GROWTH AND EXPORT EXPANSION IN DEVELOPING COUNTRIES: SOME EMPIRICAL EVIDENCE

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DISCUSSION PAPER

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by
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I. Introduction

In recent years there has been much discussion by economists on the relative merits of development strategies involving either import substituting industrialization (ISI) or export expansion (EE), especially of manufactured goods. While frequently presenting the choice of strategy as an either-or proposition, such discussion during the 1970's has gradually evolved into something of a new conventional wisdom, stressing the importance of export promotion and expansion. This paper provides additional statistical evidence in support of the evolving new conventional wisdom.

Following the work instigated by the formulation of the Prebisch-Singer Thesis in the late 1940, there developed an abundant literature critical of the gains to be reaped from international trade by less developed countries (LDC's). The LDC's were frequently depicted as beleaguered by secularly deteriorating terms of trade, noxious backwash effects stemming from export growth, the loss of political autonomy necessary for pursuing development oriented policies, helplessness in the face of the vagaries of international goods markets, and the protectionism of the developed countries. Still other studies focused on the static nature of conventional classical and neoclassical international trade theory and the association of high individual country income levels with industrialization. The implications of this body of literature were to reject the free trading economic philosophy nominally

espoused in many developed countries, as prejudicial to the economic interests and economic development of the LDC's. The development of a domestic industrial sector via protection and at the expense of export growth was stressed. As such, this strain of literature constituted the intellectual underpinning and justification of the vigorous and protectionistic policies of ISI pursued by many LDC governments during the 1950's and 1960's.

The experience of these, and other, countries, concomitant with the improvement of statistical data collection in the LDC's, constituted the basis for a large number of individual country case studies focusing on the relationships between economic growth, industrialization, and economic policy. Numerous studies are now available which demonstrate the distortions and harmful economic effects resulting from the policies undertaken as a part of ISI strategies, even though vigorous industrial, and even, overall economic growth may also occur.[1] Indeed, these distortions and difficulties with ISI growth might be considered as the costs of growth and development if growth through more export oriented policies were not feasible. Yet, the evidence is increasing that export oriented economic growth is not only entirely feasible but can be very rapid as well. The dramatic economic success of some countries pursuing export oriented policies, along with the equally dramatic failure of some countries pursuing autarkistic policies, has provided examples necessitating a re-examination of the role of international trade in the development of poor countries. In large part, this re-examination has led to a re-emphasis of the benefits for developing countries to be derived from trade and specialization along comparative advantage lines.

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[1] For some useful surveys and research summaries see Balassa (1971,1978 a), Bhagwati (1978), Donges and Riedel (1977), Krueger (1978), and Little, Scitovsky, and Scott (1970). For a well argued study, less critical of ISI, see Ahmad (1978).

Individual country case studies have linked the effects of economic policies, export performance, and overall economic growth for a number countries. The success of countries such as Taiwan, Korea, Singapore and Hong Kong with export oriented development strategies is now well documented. Less abundant is the knowledge and evidence of the comparative experience of countries with export and income growth. In making comparisons across countries, the question is whether countries pursuing export oriented policies are likely to grow faster than those not pursuing such policies. In other words what is the relationship between economic policies, export growth, and economic growth as seen through an intercountry comparison?

These are several published studies which undertake intercountry statistical comparisons of export performance and economic growth.[2] Of these, studies by Michaely and Balassa focus on the experience of the developing countries. Using a sample of some 41 developing countries, Michaely found a significant positive relationship between proportional per capita income growth and the proportional increase in the ratio of exports to GNP. While this relationship was every strong for the 23 most developed countries in the sample, Michaely could discern no relationship for the poorest countries, leading him to the conclusion that "growth is affected by export performance only once countries achieve some minimum level of development."[3]

A subsequent study by Bela Balassa also found a significant and positive relationship between economic growth and export expansion as posited by the

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[2] See, for example, Maizels (1968), Kravis (1970), Michaely (1977) and Balassa (1978 b). There are of course numerous studies that examine the export and growth experience of groups of LDC's or LDC aggregates but which fall short of undertaking any intercountry econometric analysis. For a good example, see the comprehensive study of de Vries (1977).

