ECONOMIC INCENTIVES AND AGRICULTURAL EXPORTS IN DEVELOPING COUNTRIES

by

Bela Balassa

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IN DEVELOPING COUNTRIES

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ABSTRACT

The findings of this paper indicate that exports in general, and agricultural exports in particular, strongly respond to price incentives. This conclusion has been established by an econometric analysis of data for developing countries and for a subset of Sub-Saharan African countries as well as by comparisons of the experience of countries at different levels of development and following different policies.

The econometric analysis shows the responsiveness of the exports of goods and nonfactor services, merchandise exports, and agricultural exports to changes in the real exchange rate. It is of particular interest to note that this response is apparently greater in Sub-Saharan African countries than in developing countries in general.

The country analyses further indicate that outward-oriented countries had a far better export performance in regard to merchandise exports, as well as for traditional agricultural exports, than inward-oriented economies. The conclusion applies to all the periods under consideration as well as to countries at different levels of development, from newly-industrializing developing countries to Sub-Saharan African countries.
ECONOMIC INCENTIVES AND AGRICULTURAL EXPORTS IN DEVELOPING COUNTRIES

This paper will examine the effects of economic incentives on exports in general, and on agricultural exports in particular, in the developing countries. In view of the questions often raised about the effectiveness of economic incentives in the least developed countries, especially in Sub-Saharan Africa, the experience of latter group of countries will also be reviewed.

Section I will introduce a simple econometric model to estimate the effects of price incentives on exports. In Section II, the model will be applied to the exports of goods and nonfactor services and to merchandise exports. In Section III, the same model will be used to indicate the effects of price incentives on agricultural exports. Finally, Sections IV, V, and VI will present information on the responsiveness of merchandise and of agricultural exports to incentives in the 1960-73, 1973-78, and 1978-81 periods, respectively, by making use of intercountry comparisons.

I. MODELLING THE RESPONSE OF EXPORTS TO PRICE INCENTIVES

In this section, a simple model consisting of (foreign) export demand and (domestic) export supply equations will be put forward for estimating the effects of price incentives, and of other relevant variables, on exports. Foreign demand for a country's exports \(X^F\) will be affected by changes in its international competitiveness. This may be indicated by changes in the index of the real exchange rate, derived as the nominal exchange rate \(R\) adjusted for changes in the prices of traded goods (defined in terms of wholesale prices \(P^F_T\) and in the domestic economy \(P^D_T\)). Introducing foreign incomes \(Y^F\) as an additional variable affecting exports, we obtain equation (1).
\[ X^F = f\left(\frac{R \cdot P_T^F}{P_T^D}; Y^F\right) \]  

(1)

In turn, the supply of a country's exports \( (X^D) \) will be affected by changes in relative incentives to traded vs. non-traded goods. This may be indicated by an index of relative prices in the domestic economy, derived as the ratio of domestic price indices for traded goods \( (P_T^D) \) and for nontraded goods \( (P_N^D) \). \(^3\) Introducing a domestic capacity variable \( (C^D) \), we obtain equation (2). Finally, (3) represents the equilibrium condition.

\[ X^D = g\left(\frac{P_T^D}{P_N^D}; C^D\right) \]  

(2)

\[ X^D = X^F \]  

(3)

The reduced form equilibrium equation, derived from this system of equations, has been estimated by utilizing time-series data for 53 developing countries and for a subset of 16 Sub-Saharan African countries, for the periods 1965-73 and 1974-82 as well as for the two periods combined. The first of the two periods was characterized by rapid growth in the world economy while the second included the two oil shocks and the ensuing recessions. \(^4\) The choice of the countries has been dictated by the availability of data on trade and national income statistics and domestic price indices. \(^5\)

In view of the existence of an intercorrelation between exports and domestic capacity, the export-output ratio has been used as the dependent variable in estimating equations. Separate estimates have been made for the
exports of goods and nonfactor services as well as for merchandise exports, with the gross domestic product used as the output variable in both cases. In turn, the combined gross domestic products of the developed countries, the principal markets for the exports of the developing countries, has been utilized as the foreign income variable.

Estimation has been done by expressing all variables in terms of rates of change between successive years and combining time-series observations for individual countries. Experimentation with lag structures has not been successful; hence, the reported estimates utilize data in an unlagged form.

In the event, the real exchange rate variable, but not the relative price variable for traded and nontraded goods, proved to be statistically significant in the equations. This is not surprising since changes in the real exchange rate may practically instantaneously result in the redirection of production from domestic to foreign markets while the effects of changes in the relative prices of traded and nontraded goods are slower in coming and may affect exports and output in similar ways. 6/

II. EFFECTS OF PRICE INCENTIVES ON EXPORTS

Table 1 reports the results of estimates for the exports of goods and nonfactor services and for merchandise exports, obtained by the use of the model described in Section I, for the 53 developing countries and for the subset of 16 Sub-Saharan African countries. The table shows the individual regression coefficients, their t-values, the number of observations, F-statistics, and the (adjusted) coefficient of determination. The estimates pertain to the 1965-73 and the 1974-82 periods and to the two periods combined.
### Table 1
Regression Equations for Export Output Ratios in Developing Countries
(t-values in parenthesis)

