

TAYLOR, L., 1983, Structuralist macroeconomics: applicable models for the Third World, Basic Books, New York.

TEITEL, S. and F.E. Thuomi, 1986, From import substitution to exports: the manufacturing exports experience in Argentina and Brazil, Economic Development and Cultural Change, v37, n3, 455-490.

TYLER, W., 1981, Growth and export expansion in developing countries, Journal of Development Economics, v9, 121-130.

VOIVODAS, C., 1973, Exports, foreign capital inflow and economic growth, Journal of International Economics, v3, n4, 337-349.

WORLD BANK, World Development Report, various issues.

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