[3] See Appendix Table 1, listing individual country characteristics and economic performance.

new conventional wisdom emphasizing export promotion for LDC's. Balassa's sample,
however, was quite restrictive, consisting of only 11 countries.   More important
still, his sample included such obvious high performers as Korea and Taiwan and
poor performers as India and Chile. Balassa's study raises the question of
whether his results would hold for a wider, less restrictive sample of developing
countries. It is this question that the major empirical part of this paper
addresses. Our study differs from Michaely's in that it involves a different
choice in measuring the export growth variable, the analysis of additional
relationships, the use of later period data, and the inclusion of more countries
in the sample, which in our case is restricted to middle income developing
countries.

The intercountry analysis of the relationship between export growth,
industrial development, and GDP growth in developing countries will be taken
up in the next section. As we shall see, there exists very strong intercountry
evidence of positive associations between export promotion, industrial expansion,
and economic growth. Section III will consist of some concluding remarks.

II. Evidence of recent economic growth and export expansion

To undertake the intercountry comparisons we have made use of data recently
published by the World Bank.[4] Our sample covers 55 middle income developing
countries, eliminating from the analysis the lower income developing countries,
defined as having GNP per capita of US$ 300 or less in US 1977 dollars. Of the
55 selected countries, 6 were oil exporters belonging to OPEC. For some of the
analysis they have been omitted from the sample. The rationale of omitting the
poorest countries is that some basic level of development is necessary for a
country to most benefit from export oriented growth, particularly involving

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[4] The World Bank, World Development Report, 1979.

manufactured exports.[5] Thus, rather arbitrarily, all countries defined by the World Bank as middle income developing countries in 1977 have been included in our analysis. Thus the sample is biased towards the relatively more successful countries, since some of the included countries would have been included as among the world's poorest in 1960. The period analyzed covered 1960-77, and the intercountry sample includes assorted economic performance variables for the basic period in question.

The major economic performance variable analyzed is the annual average growth rate of GDP for the period 1960-77. Pearson and Spearman rank correlations between the GDP growth rate and various other economic variables are reported in Table 1. First, it can be seen that there is a positive and highly significant relationship between economic growth and manufacturing output growth. Success in attaining high rates of economic growth for the middle income countries in associated with industrial development. As expected, this statistical relationship is stronger still when the OPEC countries are excluded from the sample. The policy implication is that a coherent industrial policy should be an integral part of a country's overall development strategy. Without the presence of exportable petroleum reserves, growth and development imply industrialization.

A second dimension of the correlation analysis involves the bivariate association between economic growth and the rate of growth in gross domestic

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[5] It might be noted that, as a whole, the low income developing countries were characterized not only by slow economic growth but slow export growth as well. For the period 1960-77 their GNP per capita grew collectively at only 1.4 percent annually, as compared to 3.6 and 3.4 percent, respectively, for the middle income developing countries and the industrialized countries. Exports for the low income developing countries increased by 2.2 percent annually.
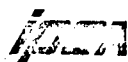
Table 1

CORRELATIONS[a] BETWEEN GDP GROWTH RATES (1960-77)[b] AND SELECTED

ECONOMIC VARIABLES FOR MIDDLE INCOME COUNTRIES

Variable	All Middle Income Developing Countries max n= 55		Non-OPEC Middle Income Developing Countries max n = 49	
	r	r_s	r	r_s
Growth Rate of Manufacturing Output (1960-77)	.82 (.001)	.73 (.001)	.86 (.001)	.82 (.001)
Growth Rate of Gross Domestic Investment (1960-77).	.77 (.001)	.64 (.001)	.78 (.001)	.69 (.001)
Growth Rate of Exports[c] (1960-77)	.49 (.001)	.47 (.001)	.55 (.001)	.50 (.001)
Growth Rate of Manufactured Export Earning (1963-76)	.38 (.007)	.43 (.002)	.46 (.002)	.57 (.001)
Growth Rate of Direct Foreign Private Investment (1970-77)	.38 (.011)	.30 (.035)	.18 (.168)	.30 (.046)
Change in Net Barter Terms of Trade[d] (1960-77)	--	.06 (.345)	--	.02 (.452)

Notes:

[a] Simple Pearson (r) and Spearman rank (r_s) correlation coefficients are reported for the indicated pairings according to the completeness of the available data. Levels of statistical significance, involving a one-tailed test, are shown in parentheses beneath the correlation coefficients.

