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EXPORT INSTABILITY, INVESTMENT AND ECONOMIC GROWTH IN DEVELOPING COUNTRIES *

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INTRODUCTION

Export instability is often seen to be detrimental to the economic growth of those developing countries which have a large export sector and which depend on a few primary products for this export.

One of the arguments against export instability is that it produces instability in government revenue which leads to instability in government expenditure. This instability in government expenditure is then seen to affect economic growth adversely in two ways. First, it makes the orderly implementation of development plans difficult. In order to avoid supply bottlenecks, scarce skilled personnel may have to be diverted from more important developmental tasks and the opportunity cost of this may be high. This argument therefore concentrates on the administrative problems and costs created by expenditure instability as a result of export instability.

The second reason for believing that expenditure instability is detrimental to economic growth is the adverse effect that expenditure instability has on investment. Public and private investment programmes complement each other to a large extent. For example, the availability of industrial estates at subsidized rates can influence industrial investment. Instability in public expenditure reduces the confidence that private investors have in the ability of the government to provide the necessary complementary public facilities. This results in the precautionary discounting of potential investment returns and so in a lowering of the investment level.[1]

These arguments against export instability, which emphasize its effects on economic growth through revenue and expenditure instability, have not generally been explicitly stated in the literature on instability and growth.[2] In the few places where they have been mentioned, there is no attempt to verify them empirically.[3] This paper aims to fill part of this gap in the literature by examining the effect of export instability on economic growth via its influence on investment for a group of 44 developing countries over the period 1967-81. It does not attempt to examine the administrative costs of export instability.

EXPORT INSTABILITY AND ECONOMIC GROWTH

We begin the Harrod-Domar growth equation:

$$Yg = (1/k)(1/Y) \qquad (1)$$

where Y_g is the growth rate of the real GDP, k the incremental capital-output ratio, and $1/Y$ the domestic investment expenditure to GDP ratio.

$1/Y$ is then made to vary inversely with instability in government expenditure ($\dot{E}$) because of precautionary discounting by private foreign and local investors:

$$1/Y = a - b\dot{E} \quad (2)$$

Governments depend largely on their revenues for funding their expenditure programmes so that instability in government revenue (*R*) will be reflected by instability in government expenditure. The presence of foreign funds for the government weakens the relationship between revenue instability and expenditure instability as it provides the government with another source of funds for financing its expenditure programme. Thus the higher the government foreign capital inflow as a proportion of GDP, (*F*), the lower will be expenditure instability for a given revenue instability. Thus we have:

$$\dot{E} = d + dR = eF \quad (3)$$

R is hypothesized to vary positively with instability in export earnings (*X*). Most of the economies of developing countries are dominated by the agricultural sector. The price elasticity of demand for and the price elasticity of supply of agricultural products are low. At the same time supply is unstable because of the vagaries of the weather and other natural factors. Demand is sensitive to changes in the income level, especially if the products are for export, so that shifts in demand occur frequently. These supply and demand conditions combine to produce severe price and income instability. This then produces government revenue instability because of the importance of the agricultural sector in the tax structure of developing countries and because of the widespread use of ad *valorem* export taxes for administrative efficiency and ease. Thus we have:

$$R = f + gX \quad (4)$$

Through a series of substitutions, we obtain the following estimating equation:

$$Y_g = a_0 - b_0X + c_0F \quad (5)$$

where $a_0 = (a - bc - bdf)/k$, $b_0 = bdg/k$, and $c_0 = be/k$

In the empirical analysis that follows we shall estimate not only equation (5) but also equations (2), (3) and (4) in order to test for the presence of the structural relationships underlying the postulated link between export instability and economic growth.

The testing for the underlying structural relationships is required to ensure that we are testing the hypothesis of precautionary discounting and not some other hypothesis arising out of the general argument against export instability. For example, it has been claimed that export instability produces inflation which then affects investment and therefore growth adversely.[4] Thus we have:

$$1/Y = h - iP + jF \quad (6)$$

$$P = l + mX \quad (7)$$

where P is the rate of inflation and the other variables are as defined previously. 1/Y is also made to depend on F because foreign capital inflows provide another source of funds for investment. The substitution of equation (7) into equation (6) and the substitution of the

resulting equation into the Harrod-Domar growth equation (1) produces the following estimating equation:

$$Y_g = a_1 - b_1X + c_1F \qquad (8)$$

where $a_1 = (h - il)/k$, $b_1 = im/k$, and $c_1 = j/k$.

