Are Primary Exports Really Unimportant to the Export-Output Relationship?

Addington Coppin*

While several studies have concluded that manufacturing exports contribute more than do primary exports to economic growth in lesser developed countries, one of these has recently suggested that primary exports might not make an independent contribution to the export-output nexus. However, that finding could be due to a theoretical error in the model specification. The empirical results below reveal an efficiency role for primary exports in the specification of the export-output relationship for the period 1973-1983. The labor supply is also revealed to have been a non-binding constraint on production during the period.

I. Introduction

The literature on the effects of exports on output has evolved out of concerns as to which type of industrialization strategy best favours economic growth in developing countries. The findings have largely supported the hypothesis that export-orientation leads to better growth performance than import-substitution policies. This is due to a superior resource allocation along the lines of comparative advantage, greater capacity utilization, and exploitation of technological improvements. By comparison, import substitution policies in the small domestic markets of many developing countries have often led to high cost production, usually with technologies which are inappropriate to the domestic resource endowments.¹

Ever since studies of the 1960s revealed that some exports make a larger contribution to economic growth than others,² it has become of in-

² See, e.g., Syron and Walsh (1968).

^{*} Department of Economics, Oakland University, Rochester, MI., USA.

¹ Balassa (1978: pp. 181-183) presents a good discussion on this.

terest to specify such a differential effect in models which study the export-output growth relationship. Balassa's (1985) study found that including the share of manufactured exports as a separate regressor variable increased explanatory power. A recent study by Fosu (1990), however, argued that by entering the manufacturing share separately in addition to export growth, Balassa was implicitly assuming the marginal productivity of exports to be constant with respect to export composition. Fosu chose, instead, to specify a role for an interactive term incorporating the composition of exports with the volume of exports. Based on a sample of 64 countries for the data period 1960-80, he concluded that the differential contribution from exports in these developing countries was due entirely to manufacturing exports.

The Fosu study, in effect, says that there is no significant difference in the contributions of primary export activity and import substitution activity in developing countries, but that investing the same resources in manufacturing export activity can make a greater contribution to growth. The implication is that the efficiency gains due to international competition in primary export industries on average offset those inefficiencies due to protectionist policies in the import-competing industries of the domestic manufacturing sector.

A priori, it seems plausible to us that the primary export sector should, via its foreign exchange-earning potential, make a positive, differential contribution to output — in particular where this sector is operating under competitive conditions in the international market. For, it is frequently the case that production for the domestic market in many small, developing countries obtains under increasing returns to scale (decreasing costs) on the other hand, production for the international market can usually better exploit these production economies.³

I contend that the model estimated in Fosu (1990) might be misspecified, given its theoretical foundation. However, even if we assume the Fosu result to be a priori plausible, our own estimation suggests that such was not the case during the period 1973-1983, over the sample of 59 countries for which we investigated this relationship.

³ Further, the export sectors all play a role in producing second round employment in the domestic economy, particularly in the service sectors. Then there is to be considered the case of the export processing zones; these are becoming of significant importance in the exports of manufactured goods from developing countries. Since these zones contribute far more to export values than they do to domestic value added, they should reduce the manufacturing export differential (where such exists).

II. Theoretical Specifications

The recent Fosu (1990a) study specifies the augmented production function^{4,5}

(1)
$$Q = f[(L, K); X]$$

where L and K have constant elasticities (b_1, b_2) , but the "output elasticity" of X (b_3) is a weighted average of the elasticities of the two export sectors (primary or non-manufacturing (N), and manufacturing (M)); in particular, with variable shares, $s_i = X_i/X$:

(2)
$$b_3 = b_{3N} s_N + b_{3M} s_M$$

Taking logs and differentiating, Fosu obtains⁶

(3)
$$\dot{Q} = [b_{3N} + cs_M] \dot{X}$$

where
$$c = (b_{3M} - b_{3N})$$

or

(4)
$$\dot{Q} = f(\dot{X}, s_M \dot{X})$$

which he estimates.⁷ However, since s_M is assumed to be variable, it must be differentiated at equation 3; accordingly, I obtain

⁴ Q, L, K and X refer to output, labour, capital and exports respectively. For a fuller exposition on this function, see Ram (1985: p. 417)