[b] All growth rates are expressed as annual average rates.

[c] Country export growth rates were computed in real terms with deflation by export price indices.

[d] Expressed as the ratio of the 1977 barter terms of trade to the 1960 barter terms of trade.

Source: Author's computations.

investment. As seen in Table 1, the relationship is positive as hypothesized. The countries growing the fastest are those whose capital formation also grew the fastest. This finding, while not at all surprising, lends some support to those theories of economic development which attribute a key role to capital formation.

To analyze the relationship between GDP growth and export growth we have elected to use the annual average real growth rate of total exports during the 1960-77 period as a representation of the export growth variable.[6] It is clear from Table 1 that there exists positive and significant relationship between GDP growth and export growth for the middle income developing countries. Both the Pearson and Spearman correlation coefficients are significant at the 1 percent level, including and excluding the OPEC countries. The policy implication is that countries which neglect their export sectors through discriminatory economic policies run the considerable risk of having to settle for a lower rate of economic growth. The same can be said for manufacturing exports, since, like overall export growth, there exists a strong positive relationship between GDP growth and the growth of manufacturing exports, significant in all four cases at

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[6]On the grounds that exports, as part of GNP, are bound to be positively related to GNP, Michaely has used the proportional change in the exports to GNP ratio as an indication of export growth. It should be noted, however, that there are many components of GNP, and exports are but one. Moreover, export production, and its growth, more accurately reflects the allocation of economic resources in an economy. Import competing production, as part of an ISI strategy, also contributes to GNP and GNP growth. Since export and import competing production represent alternative uses of economic resources, intercountry differences in export growth presumably are affected by different development strategies. The question is then one of, given these development strategies, which countries can attain the highest rates of economic growth. While a cardinal correlation measure may indeed be positive, the rank order correlation coefficient may not be. In any case, Michaely's measure and our own are highly correlated. Moreover, the correlations between GDP growth and export growth, measured either way, do not differ substantially. For example, the Pearson correlation coefficient between the GDP growth rate and the proportional increase in the export the GDP ratio was 0.40, significant at the 1 percent level.

the 1 percent level. (Table 1). Those countries enjoying the fastest rates of economic growth also have witnessed the fastest rates of growth for manufacturing exports. Thus a growth strategy for a middle income developing country involving a manufactured export dimension is more likely to be sucessful than one not relying on promoting manufacturing exports.

We have also explored the association between the GDP growth rate and the rate of growth of direct foreign private investment, a relationship subject to considerable controversy. Our rather tentative analysis does indicate a positive relationship significant at the 5 percent level in every case except for the Pearson correlation coefficient for the non-OPEC sample. Great care should be taken, however, in interpreting this suggestive evidence. First, the period in question for our measurement of direct foreign investment was 1970-77 rather than the full 1960-77 period. In addition, since direct foreign private investment is extremely volatile, it is not clear that the 1970 and 1977 years were sufficiently representative to use as the base years in the computation of the proportional increase for the period. Finally, the direction of causality, if any, is not at all clear. It is as plausible that high growth rates serve to attract direct foreign investment as it is that the latter contributes to growth.

The final bivariate relationship examined is that between the GDP growth rate and the proportional change in the country's net barter terms of trade. The literature associated with the Prebisch-Singer thesis emphasizing the importance of a country's terms of trade would hypothesize a positive relationship, i.e., an improvement in the terms of trade is associated with high growth rates. Our analysis, undertaken on an ordinal basis, does not support this hypotesis. There is no readily apparent relationship between terms of trade changes and economic growth performance. This suggests that, rather than wringing their hands in worry over terms of trade movements, policy-makers in middle income countries would do better to implement policies to increase export growth.