It can be seen that equation (8) is identical to equation (5) for estimating purposes. Yet the derivations of equations (8) and (5) show that two different aspects of the general argument against export instability are being tested. It makes nonsense of the theoretical distinction between the two hypotheses if the same estimating equation is used. In order to ensure that we are testing for the precautionary discounting of investment returns, the specific intermediate linkages between export instability and economic growth, as given by equations (2), (3) and (4), have to be estimated.

EMPIRICAL VERIFICATION PROCEDURE

Equations (2), (3). (4) and (5) were estimated by ordinary least-squares regression analysis for a sample of 44 developing countries for the period 1967-81.[5] The first part of the period was one of relative international economic stability, the second one of relative instability following the massive increases in the price of oil in 1973 and 1978-79.

As the problems identified in the model represented by equations (1)-(5) are theoretically only of concern to those developing countries which have a large export sector and which are highly dependent on a few primary commodities for this export, the equations were also estimated for two sub-groups of countries.[6] Sub-group one consists of those 14 countries which have above-average export to GDP ratios and commodity concentration ratios. Sub-group two consists of those 15 with below-average values for these two ratios. The expectation is that economic growth in the countries in sub-group one would be affected more by export instability than those in sub-group two.

The instability index used is the standard error of estimate normalized by the mean. The standard error of estimate is obtained by taking deviations 01 the value of the variable concerned (e.g. export earnings) from its trend values over a given period. The trend values are obtained by a simple linear or non-linear regression, whichever gives the better fit. of the export earnings against time. It is important that only the trend values from the best fitting regression line are used. If a linear trend is imposed on the export values of a country that are not linearly related to time, it will produce biased regression coefficients because of the presence of first-order auto-correlation in the residuals. Also, it will result in countries with higher export growth rates having larger standard errors of estimate, and therefore higher export instability indices. If export growth is important for economic growth. the positive bias created will produce a spurious positive relationship between export instability and economic growth.[7] $\dot{E}$, R and X are the instability indices for government expenditure, government revenue and export earnings respectively.

Both the linear and the logarithmic formulations of the functional relationships postulated by equations (2), (3), (4) and (5) were estimated. The linear formulation produces, in general. the better results. The results for the total sample of countries. obtained when the instability index was derived from the best fitting trend lines, are given in Table I, Table II

presents the results for the countries in sub-group one and Table III the results for the countries in sub-group two. These tables also contain the results obtained when the instability index was derived from the second-best fitting trend line. The regression coefficient for the export instability variable (*X*) when the second-best fitting trend line is used is expected to be more significant (and positive) than that obtained when X was estimated using the best-fitting trend line because of the positive bias created by the use of the second-best fitting trend line.

EMPIRICAL RESULTS

Table I shows that, for the total sample of 44 developing countries, export instability produced revenue instability (equ.4) which, in turn, brought about expenditure instability (equ.3), in spite of the cushioning effect of foreign capital flow. However, there is no evidence that all these things led in turn to the precautionary discounting of investment returns (equ.2). The coefficients obtained for E in equation (2) are not statistically significant, even though they have the expected negative sign.

The results for equation (5) show that export instability was detrimental to economic growth, when the second-best fitting trend line was used to derive *X*. When the best-fitting trend line was used, export instability had no effect on economic growth. This shows quite clearly that a spurious positive relation between export instability and economic growth will be obtained whenever an incorrect method of estimating instability is used.

Table II shows that, for those countries with above-average dependence on exports and on a few primary commodities (sub-group one countries), export instability produced revenue instability. However, this was not translated into expenditure instability nor into a slowing down of the rate of economic growth. The presence of government foreign capital inflow had weakened the link between revenue instability, induced by export instability, and expenditure instability. As investment is expected to be adversely affected by expenditure instability, the absence of expenditure instability did not produce a lowering of investment and hence of economic growth.

For those countries with below-average exports to GDP ratios and commodity concentration ratios (sub-group two countries), export instability did lead to revenue instability (Table III). This produced, in turn, expenditure instability but not lower economic growth.