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>Real Exchange Rate</th>
<th>Foreign Income</th>
<th>N</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>53 Developing Countries</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. 1965-73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) exports of goods and nonfactor services</td>
<td>-0.11**</td>
<td>0.25**</td>
<td>2.69**</td>
<td>424</td>
<td>12.64</td>
<td>0.052</td>
</tr>
<tr>
<td>(b) merchandise exports</td>
<td>-0.16**</td>
<td>0.71**</td>
<td>3.75**</td>
<td>424</td>
<td>49.90</td>
<td>0.188</td>
</tr>
<tr>
<td>11. 1974-82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) exports of goods and nonfactor services</td>
<td>-0.02*</td>
<td>0.58**</td>
<td>1.16**</td>
<td>424</td>
<td>54.92</td>
<td>0.203</td>
</tr>
<tr>
<td>(b) merchandise exports</td>
<td>-0.03*</td>
<td>0.78**</td>
<td>1.49**</td>
<td>424</td>
<td>55.84</td>
<td>0.206</td>
</tr>
<tr>
<td>111. 1965-82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) exports of goods and nonfactor services</td>
<td>0.00*</td>
<td>0.48**</td>
<td>0.51*</td>
<td>901</td>
<td>53.08</td>
<td>0.104</td>
</tr>
<tr>
<td>(b) merchandise exports</td>
<td>0.00*</td>
<td>0.77**</td>
<td>0.56*</td>
<td>901</td>
<td>84.59</td>
<td>0.157</td>
</tr>
<tr>
<td><strong>16 Sub-Saharan African Countries</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. 1965-73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) exports of goods and nonfactor services</td>
<td>-0.05</td>
<td>0.37*</td>
<td>1.21</td>
<td>128</td>
<td>2.43</td>
<td>0.022</td>
</tr>
<tr>
<td>(b) merchandise exports</td>
<td>-0.14</td>
<td>0.27*</td>
<td>3.39</td>
<td>128</td>
<td>2.81</td>
<td>0.028</td>
</tr>
<tr>
<td>11. 1974-82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) exports of goods and nonfactor services</td>
<td>-0.02</td>
<td>0.78**</td>
<td>0.95</td>
<td>128</td>
<td>24.44</td>
<td>0.270</td>
</tr>
<tr>
<td>(b) merchandise exports</td>
<td>-0.02</td>
<td>0.91**</td>
<td>1.79</td>
<td>128</td>
<td>10.28</td>
<td>0.127</td>
</tr>
<tr>
<td>111. 1965-82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) exports of goods and nonfactor services</td>
<td>0.01</td>
<td>0.88**</td>
<td>0.04</td>
<td>272</td>
<td>36.98</td>
<td>0.210</td>
</tr>
<tr>
<td>(b) merchandise exports</td>
<td>0.02</td>
<td>1.01**</td>
<td>0.52</td>
<td>272</td>
<td>18.83</td>
<td>0.116</td>
</tr>
</tbody>
</table>

Source: World Bank data base

Note: (a) The variables have been expressed in terms of rates of change between successive years for individual countries combining time-series and cross-section observations.
(b) Levels of statistical significance: + 10%; * 5%; ** 1%.
The real exchange rate variable has the expected sign, and it is statistically significant at the 1 percent level for the merchandise exports of the 53 developing countries, in all the equations. The foreign income variable also has the expected sign and it attains the 1 percent level of significance in the equations for the 1965-73 and the 1974-82 periods. However, its significance level declines to 5 percent in the equation for the exports of goods and nonfactor services and to 10 percent in the equation for merchandise exports in cases when the two periods are combined.

According to the estimates, a one percent change in the real exchange rate is associated with a 0.77 percent change in the ratio of merchandise exports to output over the entire 1965-82 period. The regression coefficient is slightly lower for the first period (0.71), and slightly higher for the second (0.78), but the difference is not significant statistically.

Larger differences have been obtained for the exports of goods and nonfactor services; the regression coefficient for the real exchange rate variable rises from 0.25 in 1965-73 to 0.58 in 1974-82; it takes the value of 0.48 for the entire period. The difference between the regression coefficients for the 1965-73 and 1974-82 periods is statistically significant at the 1 percent level, indicating a shift in the underlying function.

In view of the relative constancy of the regression coefficient of the real exchange rate variable in the case of merchandise exports, a shift appears to have occurred in regard to nonfactor services. At the same time, the weaker response obtained in regard to services may be explained by reference to the fact that some service items, such as license and management fees, are hardly responsive to exchange rate changes.
The regression coefficients of the foreign income variable declined between the two periods, irrespective of whether one considers the exports of goods and nonfactor services or of goods alone. The coefficients are 2.69 for the exports of goods and nonfactor services and 3.75 for merchandise exports in the first period and 1.16 and 1.49, respectively, in the second, with estimated coefficients of 0.51 and 0.56 for the two periods combined. The differences are statistically significant at the 10 percent and the 5 percent level, respectively. It would appear, then, that the income elasticity of demand in the developed countries for the exports of the developing countries decreased in the period of external shocks.

These considerations may explain that the decline in the foreign income elasticity is larger for merchandise exports than for the exports of goods and nonfactor services. Nevertheless, the elasticity continues to be lower for goods and nonfactor services than for goods alone, indicating that some service items, such as dividends and interest, are not responsive to income changes in the developed countries.

Note finally that the coefficient of determination of the regression equations is low. This is not surprising, given that the variables are expressed in terms of rates of change; in particular, taking the rate of change of the export-output ratio tends to magnify the errors in the export and output data. Nevertheless, the F-statistics are uniformly high, indicating the existence of a significant and systematic relationship of the underlying economic variables.