The correlations reported in Table 1 are bivariate associations not incorporating the effect of other variables. A more rigorous approach to explaining GDP growth would involve the specification and estimation of a model seeking to explain such growth. Assume a Cobb-Douglas production function incorporating three productive factors such that

(1) $X_i = A \, K_i^{\alpha} \, L_i^{\beta} \, E_i^{\gamma}$

where

X_i = country i's GNP

A = a technological constant

K_i = country i's capital stock services

L_i = country i's exports

E_i = country i's exports.

The third factor, exports, has been included on the grounds that there are scale effects and externalities associated with export production and sales. For instance, by competing in export markets products in addition to those exported many come to be produced more efficiently. Also, allocational gains may be realized through greater export activity. With increased international specialization along comparative advantage lines developing countries can attain a wider use of abundant labor resources and a fuller use of existing capacity.

A time dimension can be added to the basic production function by expressing all variables as a function of time. By differentiating the resultant equation with respect to time and dividing through by the original equation we obtain the following linearly estimatable equation:

(2) $\dfrac{\dot{X_i}}{X_i} = \dfrac{\dot{A}}{A} + \alpha \dfrac{\dot{K_i}}{K_i} + \beta \dfrac{\dot{L_i}}{L_i} + \gamma \dfrac{\dot{E_i}}{E_i}$

Making the assumption that the investment growth rate corresponds to the increase in the capital stock, various forms of Equation 2 were estimated and reported in Table 2. This exercise can be seen as one in which the intercountry variance in GDP growth rates for the 1960-77 period is explained in terms of the proportional growth of capital formation, the labor force, and exports for the same period.[7]

Examining first the regression estimates made with the entire middle income developing country sample, it is again clear that both capital formation and exports play significant roles in contributing to GDP growth. As seen in Regression Equation 1, a good fit is obtained with only capital formation and labor force growth. While adding total export growth (in Regression Equation 2) does little to increase the R^2, the coefficient for export growth is statistically significantly different from zero. Moreover, 69 percent of the variance in the intercountry GDP growth rates can be explained by the rates of growth of capital formation, the labor force and total exports. For their part, a one percent increase in the rate of growth total exports is associated with an increase of 0.057 of one percent in GDP growth. Expressed in another way, a 17.5 percent increase in exports is associated with a 1 percent increase in GDP.[8] Incorporating manufactured exports into the model instead of total exports (Regression Equation 3) yields similar results. Removing the OPEC countries from the sample, as is done in Regression Equations 1a, 2a, and 3a, changes the basic results in only a minor way.

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[7] A somewhat parallel analysis was conducted by Balassa (1978 b) with a 10 country sample and with similar results.

[8] A simultaneity problem in the specification of our model may in part understate the contribution of export expansion on economic growth. It can be argued that exports and investment are related such that export opportunities and growth contribute to the growth of investment demand, which in turn contributes to increased investment and capacity growth. Reinforcing this effect is the relatively high propensity to save out of export incomes, as suggested by recent empirical work identifying an intercountry positive correlation between exports and domestic savings. (Weisskopf, 1977). In our sample of middle income developing countries a positive association was discovered between the real growth rate of exports and the proportional increase in the savings to GDP ratio for the 1960-77 period. The Spearman rank correlation coefficient was estimated at 0.32, significant at the 2 percent level.