6 We omit the L and K variables for the present. Intermediary steps in the manipulation of (1) are

ln Q = b₃ ln X =
$$(b_{3N} s_N + b_{3M} s_M)$$
 ln X
 \rightarrow Q = $(b_{3N} s_N + b_{3M} s_M)$ X

⁵ There has been some debate as to the direction of causality in the relationship between exports and output growth. While the results of several earlier studies have not been conclusive, a recent study by Bahmani-Oskooee, Mohtadi and Shabsigh (1991) has, by adopting an optimal lag criterion, concluded in favor of the export promotion hypothesis, especially in the case of well-known newly industralized countries.

⁷ Obtaining a statistically insignificant $\dot{\mathbf{X}}$ variable, but a statistically significant $\mathbf{s}_M\dot{\mathbf{X}}$ variable, he concludes "that the previously reported positive influence of exports on economic growth in developing countries may be attributed almost entirely to the manufacturing contents of exports."

(5)
$$\dot{Q} = b_{3N}\dot{X} + cs_M(\dot{X} + \ln X \dot{s}_M)$$

i.e.

(6)
$$\dot{Q} = f(\dot{X}, s_M(\dot{X} + \ln X \dot{s}_M))$$

Omitting the last portion is tantamount to saying s_M is constant (which reduces the model to $\dot{Q} = f(\dot{X})$), or $\ln X = 0$ (which reduces the model to Q constant — a clearly unacceptable solution)).

If, alternatively, the specification were as follows:

$$(7) X = X_N^a X_M^b,$$

where a and b are the weights of the two sectors' (primary and manufacturing) exports in total real exports, and

(8)
$$Q = X_N^{au} X_M^{bv};$$

where u and v are the elasticities of real valued exports, then $X_N = (X \cdot X_M^{-b})^{(1/a)}$ implies

$$Q = X^{u} X_{M}^{a(v-u)}$$

and

(9)
$$\dot{\mathbf{Q}} = \mathbf{u} \ \dot{\mathbf{X}} + \mathbf{a}(\mathbf{v} \cdot \mathbf{u}) \ \dot{\mathbf{X}}_{M}$$

i.e.

(10)
$$\dot{Q} = [u(1-a) + va]\dot{X} + a(v-u)(X_M/\dot{X})$$

The coefficient on the \dot{X} term will be larger than that on the (X_M/\dot{X}) term when v>u (except of course when u=0— the case of primary exports making no explicit (additional) contribution to the rate of output growth, beyond their employment of primary resources). Notice the Fosu s_M (= X_M/X) term is explicit to our formulation— but as a growth rate, rather than as a level.

⁸ Of course, if $\dot{X} = f(\dot{s}_M \ln \dot{X})$, linear, \dot{X} would be a reasonable proxy variable. Under such conditions, the low t statistic on the exports variable might be due more so to multicollinearity than to the insignificance of primary exports in the relationship.

⁹ Except that ours is a ratio of real values rather than Fosu's nominal values.

III. Empirical Results

The OLS estimates from various specifications are contained in Table 1. I utilize World Bank data for the period 1973-83, for 59 LDCs. The variables are defined as in previous literature (e.g. Ram (1985), Fosu (1990)). In all of the specifications tested, the rate of growth of the labour force proved to be statistically insignificant. This suggests that, on average, labour supply was not a binding constraint on the rate of growth of output in the sample of countries studied during the period 1973-83. Dequation I.2 (i.e. equation 2 of Table 1), which is the generic specification of output as a function of labour, capital and real exports, Treveals a significant role for exports in the data period chosen here, for the sample of 59 countries.

Equation I.4 shows that the interactive variable of Fosu is not statistically significant for our sample when exports are included explicitly. The variable I argue to be appropriate on theoretical grounds (labelled Z in Equation I.5) also proves to be statistically insignificant. The variable s_M specified as a level also fails to be statistically important to the regression (this result is not shown). However, I obtain a significant role for the rate of growth of manufacturing sector exports as a ratio of total real exports (equation I.6). The positive differential here suggests that manufacturing exports were more important than non-manufacturing exports in the determination of the rate of economic growth in our sample of 59 countries, but the strong role for non-manufacturing exports is evident by the highly significant export growth coefficient.