Table 1 also shows results obtained for 16 Sub-Saharan African countries. The real exchange rate variable again has the expected sign and it is statistically significant at the 1 percent level in the equations for the
1974-82 and the 1965-82 periods but not for the 1965-73 period. In the latter case, the regression coefficient is significant at the 10 percent level for the exports of goods and nonfactor services and it does not reach this level of significance for goods alone.

Limiting attention to the values taken by the regression coefficients which have a high level of statistical significance, we find that the coefficients for the real exchange rate variable are uniformly higher for the Sub-Saharan African countries than for all developing countries taken together. For the 1974-82 subperiod and for the entire 1965-82 period, the differences between the two sets of estimates are 0.13 and 0.24 percentage points for merchandise exports and 0.20 and 0.40 percentage points, respectively.

The results conflict with popular notions, according to which changes in real exchange rates would have less of an effect on the exports of Sub-Saharan African countries than for countries at higher levels of development. But they are consistent with the observation that African countries, which let their exchange rate become greatly overvalued, experienced considerable losses in export market shares (Section V).

The regression coefficient of the foreign income variable exhibits a downward shift in the case of the Sub-Saharan African countries as well. The level of statistical significance of the regression coefficients is very low; it exceeds 5 percent only in the case of merchandise exports in the 1965-73 period. This result may be explained by the high share in Sub-Saharan exports of foodstuffs, such as tropical beverages, the exportation of which responds little to income changes in the developed countries. Also, coffee exports, accounting for a large proportion of the exports of several Sub-Saharan
African countries, are determined by quotas under the International Coffee Agreement, which bear little relationship to changes in incomes in the developed countries.

III. EFFECTS OF PRICE INCENTIVES ON AGRICULTURAL EXPORTS

The above equations have further been estimated for agriculture, with data on agricultural exports and production used in calculating the export-output ratio. In the case of agriculture, estimates have also been made for the ratio of net exports (exports less imports) to output. The estimates pertain to 52 developing countries (51 countries in the case of the net export equations) and to the subset of 16 Sub-Saharan African countries, with the omissions being due to the lack of data on agricultural output and/or exports.

The results again show the responsiveness of exports to changes in the real exchange rate. In the equations for the developing country group, the estimated regression coefficients for agricultural exports are 0.55 for the 1960-73, 0.79 for the 1974-82, and 0.68 for the 1965-82 period. All the coefficients are statistically significant at the 1 percent level (Table 2). As in the case of merchandise exports, then, the regression coefficients estimated for the two periods combined lies between that for the first and for the second period, with coefficient values rising between the two.

A comparison of the results reported in Tables 1 and 2 indicate that the regression coefficients for agricultural exports exceed the coefficients estimated for the exports of goods and services by a considerable margin. At the same time, apart from the 1974-82 period, the coefficients are slightly lower than those for merchandise exports. The following comparisons will be limited to merchandise exports.
## Table 2

Regression Equations for Agricultural Exports in Developing Countries

<table>
<thead>
<tr>
<th>Constant Real Exchange Rate</th>
<th>Foreign Income</th>
<th>( N )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
</table>

### A. Export-Output Ratio

#### 52 Developing Countries

<table>
<thead>
<tr>
<th>Period</th>
<th>( \text{Export-output Ratio} )</th>
<th>( \text{Real Change} )</th>
<th>( \text{Rate Foreign Income} )</th>
<th>( N )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. 1965-73</td>
<td>-0.05</td>
<td>0.55</td>
<td>1.69</td>
<td>416</td>
<td>7.10</td>
<td>0.029</td>
</tr>
<tr>
<td></td>
<td>(-0.81)</td>
<td>(3.54)**</td>
<td>(1.22)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. 1974-82</td>
<td>-0.03</td>
<td>0.79</td>
<td>1.54</td>
<td>416</td>
<td>31.52</td>
<td>0.128</td>
</tr>
<tr>
<td></td>
<td>(-1.57)</td>
<td>(7.44)**</td>
<td>(2.28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. 1965-82</td>
<td>-0.00</td>
<td>0.68</td>
<td>0.73</td>
<td>884</td>
<td>30.73</td>
<td>0.063</td>
</tr>
<tr>
<td></td>
<td>(-0.21)</td>
<td>(7.47)**</td>
<td>(1.56)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 16 Sub-Saharan African Countries

<table>
<thead>
<tr>
<th>Period</th>
<th>( \text{Export-output Ratio} )</th>
<th>( \text{Real Change} )</th>
<th>( \text{Rate Foreign Income} )</th>
<th>( N )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. 1965-73</td>
<td>0.04</td>
<td>1.08</td>
<td>0.43</td>
<td>128</td>
<td>1.75</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(1.87)†</td>
<td>(0.13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. 1974-82</td>
<td>-0.02</td>
<td>1.15</td>
<td>2.52</td>
<td>128</td>
<td>10.24</td>
<td>0.127</td>
</tr>
<tr>
<td></td>
<td>(-0.36)</td>
<td>(4.00)**</td>
<td>(1.58)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. 1965-82</td>
<td>0.04</td>
<td>1.35</td>
<td>0.68</td>
<td>272</td>
<td>14.79</td>
<td>0.092</td>
</tr>
<tr>
<td></td>
<td>(0.85)</td>
<td>(5.26)**</td>
<td>(0.61)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### B. Net Exports - Output Ratio