Table 2

INTERCOUNTRY REGRESSION ANALYSIS OF GDP GROWTH RATES FOR MIDDLE INCOME DEVELOPING COUNTRIES, 1960-77

Regression Equations	Number of Observations n	Constant $\hat{A}$ A	Regression Coefficients for Growth Rates of:				R^2
			Capital Formation K	Labor Force L	Total Exports E	Manufacturing Exports E_m	
All Middle Income Countries							
1.	41	1.991	.284 (7.077)	1.060 (2.739)			.661
2.	41	1.997	.254 (5.921)	.981 (2.576)	.057 (1.694)		.685
3.	37	1.745	.236 (5.272)	1.014 (2.704)		.045 (2.227)	.714
Non-OPEC Middle Income Countries							
1a.	37	2.035	.289 (7.046)	1.025 (2.616)			.683
2a.	37	2.036	.256 (5.671)	.955 (2.477)	.055 (1.604)		.706
3a.	35	1.914	.270 (5.747)	.909 (2.476)		.031 (1.445)	.746

Notes: The t values appear in parentheses beneath the regression coefficients. All the regression coefficients are significant at the 5 percent level except the coefficients for total export growth in Equation 2a and for manufactured export growth in Equation 3a. These regression coefficients, however, are both significant at the 10 percent level of confidence.

Making the assumption of Hicks neutral technological progress, the constant is our regression estimates represents an estimate of annual average technological progress. It is seen that in all estimates the technological progress measure is high, running around 2 percent annually. This suggests that tecnological progress has indeed been important in the middle income developing countries. The policy implication is that developing countries should take measures to stimulate technological progress through the transfer and adaption of technology. Also, since the technological change parameter estimates decrease in the equations with manufactured export growth included, it is suggested that manufacturing export activity is accompanied by greater technological progress.

III. Concluding Remarks

Our results present additional empirical evidence demonstrating a strong cross-country association between export performance and GNP growth. This suggest that countries which neglect their export sectors through discriminatory economic policies are likely to have settle for lower rates of economic growth as a result. While in our treatment it has been assumed that export performance reflects export related economic policies, a growing body of empirical literature supports this contention.[9] Consequently, economic policies entailing appropriate price incentives for exports appear to take on a central importance in the economic growth of developing countries.

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[9] A representation survey of the literature is contained in Balassa (1978 a). See also Keesing (1979).

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Appendix Table 1

ECONOMIC GROWTH AND EXPORT PERFORMANCE
VARIABLES FOR 55 MIDDLE INCOME
DEVELOPING COUNTRIES, 1960-77

Country	GNP per Capita, 1977 (US 1977 dollars)	Total Exports, 1977 (US Current million dollars)	Manufacturing Exports, 1976 (US Current dollars)	Real Annual Average Rates of Growth (%)				
				GDP, 1960-77	Industrial Output, 1960-77	Gross Domestic Investment, 1960-77	Total Exports, 1960-77	Manufacturing Exports, 1963-76
Egypt	320	1,726	386	5.9	5.3	11.5	0.5	6.5
Cameroon	340	705	50	4.2	n.a.	7.5	4.3	15.4
Yemen, PDR	340	177	12	n.a.	n.a.	n.a.	n.a.	n.a.
Ghana	380	1,300	12	1.4	n.a.	-5.4	-0.7	5.7
Honduras	410	511	39	4.4	5.5	8.4	6.8	19.5
Liberia	420	447	n.a.	4.1	n.a.	4.0	11.1	3.4
Nigeria	420	11,823	58	4.4	12.4	13.3	4.1	4.9
Thailand	420	3,151	608	7.8	11.1	11.7	8.0	25.2
Senegal	430	520	14	2.7	4.2	0.8	3.7	-1.7
Yemen Arab Rep.	430	11	1	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	450	3,151	608	5.6	7.1	9.6	3.4	18.7
Zambia	450	897	1	4.1	n.a.	3.8	0.4	n.a.
Congo, People's Rep.	490	173	23	3.9	9.3	4.2	8.6	4.6
Papua New Guinea	490	611	n.a.	5.9	n.a.	8.9	n.a.	n.a.
Rhodesia	500	n.a.	n.a.	3.9	n.a.	n.a.	n.a.	n.a.
El Salvador	550	959	209	5.6	7.8	7.0	4.4	14.8
Morocco	550	1,300	202	4.4	5.7	12.9	2.3	n.a.
Bolivia	630	641	20	5.5	6.2	8.9	7.1	4.3
Ivory Coast	690	2,155	124	7.4	10.1	11.2	8.1	18.6
Jordan	710	249	72	6.8	n.a.	n.a.	14.5	32.1
Colombia	720	2,302	384	5.6	6.0	4.1	0.8	20.8
Paraguay	730	279	26	5.5	n.a.	12.5	6.9	9.8
Ecuador	790	1,218	34	n.a.	n.a.	n.a.	5.9	14.6
Guatemala	790	1,160	218	5.8	7.6	8.9	6.7	16.8
South Korea	820	10,047	6,770	9.9	17.1	18.7	33.4	41.3
Nicaragua	830	608	87	6.6	9.5	9.8	7.9	23.1
Dominican Rep.	840	780	120	6.3	9.3	12.2	1.5	37.4
Peru	840	1,564	101	5.1	5.3	4.3	0.7	18.1
Tunisia	860	921	203	6.2	9.0	8.2	3.4	18.2
Syrian	910	1,063	108	6.2	8.0	n.a.	5.4	7.8
Malaysia	930	6,088	824	7.0	n.a.	8.3	5.7	15.8
Algeria	1,110	5,809	48	4.9	10.0	6.7	2.0	n.a.
Turkey	1,110	1,753	466	6.6	9.2	10.4	1.3	32.8
Mexico	1,120	4,066	1,010	6.3	8.0	8.9	2.7	10.2
Jamaica	1,150	856	345	n.a.	2.5	3.1	2.2	22.3
Lebanon	n.a.	632	196	n.a.	n.a.	n.a.	11.4	21.6
Chile	1,160	2,190	142	2.7	2.3	1.2	3.5	9.7
Taiwan	1,170	9,349	6,922	8.6	14.7	13.3	20.8	29.1
Panama	1,220	243	18	6.0	n.a.	6.9	n.a.	n.a.
Costa Rica	1,240	798	180	6.2	n.a.	7.0	7.3	25.2