The results for the two sub-groups of countries are, therefore, not all that different. However, it would not be possible to argue from this that countries with quite different production and export structures are not affected differently by export instability. The sample sizes (14 and 15) are too small for meaningful results to be obtained.

CONCLUDING REMARKS

There is no evidence to show that export instability encouraged the precautionary discounting of investment returns and so slowed down the rate of investment and therefore economic growth for a group of 44 developing countries over the period 1967-81. Export instability did produce revenue instability which, in turn, brought about expenditure instability. However, the chain reaction went no further than this.

The finding of a positive and significant relationship between export instability and economic growth was due to the use of an inappropriate method of measuring export instability. Existing studies which show export instability to be beneficial to economic growth may have to be reassessed in the light of this finding.

It would be useful to test the model separately for those countries which are economically very unstable and which have a narrow economic base, as the hypothesis is seen to be especially valid for such countries. However, it was not possible to do this meaningfully as the number of such countries in the total sample is far too small.

[Footnote]

* I am grateful to two anonymous referees for their comments but do not implicate them in the findings

1. F. S. Idachaba, 'Revenue Instability in Developing Countries: The Ghanaian Experience', Public Finance, vol. 30, No. 1. 1975: pp. 98-9.
2. D, Lim, 'Export Instability and Economic Growth: A Return to Fundamentals', Oxford Bulletin of Economics and Statistics, vol. 38, No. 4, 1976: p. 314.
3. Idachaba. op. cit.
4. See G. Myrdal, A?7 Intentional[Economy (London, Harper and Row, 1956): pp. 238-52
5. The data for estimating the variables included in the equations are taken from the first, second and third editions of The World Bank, World Tables (Baltimore, Johns Hopkins University Press).
6. The 41 countries can he divided into four sub-groups:

   Sub-group One -- those whose export/*GDP(X/Y)* ratios and commodity concentration (*CC*) ratios are above average: these number 14.

   Sub-group Two -- those whose *X/Y* and *CC* ratios are less than average: these number 15

   Sub-group Three -- those with above-average values for. the *X/Y* ratio and below average values tor the *CC* ratio: these number 5

   Sub-group Four -- those with below-average values for the *X/Y* ratio and above average values for the *CC* ratio: these number 11.

   The countries in these four sub-groups are given in Appendix I. The commodity concentration ratio is the current value of the three major export primary commodities of a country as a percentage of the total current value of its merchandise exports.

7. This possibility was raised by (;, Tan. "Export Instability. Economic Growth and GDP Growth", Journal of Development Economics, Vol. 12, No. 1/2, 1983, in a comment on N. V. Lam, " Export Instability. Expansion and Market Concentration: A Methodological Interpretation". Journal of Development Economics, Vol. 7, No. 1, 1970. C. Glezakos provided corroborating evidence of this positive bias in "Instability and the Growth of

TABLE I

Cross-Country Linear Regressions Explaining I/Y, $\dot{E}$, $\dot{R}$, and Y_g: Total Sample (44 Countries), 1967-81

Dependent Variable	I/Y Equ. (2)		$\dot{E}$ Equ. (3)		$\dot{R}$ Equ. (4)		Y_g Equ. (5)	
Independent Variable	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line
Constant	20.708 (19.884)*	21.364 (16.825)*	0.056 (1.359)	0.111 (2.717)*	0.016 (0.229)	0.014 (0.150)	5.040 (6.021)*	3.326 (4.021)*
$\dot{E}$	-2.744 (-0.907)	-3.406 (-1.274)						
$\dot{R}$			1.040 (7.984)*	0.970 (10.713)*				
F			-0.551 (-0.107)	-0.003 (-0.752)			-0.040 (-0.673)	-0.011 (-0.194)
$\dot{X}$					1.102 (2.407)*	1.221 (3.312)*	1.760 (0.406)	7.682 (2.645)*
R^2	0.019	0.037	0.619	0.746	0.148	0.207	0.018	0.158
F-ratio	0.823	1.623	33.321	60.195	7.325	10.972	0.377	3.842

Note: Figures in parentheses are the t values of the regression coefficients. Statistical significance at the one and five per cent confidence levels are indicated by * and ** respectively. The same applies to Tables II and III.

Exports: A Misinterpretation 01 the Evidence from the Western Pacific Countries",
Journal of Development Economics, Vol. 12, 1983.