#### 51 Developing Countries

<table>
<thead>
<tr>
<th>Period</th>
<th>( \text{Net Exports - Output Ratio} )</th>
<th>( \text{Real Change} )</th>
<th>( \text{Rate Foreign Income} )</th>
<th>( N )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. 1965-73</td>
<td>0.17</td>
<td>0.42</td>
<td>-7.58</td>
<td>408</td>
<td>0.11</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.21)</td>
<td>(-0.42)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. 1974-82</td>
<td>-1.30</td>
<td>7.89</td>
<td>46.58</td>
<td>408</td>
<td>5.93</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>(-2.14)†</td>
<td>(2.45)†</td>
<td>(2.25)†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. 1965-82</td>
<td>-0.65</td>
<td>4.96</td>
<td>14.00</td>
<td>867</td>
<td>4.02</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(-1.53)</td>
<td>(2.38)†</td>
<td>(1.30)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 16 Sub-Saharan African Countries

<table>
<thead>
<tr>
<th>Period</th>
<th>( \text{Net Exports - Output Ratio} )</th>
<th>( \text{Real Change} )</th>
<th>( \text{Rate Foreign Income} )</th>
<th>( N )</th>
<th>( F )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. 1966-73</td>
<td>1.65</td>
<td>-4.73</td>
<td>-42.65</td>
<td>128</td>
<td>0.42</td>
<td>-0.009</td>
</tr>
<tr>
<td></td>
<td>(0.61)</td>
<td>(-0.52)</td>
<td>(-0.77)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. 1974-82</td>
<td>0.12</td>
<td>16.43</td>
<td>6.62</td>
<td>128</td>
<td>6.57</td>
<td>0.081</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(3.55)**</td>
<td>(0.26)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. 1965-82</td>
<td>0.07</td>
<td>11.47</td>
<td>-7.72</td>
<td>272</td>
<td>4.39</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(2.96)**</td>
<td>(-0.46)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
See Table 1
The regression coefficient for foreign incomes is shown to decline between the two periods in the case of agricultural exports. But, the differences are not significant statistically and the decline is much smaller than for merchandise exports, which include fuels where developing country exports decreased over time. Finally, the regression coefficient of the foreign income variable for the combined period is substantially lower than for the two periods, taken individually, although the level of significance of the estimates is low.

As in the case of merchandise exports, the regression coefficient of the real exchange rate variable for agricultural exports is uniformly higher for the Sub-Saharan African countries than for all developing countries. In fact, the differences are larger in the present case, ranging from one-half for the 1974-82 period to a near doubling for the 1965-73 and the 1965-82 periods; the coefficients are statistically significant at the 1 percent level, except for the first period where the level of significance only approaches 5 percent.

In turn, the statistical significance of the foreign income variable does not even reach the 10 percent level for the countries of Sub-Saharan Africa. This result may be explained by reference to the low income elasticity of demand in the developed countries for foodstuffs and, in particular, for tropical beverages that account for a large proportion of the agricultural exports of the countries of Sub-Saharan Africa.

The coefficient of determination is lower for agricultural exports than for merchandise exports in both the developing country and the Sub-Saharan African country regressions. The differences in the results may be explained by non-price factors, such as the weather, which affect agricultural
production. Nevertheless, apart from the 1965-73 period, the F-statistics are high, in particular in the developing country equations.

The adjusted $R^2$s and the F-statistics are substantially lower in the equations utilizing the net export ratio as the dependent variable. This result may be explained in part by the fact that errors in the export and the import data are amplified when one takes the difference between the two and in part by the effects on imports of changes in foreign exchange receipts and in the availability of food aid.

The above considerations may also explain the fact that the statistical significance of the real exchange rate variable is lower in the net export equations than in the export equations for the 51 developing countries; the variable is statistically significant at the 5 percent level for the 1974-82 and 1965-82 periods but not for the 1965-73 period. In the former two cases, the values of the regression coefficients are high -- 7.9 and 5.0, respectively. In interpreting this result, it should be recognized that net export-output ratios tend to be small, and hence even a relatively small absolute change can lead to large changes in percentage terms.

The coefficients of the foreign income variable are also high, but their level of statistical significance is low. The same conclusion applies to the equations estimated for Sub-Saharan African countries. And while the coefficients are negative in some cases, no importance should be attached to this result since they are not statistically significant.

The latter conclusion also applies to the real exchange rate variable in the equation for the Sub-Saharan African countries in the first period. However, in the other two equations, this variable is significant at the 1 percent level. It takes values of 16.4 for the 1974-82 period and 11.5 for
the 1965-82 period. While the results are affected by the smallness of the net export-output ratio, they provide evidence of the effects of changes in real exchange rates on trade in agricultural products.

IV. INCENTIVES AND EXPORT PERFORMANCE: COUNTRY EXPERIENCES IN THE 1960-73 PERIOD

A comparison of the experience of eleven semi-industrial countries provides additional evidence on the effects of incentives on agricultural exports in the 1960-73 period of rapid world economic growth. These countries were classified into four groups on the basis of the system of incentives applied during the period.

The countries of the first group, Korea, Singapore, and Taiwan, adopted outward-oriented policies in the early 1960s. These countries provided essentially a free trade regime to exports, further granting some export subsidies that insured similar treatment to exports and to import substitution in the industry sector. Nor was there discrimination against agricultural exports as agriculture and industry received similar incentives.