IV. Conclusion

The recent Fosu result of an insignificant differential role for non-

¹⁰ Indeed, a look at the raw data (See World Development Report, 1984, Table 2 (p. 176) and Table 21 (p. 214)) shows that labor forces in the majority of low-income countries (controlling for China and India) grew at an annual average of 2.1% during the 1965-73 period, compared with 4.1% during the 1973-83 period; comparative statistics for middle-income countries are 2.2% and 2.6% per annum respectively. On the other hand, rates of growth of output in the same low-income countries averaged 3.7% in the 1965-73 period, versus 3.3% for the 1973-83 period; comparative figures for the middle-income countries are 7.1% and 4.7% respectively.

¹¹ Again, all references here are to growth rates.

¹² The simple correlation coefficient for the \dot{X} and $s_M\dot{X}$ variables did not prove to be a problem here ($r^2=0.66$).

manufacturing exports in a sample of 64 less developed countries during the data period 1960-80 is not revealed in our study of 59 low- and middle-income LDCs for the data period 1973-1983. Instead, I find that both primary and manufacturing exports were important to the export-output relationship. Our results also reveal that labour supply was not a binding constraint on economic growth during the period. The fact that labour forces grew faster in the sample period than in the 1960s, while the rates of output growth were lower, appears to support our empirical estimates.

Table 1
THE EXPORT-OUTPUT RELATIONSHIP
IN DEVELOPING COUNTRIES, 1973-1983

Constant	Ĺ	Ķ	Ż	s _M X	s _M	Z	ADJ R ²	SEE
11.00	0.14 (0.31)	0.24 (3.95)					.19	2.51
2. 0.07	0.19 (0.48)	0.13 (2.34)	0.27 (4.46)				.40	2.17
30.60	0.23 (0.53)	0.18 (3.13)		0.68 (3.20)			.31	2.33
4. 0.03	0.21 (0.53)	0.13 (2.31)	0.23 (2.96)	0.21 (0.81)			.39	2.18
5. 0.14	0.19 (0.46)	0.13 (2.18)	0.26 (4.30)			0.01 (0.19)	.39	2.19
6. 0.62	0.11 (0.28)	0.11 (1.87)	0.27 (4.64)		0.07 (2.32)		.44	2.10

Dependent variable is output growth. Data in parentheses are 't' statistics. A dot over the variable represents its rate of growth. Sample size is 59 countries in all cases above. Variables L, K, X refer to labor, capital and exports respectively (Capital growth is proxied as in other studies by the annual average of gross investment to output). s_M is the share of real manufactured exports in total exports, while the variable $Z = s_M(\dot{X} + s_M \ln X)$. Data are sourced from World Development Report 1984 (World Bank), and World Tables, 1988/89 (World Bank).

Countries included in this study are: Bangladesh, Benin, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic, Chile, China, Columbia, Congo, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Ivory Coast, Jamaica, Jordan, Kenya, Lesotho, Liberia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Morocco, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Somalia, Sri Lanka, Sudan, Syria, Tanzania, Thailand, Togo, Uganda, Yernen Arab Republic, Zaire, Zambia, Zimbabwe.

References

- Bahmani-Oskooee, M., H. Mohtadi and G. Shabsigh "Exports, Growth and Causality in LDCs: A Re-Examination," Journal of Development Economics, 36, 2, 1991, 405-415.
- Balassa, B., "Exports and Economic Growth: Further Evidence," Journal of Development Economics, 5, 2, 1978, 181-189.
- Economic Growth in Developing Countries after the Oil Shock,"

 Journal of Development Economics, 18, 1985, 23-35.
- Fosu, A., "Export Composition and the Impact of Exports on Economic Growth of Developing Countries,"

- Economics Letters, 34, 1, 1990a, 66-71.
- Ram, R., "Exports and Growth: Some Additional Evidence," Economic Development and Cultural Change, 33, 2, 1985, 415-425.
- Syron, R. and B. Walsh, "The Relation of Exports and Economic Growth," *Kyklos*, 21, 3, 1968, 541-547.
- World Bank, World Development Report, New York: Oxford University Press, 1984.
- Washington, D.C.: The World Bank, 1989.