Appendix Table 1 (Continued)

ECONOMIC GROWTH AND EXPORT PERFORMANCE

VARIABLES FOR 55 MIDDLE INCOME

DEVELOPING COUNTRIES, 1960-77

Country	GNP per Capita, 1977 (US 1977 dollars)	Total Exports, 1977 (US Current million dollars)	Manufacturing Exports, 1976 (US million current dollars)	Real Annual Average Rates of Growth (%)				
				GDP, 1960-77	Industrial Output, 1960-77	Gross Domestic Investment, 1960-77	Total Exports, 1960-77	Manufacturing Exports, 1963-76
South Africa	1,340	6,158	1,788	n.a.	n.a.	n.a.	6.0	8.6
Brazil	1,360	12,054	2,500	7.2	n.a.	8.3	5.6	29.5
Uruguay	1,430	608	181	1.4	1.8	0.5	3.5	8.9
Iraq	1,550	9,664	5	8.9	7.8	n.a.	4.1	5.0
Argentina	1,730	5,651	975	3.7	4.7	3.1	4.2	15.3
Portugal	1,890	2,023	1,231	5.8	7.2	n.a.	4.8	7.6
Yugoslavia	1,960	5,254	3,395	6.3	7.5	6.0	6.8	10.7
Iran	2,160	24,245	160	9.9	9.3	16.5	7.4	7.3
Trinidad and Tobago	2,380	2,180	122	3.7	n.a.	0.5	2.6	15.2
Hong Kong	2,590	9,626	7,882	9.3	n.a.	8.4	10,2	15,6
Venezuela	2,660	9,548	103	5.8	3.9	8.3	3.2	1.6
Greece	2,810	2,724	1,252	6.1	7.6	6.1	12.0	27.7
Israel	2,850	2,959	1,880	7.2	n.a.	4.3	10.6	12.8
Singapore	2,880	8,241	3,020	8.7	11.0	14.4	6.5	12.1
Spain	3,190	10,230	6,025	6.3		8.0	11.1	22.3
Unweighted Average	1,121	3,588	965	5.8	7.8	7.7	6.1	15.5
Number of Observations	54	54	53	49	35	45	50	47

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