The second group, Argentina, Brazil, Colombia, and Mexico, adopted inward-oriented policies, entailing discrimination against exports as well as against agriculture in the postwar period. In the mid 1960s, Brazil and Colombia and, to a lesser extent, Argentina and Mexico reduced -- but did not eliminate -- the bias of the system of incentives against manufactured exports. The extent of discrimination remained especially pronounced against traditional agricultural exports while nontraditional exports received similar
Table 3
Export Growth Rates, 1960-73

<table>
<thead>
<tr>
<th></th>
<th>Merchandise Exports</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>40.0</td>
<td>44.0</td>
<td>42.1</td>
</tr>
<tr>
<td>Singapore</td>
<td>28.5</td>
<td>28.5</td>
<td>28.5</td>
</tr>
<tr>
<td>Taiwan</td>
<td>23.5</td>
<td>35.5</td>
<td>29.8</td>
</tr>
<tr>
<td>Argentina</td>
<td>6.7</td>
<td>10.8</td>
<td>8.9</td>
</tr>
<tr>
<td>Brazil</td>
<td>5.4</td>
<td>19.9</td>
<td>13.0</td>
</tr>
<tr>
<td>Colombia</td>
<td>1.5</td>
<td>12.7</td>
<td>7.4</td>
</tr>
<tr>
<td>Mexico</td>
<td>7.8</td>
<td>8.1</td>
<td>8.0</td>
</tr>
<tr>
<td>Israel</td>
<td>15.3</td>
<td>17.0</td>
<td>16.2</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>13.6</td>
<td>13.8</td>
<td>13.7</td>
</tr>
<tr>
<td>Chile</td>
<td>10.1</td>
<td>-5.3</td>
<td>7.5</td>
</tr>
<tr>
<td>India</td>
<td>5.5</td>
<td>7.0</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Source: Bela Balassa and Associates, 1982, Table 3.1.
treatment as manufactured exports in Brazil and Colombia but not in Argentina and Mexico.

The third group, Israel and Yugoslavia, limited the bias of the incentive system against exports during the 1950's, but increased this bias afterwards. Finally, inward-oriented policies continued to be applied in Chile and India, which are classified in the fourth group. Chile made some attempts to promote exports in the early 1960s but subsequently resumed its inward-oriented stance, from which India hardly deviated during the period under consideration.

Korea, Singapore, and Taiwan increased their manufactured exports several times faster than the developing country average during the 1960-73 period. The system of incentives applied also permitted them to raise agricultural exports at a rapid rate, averaging 28 percent in Korea, 16 percent in Taiwan, and 11 percent in Singapore that hardly has any agricultural base. Correspondingly, the total merchandise exports of the three countries rose at average annual rates of 42, 29, and 30 percent between 1960 and 1973 (Table 3).

At the other extreme, total exports as well as agricultural exports increased at average annual rates of less than 7 percent in India. And while export growth accelerated in Chile between 1960 and 1966 in response to the incentives provided, agricultural and manufactured exports changed little afterwards as the bias against exports greatly intensified.

Israel and Yugoslavia occupied an intermediate position in regard to export incentives as well as export performance. Between 1960 and 1973, their merchandise exports rose at average annual rates of 16 and 14 percent, respectively, while agricultural exports increased 11 and 8 percent a year.
Finally, in the second group, Brazil and Colombia experienced a considerable acceleration of the growth of both agricultural and manufactured exports after 1966 in response to increased incentives while smaller changes occurred in Argentina and in Mexico where the reform of the incentive system was less far-reaching. In the first two countries, the acceleration was particularly rapid in agricultural exports, with annual average increases of 17 and 11 percent, respectively, between 1966 and 1973. The corresponding figures were 6 percent for Argentina and 6 percent for Mexico. In all four cases, the rate of growth of manufactured exports, and hence of total merchandise exports, was higher but this occurred from a low base. Thus, the share of manufactured exports in industrial output did not surpass 4 percent in 1973 in Argentina and Brazil while it exceeded 40 percent in the countries of the first group.

V. INCENTIVES AND EXPORT PERFORMANCE: COUNTRY EXPERIENCED IN 1973-78 PERIOD 9/

The 1973-78 period was characterized by external shocks in the form of the quadrupling of oil prices in 1973-74 and the world recession of 1974-75. At the same time, policy responses to external shocks differed to a considerable extent among newly-industrializing countries, defined as having per capita income between $1100 and $3000 in 1978 and a manufacturing share in GDP of 20 percent or higher in 1977, as well as among less developed countries that occupy the range between the newly-industrializing and the least developed countries.

Within the first group, Korea, Singapore, and Taiwan continued with their outward-oriented policies and were joined by Chile and Uruguay. In turn, after lesser or greater efforts made to reduce the bias of the incentive
system against exports in the earlier period, Argentina, Brazil, Israel, Mexico, Portugal, Turkey, and Yugoslavia increased the extent of their inward-orientation.

Among less developed countries, Kenya, Mauritius, Thailand, and Tunisia applied relatively outward-oriented policies during the period under consideration. Conversely, inward orientation predominated in Egypt, India, Jamaica, Morocco, Peru, the Philippines, Tanzania, and Zambia.

The choice between outward and inward orientation was associated with differences in macroeconomic policies in both newly-industrializing and less developed economies. While outward-oriented countries adopted realistic exchange rates and limited reliance on foreign borrowing, most inward-oriented countries let their exchange rate appreciate, supported by foreign borrowing. At the same time, the borrowed funds were not generally used to promote efficient activities oriented towards exportation.