TABLE II

Cross-Country Linear Regressions Explaining I/Y, $\dot{E}$, $\dot{R}$, and Y_g: Sub-Group One (14 Countries), 1967-81

Dependent Variable	*I/Y* Equ. (2)		$\dot{E}$ Equ. (3)		$\dot{R}$ Equ. (4)		Y_g Equ. (5)	
Independent Variable	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line
Constant	19.440 (7.059)*	23.594 (5.147)*	0.198 (2.409)*	0.333 (4.501)*	−0.004 (−0.098)	0.039 (0.537)	4.752 (2.863)*	2.385 (1.279)
$\dot{E}$	2.999 (0.259)	−10.635 (−0.793)						
$\dot{R}$			0.290 (0.718)	0.167 (0.680)				
F			−0.006 (−0.963)	−0.008 (−1.823)**			0.028 (0.305)	0.079 (0.869)
$\dot{X}$					1.012 (3.878)*	0.982 (3.048)*	−4.040 (−0.484)	6.592 (0.918)
R^2	0.006	0.050	0.134	0.281	0.556	0.436	0.044	0.093
F-ratio	0.067	0.629	0.853	2.148	15.040	9.287	0.253	0.564

TABLE III

Cross-Country Linear Regressions Explaining I/Y, $\dot{E}$, $\dot{R}$, and Y_g: Sub-Group Two (15 Countries), 1967-81

Dependent Variable	*I/Y* Equ. (2)		$\dot{E}$ Equ. (3)		$\dot{R}$ Equ. (4)		Y_g Equ. (5)	
Independent Variable	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line
Constant	22.475 (14.169)*	22.627 (11.654)*	-0.022 (-0.714)	0.001 (0.025)	-0.055 (-0.426)	0.010 (0.055)*	5.482 (5.365)*	4.567 (4.423)*
$\dot{E}$	-4.463 (-1.012)	-3.127 (-0.817)						
$\dot{R}$			1.140 (17.799)*	1.084 (16.482)*				
F			0.013 (1.775)**	0.010 (1.065)			-0.034 (-0.197)	0.007 (0.041)
$\dot{X}$					1.679 (2.245)*	1.400 (2.077)*	1.849 (0.397)	4.600 (1.412)
R^2	0.073	0.049	0.964	0.958	0.279	0.249	0.020	0.149
F-ratio	1.025	0.667	159.123	136.488	5.042	4.313	0.125	1.049

TABLE I

Cross-Country Linear Regressions Explaining I/Y, $\dot{E}$, $\dot{R}$, and Y_g: Total Sample (44 Countries), 1967-81

Dependent Variable	I/Y Equ. (2)		$\dot{E}$ Equ. (3)		$\dot{R}$ Equ. (4)		Y_g Equ. (5)	
Independent Variable	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line	Best Fit Trend Line	2nd-Best fit Trend Line	Best Fit Trend Line	2nd-Best Fit Trend Line
Constant	20.708 (19.884)*	21.364 (16.825)*	0.056 (1.359)	0.111 (2.717)*	0.016 (0.229)	0.014 (0.150)	5.040 (6.021)*	3.326 (4.021)*
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$\dot{X}$					1.102 (2.407)*	1.221 (3.312)*	1.760 (0.406)	7.682 (2.645)*
R^2	0.019	0.037	0.619	0.746	0.148	0.207	0.018	0.158
F-ratio	0.823	1.623	33.321	60.195	7.325	10.972	0.377	3.842

Note: Figures in parentheses are the t values of the regression coefficients. Statistical significance at the one and five per cent confidence levels are indicated by * and ** respectively. The same applies to Tables II and III.

Appendix I
(continued)

Country	Export/GDP ratio (%) 1967-81 Average	Commodity Concentration ratio (%) 1967-81 Average
Sub-group Three	44.4	47.4
Barbados	62.9	39.3
Cameroon	28.8	52.3
Cyprus	40.9	27.2
Iran	26.4	79.4
Swaziland	62.9	38.5
Sub-group Four	17.2	69.4
Bolivia	19.9	65.2
Colombia	13.3	70.4
Ecuador	18.7	74.9
Indonesia	16.0	64.7
Mali	18.1	81.1
Nigeria	21.5	75.3
Sudan	15.4	63.0
Togo	24.3	76.5
Upper Volta	9.9	67.0
Uruguay	14.9	56.0