In the case of Sub-Saharan African countries, the distinction made between alternative policies in terms of outward- and inward-orientation may be further generalized in terms of the extent of public interventions in product, capital, labor, and foreign exchange markets. Depending on the extent of these interventions, distinction has been made between market-oriented and interventionist economies. The first group includes Botswana, Cameroon, Ivory Coast, Kenya, Malawi, Mauritius, Niger, Togo, and Upper Volta while the second comprises Benin, Ethiopia, Ghana, Madagascar, Mali, Senegal, Sudan, Tanzania, Zaire, and Zambia. A three-fold classification scheme has also been utilized, with Botswana, Cameroon, Ivory Coast and Mauritius included in the group of private market economies, Benin, Ethiopia, Ghana, Madagascar, Mali, Tanzania and Zambia in the group of étatist countries, and
Kenya, Malawi, Niger, Senegal, Sudan, Togo, Upper Volta, and Zaire in an intermediate group.

The policies applied greatly affected export performance in the countries under consideration. This is evidenced by changes in export market shares for each country's merchandise exports as well as for its agricultural exports. In each case, the results reported in Tables 4 to 7 show the ratio of average export market shares in the 1974-78 period to the average for the 1971-73 base period.

All the outward-oriented NICs increased their export market shares in the period under consideration, with gains ranging from 3 to 53 percent. In turn, inward-oriented NICs experienced losses in market shares, the only exception being Brazil where the continuation of export subsidies led to moderate gains (Table 4). The losses were the largest in Portugal (39 percent), where the April 1974 Revolution also affected the results.

A similar picture emerges in the case of less developed countries. All outward-oriented LDCs gained export market shares, ranging from 8 to 21 percent. In turn, inward-oriented LDCs experienced losses of market shares, ranging from 9 to 29 percent, except that the Philippines had a small gain in response to incentives provided to manufactured exports (Table 5).

The Sub-Saharan African countries, too, fit the pattern. The range of increases in average export shares was between 9 to 81 percent in market economies, except for Cameroon, Niger, and Togo that experienced declines of 4 to 22 percent. In turn, all interventionist countries lost export market shares, with the losses exceeding one-third in Ethiopia, Ghana, and Tanzania, where the policy-induced distortions -- in particular, the overvaluation of the exchange rate -- were the most pronounced (Table 6).
### Table 4

**Changes in Export Market Shares: The Newly Industrializing Countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Merchandise Exports 1974-78</th>
<th>Merchandise Exports 1979-81</th>
<th>Traditional Agricultural Exports 1974-78</th>
<th>Traditional Agricultural Exports 1979-81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>153.4</td>
<td>167.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>103.0</td>
<td>135.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>102.5</td>
<td>116.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>136.2</td>
<td>160.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uruguay</td>
<td>122.4</td>
<td>128.5</td>
<td>106.6</td>
<td>100.9</td>
</tr>
<tr>
<td>Argentina</td>
<td>99.3</td>
<td>93.7</td>
<td>96.8</td>
<td>92.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>108.4</td>
<td>126.6</td>
<td>96.0</td>
<td>96.3</td>
</tr>
<tr>
<td>Israel</td>
<td>86.9</td>
<td>85.2</td>
<td>96.0</td>
<td>88.5</td>
</tr>
<tr>
<td>Mexico</td>
<td>79.1</td>
<td>92.2</td>
<td>78.3</td>
<td>68.9</td>
</tr>
<tr>
<td>Portugal</td>
<td>60.7</td>
<td>54.4</td>
<td>82.6</td>
<td>56.9</td>
</tr>
<tr>
<td>Turkey</td>
<td>91.6</td>
<td>103.8</td>
<td>78.1</td>
<td>73.7</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>91.1</td>
<td>87.2</td>
<td>67.1</td>
<td>39.6</td>
</tr>
</tbody>
</table>

**Source:** World Bank data tapes.

**Note:** The results show the ratio of a country's export market share in the period under consideration to its share in the base period. For 1974-78, the base period is 1971-73; for 1979-81, it is 1976-78.

The average ratio for merchandise exports has been derived as the weighted average of the ratios calculated for traditional primary exports, defined as accounting for more than 1.5 percent in total exports in 1971-73, taken individually for nontraditional primary exports, for fuel exports, and for manufactured exports. For traditional agricultural exports, the average pertains to agricultural products within the traditional primary export group.
The effects of the policies applied on export performance are also apparent in the averages calculated for the various groups. Thus, the outward-oriented newly-industrializing countries experienced an average gain of 18 percent in export market shares, compared with a loss of 8 percent for the inward-oriented NICs. In turn, the outward-oriented and the inward-oriented less developed countries had gains of 18 percent and losses of 10 percent, respectively. Finally, in Sub-Saharan Africa, market-oriented countries had an average gain of 5 percent and interventionist countries an average loss of 19 percent. Using a three-fold classification scheme distinguishing among private market economies, intermediate, and étatist countries in Sub-Saharan Africa, the corresponding figures are +15, -10, and -24 percent (Table 7).

Tables 4 to 7 further provide information on the performance of individual countries and country groups in regard to traditional agricultural exports, defined as accounting for at least 1.5 percent of export value in 1971-73. The results confirm the findings pertaining to total merchandise exports.

Among outward-oriented newly-industrializing countries, only one country, Uruguay, had traditional agricultural exports in the 1971-73 period, and it experienced increases in export market shares during the 1974-78 period. In turn, all inward-oriented NICs lost market shares in their traditional agricultural exports, ranging from 3 percent in Argentina to 33 percent in Yugoslavia.

The less developed countries show a broadly similar pattern. Among outward-oriented LDCs, Kenya and Thailand made gains of 24 and 17 percent, respectively, Tunisia experienced no change, and only Mauritius had losses in
### Table 5

**Changes in Export Market Shares: Less Developed Countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Merchandise Exports</th>
<th>Traditional Agricultural Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1974-78</td>
<td>1979-81</td>
</tr>
<tr>
<td>Kenya</td>
<td>109.0</td>
<td>101.2</td>
</tr>
<tr>
<td>Mauritius</td>
<td>108.1</td>
<td>117.9</td>
</tr>
<tr>
<td>Thailand</td>
<td>121.0</td>
<td>145.6</td>
</tr>
<tr>
<td>Tunisia</td>
<td>114.3</td>
<td>142.3</td>
</tr>
<tr>
<td>India</td>
<td>91.0</td>
<td>62.6</td>
</tr>
<tr>
<td>Egypt</td>
<td>76.0</td>
<td>53.2</td>
</tr>
<tr>
<td>Jamaica</td>
<td>83.9</td>
<td>59.6</td>
</tr>
<tr>
<td>Morocco</td>
<td>85.2</td>
<td>86.7</td>
</tr>
<tr>
<td>Philippines</td>
<td>104.8</td>
<td>136.1</td>
</tr>
<tr>
<td>Peru</td>
<td>90.3</td>
<td>121.1</td>
</tr>
<tr>
<td>Tanzania</td>
<td>71.4</td>
<td>59.8</td>
</tr>
<tr>
<td>Zambia</td>
<td>87.4</td>
<td>77.9</td>
</tr>
</tbody>
</table>

Source: See Table 4

Note: Table 4
traditional agriculture exports (11 percent). By contrast, apart from India's unchanged position, all inward-oriented LDCs lost market shares, reaching 41 percent in the case of Egypt, where the appreciation of the real exchange rate was especially large.

Finally, apart from Mauritius, Niger, and Togo, private market economies in Sub-Saharan Africa increased their market shares of traditional agricultural exports; the largest gains were observed in Malawi (50 percent), the Ivory Coast (35 percent), Kenya (25 percent), and Botswana (21 percent). In turn, all interventionist countries lost export market shares, with a nearly two-thirds loss shown for Benin and over one-third in Ethiopia and Zaire. As shown in Table 6, the differences are even more pronounced if private market economies and étatist countries are compared.

For groups of countries, data are available for all traditional primary exports that include nonagricultural products as well. As shown in Table 7, outward-oriented NICs had average gains of 24 percent, compared with losses of 10 percent for inward-oriented LDCs. Also, outward-oriented LDCs had gains of 14 percent while inward-oriented LDCs had losses of an equal magnitude. 12/

VI. INCENTIVES AND EXPORT PERFORMANCE: COUNTRY EXPERIENCES IN THE 1978-81 PERIOD 13/

In the 1978-81 period, developing countries suffered the effects of the two-and-a-half fold increase in oil prices, the ensuing recession in the developed countries, and the rapid rise in world interest rates. At the same time, as shown in Tables 4 to 7, the export performance of these countries again reflected the policies applied. 14/
Table 6

Changes in Export Market Shares: Sub-Saharan African Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Merchandise Exports 1974-78</th>
<th>Traditional Agricultural Exports 1974-78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>181.2</td>
<td>120.7</td>
</tr>
<tr>
<td>Cameroon</td>
<td>96.0</td>
<td>107.7</td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>118.9</td>
<td>134.9</td>
</tr>
<tr>
<td>Mauritius</td>
<td>108.1</td>
<td>89.1</td>
</tr>
<tr>
<td>Kenya</td>
<td>109.0</td>
<td>123.8</td>
</tr>
<tr>
<td>Malawi</td>
<td>152.3</td>
<td>150.1</td>
</tr>
<tr>
<td>Niger</td>
<td>77.8</td>
<td>47.1</td>
</tr>
<tr>
<td>Togo</td>
<td>91.4</td>
<td>61.6</td>
</tr>
<tr>
<td>Upper Volta</td>
<td>121.9</td>
<td>102.0</td>
</tr>
<tr>
<td>Senegal</td>
<td>103.2</td>
<td>119.3</td>
</tr>
<tr>
<td>Sudan</td>
<td>83.6</td>
<td>90.3</td>
</tr>
<tr>
<td>Zaire</td>
<td>76.9</td>
<td>63.1</td>
</tr>
<tr>
<td>Benin</td>
<td>41.8</td>
<td>35.8</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>60.2</td>
<td>60.2</td>
</tr>
<tr>
<td>Ghana</td>
<td>72.8</td>
<td>79.7</td>
</tr>
<tr>
<td>Madagascar</td>
<td>82.4</td>
<td>88.9</td>
</tr>
<tr>
<td>Mali</td>
<td>106.6</td>
<td>89.1</td>
</tr>
<tr>
<td>Tanzania</td>
<td>71.4</td>
<td>99.4</td>
</tr>
<tr>
<td>Zambia</td>
<td>87.4</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: See Table 4

Note: Table 4
All outward-oriented newly-industrializing countries gained market shares in total merchandise exports, ranging from 16 to 67 percent. In turn, apart from Brazil, which provided substantial export incentives, and Turkey, where important policy changes occurred in 1980, all inward-oriented NICs lost market shares, with Portugal showing the largest losses (46 percent).

The situation was similar in the case of the less developed countries. While outward-oriented LDCs gained export market shares, ranging from 1 to 45 percent, inward-oriented LDCs experienced losses of 13 to 47 percent, the exceptions being the Philippines and Peru. However, in the case of Peru, the discovery of oil reserves pushed the results into the plus column.

As far as country groups are concerned, the outward-oriented NICs and LDCs both increased their average market shares in merchandise exports by 37 percent. Conversely, inward-oriented NICs and LDCs experienced losses of 4 and 19 percent, respectively, although the results were improved by petroleum discoveries in Mexico in the first case and in Peru in the second.

All inward-oriented NICs lost market shares in traditional agricultural exports, ranging from 4 percent in Brazil to 40 percent in Yugoslavia. In turn, Uruguay, the only outward-oriented newly-industrializing country with traditional agricultural exports, had a small gain.

Also, all inward-oriented LDCs lost market shares in their traditional agricultural exports, with Egypt (55 percent), the Philippines (52 percent), and Jamaica (49 percent) incurring the largest losses. As in the previous period, Kenya (19 percent), and Thailand (24 percent) made gains among outward-oriented LDCs while Mauritius (13 percent) and Tunisia (20 percent) experienced losses.
Table 7

Changes in Export Market Shares: Country Groupings

<table>
<thead>
<tr>
<th>Country Group</th>
<th>Merchandise Exports</th>
<th>Traditional Primary Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1974-78</td>
<td>1979-81</td>
</tr>
<tr>
<td>Outward-oriented NICs</td>
<td>118.3</td>
<td>137.2</td>
</tr>
<tr>
<td>Outward-oriented LDCs</td>
<td>117.5</td>
<td>137.3</td>
</tr>
<tr>
<td>Outward-oriented NICs and LDCs</td>
<td>118.2</td>
<td>137.2</td>
</tr>
<tr>
<td>Inward-oriented NICs</td>
<td>91.9</td>
<td>96.1</td>
</tr>
<tr>
<td>Inward-oriented LDCs</td>
<td>89.8</td>
<td>80.8</td>
</tr>
<tr>
<td>Inward-oriented NICs and LDCs</td>
<td>91.2</td>
<td>91.3</td>
</tr>
</tbody>
</table>

Source: See Table 4

Note: Table 4
Finally, gains in market shares in traditional primary exports averaged 29 percent in outward-oriented NICs and 18 percent in outward-oriented LDCs. Conversely, average losses were 12 percent in inward-oriented NICs and 21 percent in inward-oriented LDCs.

Conclusions

The findings of this paper indicate that exports in general, and agricultural exports in particular, strongly respond to price incentives. This conclusion has been established by an econometric analysis of data for developing countries and for a subset of Sub-Saharan African countries as well as by comparisons of the experience of countries at different levels of development and following different policies.

The econometric analysis shows the responsiveness of the exports of goods and nonfactor services, merchandise exports, and agricultural exports to changes in the real exchange. It is of particular interest to note that this response is apparently greater in Sub-Saharan African countries than in developing countries in general.

At the same time, the econometric estimates are subject to a downward bias, due in part to the use of ordinary least-squares (OLS) estimation techniques and in part to the absence of a lag structure in the estimates. Evidence on the downward-bias of OLS is provided in estimates for export demand and export supply functions for Greece and Korea.

The country analyses further indicate that outward-oriented countries had a far better export performance in regard to merchandise exports, as well as for traditional agricultural exports, than inward-oriented economies. This
conclusion applies to all the periods under consideration as well as to countries at different levels of development, from newly-industrializing developing countries to Sub-Saharan African countries.

The findings obtained by different methods of investigation thus complement and reinforce each other. At the same time, they disprove the oft-voiced views that agricultural exports and exports from countries at low levels of development would not respond to incentives.
Notes

1/ Wholesale price indices are superior to consumer price indices that include the prices of nontraded goods and are affected by price controls applied in a number of developing countries. The former, but not the latter, objection also applies to the use of GDP deflator in the calculations.

2/ On alternative concepts of the real exchange rate, see Balassa (1987).

3/ Ideally, one would need to consider the price of value added (the effective rate of protection) rather than product prices.

4/ Also, fixed exchange rates among major currencies prevailed in the first period while flexible exchange rates dominated in the second period. This will have relevance, however, primarily for those developing countries that fixed their currency values in terms of a single foreign currency.

5/ Needless to say, the data are subject to considerable error. But, there is no reason to assume that these errors would introduce a bias in the results.

6/ Because of its lack of statistical significance, the relative price variable for traded and nontraded goods has been dropped from the estimating equations reported in the paper.

7/ The discussion draws on Balassa and Associates (1982).

8/ In the absence of appropriate deflators, the data refer to the dollar value of exports.

9/ The discussion draws on the material presented in Balassa, 1984a and 1984b. -- The latter paper also describes the scheme of classification utilized in this paper.
10/ Among these countries Kenya, Mauritius, Tanzania and Zambia were included in the less developed country group referred to earlier.

11/ This represents a subgroup of the traditional primary exports referred to earlier. In turn, it was not possible to separate nontraditional agricultural exports from other primary exports in the data.

12/ Comparable figures for groups of Sub-Saharan African countries are not available.

13/ The discussion draws on the material presented in Balassa, 1984c. Comparable data for the Sub-Saharan African countries are not available.

14/ The data relate to the ratio of average export market shares in the 1979-81 period to average shares in the 1976-78 period.

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