Outward-oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976–1985*

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I. Introduction

Asian developing economies have grown much more rapidly over the past 15 years than their counterparts in Latin America or Africa. This statement is true for a large number of countries, not just for the oft-cited gang of four (Hong Kong, Singapore, Korea, and Taiwan). This article examines sources of growth in 95 developing economies over the period 1976–85. Per capita income during this period grew at an average annual rate of 3.4% for 16 Asian economies but declined at rates of 0.3% in Latin America (24 countries) and 0.4% in Africa (43 countries).

After examining the different outcomes in Asia and Latin America, Jeffrey Sachs concluded that "the more important differences seem to center on exchange rate management and on the trade regime."[1] This view echoes more general arguments, put forward by Bela Balassa and Anne Krueger, that outward orientation fosters growth.[2] The crux of this explanation is that outward-oriented policies, reflected in a level of the real exchange rate that encouraged exports, fostered the development of the tradable sector in Asia, whereas inward orientation and an overvalued real exchange rate encouraged growth of the nontradable sector in Latin America (and Africa as well).

There are a number of reasons why the difference in orientation can affect growth, both in the short and the long run. Outward orientation makes it possible to use external capital for development without encountering serious problems in servicing the corresponding debt. Inward orientation of production is one reason why Latin American and African economies have experienced debt crises that have inhibited their growth in the 1980s. Outward orientation also generally results in more rapid growth of exports, and there may be externalities

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associated with exporting that cause open economies to grow more rapidly over long periods of time. There is considerable evidence that the process of exporting, combined with easy availability of imported inputs and machinery, accelerates technological advance in developing economies.[3]

While these theories about the sources of economic growth in Asia have gained considerable acceptance, it has proved difficult to examine them in a systematic, empirical manner. Many discussions rely on a small number of case studies, and the key explanatory variable, "outward orientation," is difficult to measure across countries, making cross-sectional analysis problematic. Outward orientation generally means a combination of two factors: first, the level of protection, especially for inputs into the production process, is relatively low (resulting in a sustainable level of the real exchange rate that is favorable to exporters); and, second, there is relatively little variability in the real exchange rate, so that incentives are consistent over time.

Existing empirical work is concentrated on the second factor, the effect of variability in the real exchange rate, as this is easier to compare across countries than the level of protection. There are a number of studies indicating that misalignment of the real exchange rate is negatively associated with growth. Misalignment is an over- or undervaluation of the real exchange rate that is unsustainable, given the overall policy package (including the trade regime).[4]

Misalignment, however, does not reflect an economy's long-run trade orientation. For instance, there are many African economies that have real exchange rates that are overvalued in the sense that they provide weak incentives to export. These exchange rates, however, are supported by strong import protection and are often quite stable in real terms over long periods of time. A country hence can be inward oriented but not have an exchange rate that is misaligned. Some other measure is thus necessary to capture the long-run trade orientation of an economy.

In the next section of this article I develop a technique for estimating a cross-country index of real exchange rate distortion, using the international comparison of prices prepared by Robert Summers and Alan Heston.[5] The norm for this index is the price level that corresponds to a country's particular resource endowment. Real overvaluation or undervaluation is measured relative to this norm and provides an indication of the extent to which incentives are geared to the domestic or international market. Whereas misalignment indicates the extent to which an exchange rate is overvalued given the fundamentals (including the trade regime), the index derived here measures the extent to which the real exchange rate is distorted away from its free-trade level by the trade regime.

This index has the advantage that it can be calculated easily for a

large number of countries, and in Section III the procedure is implemented for 117 economies over the period 1976–85. The results indicate that Latin America, on average, was overvalued 33% relative to Asia during this period, while Africa was overvalued even more (86% relative to Asia). Asian economies also exhibited more stability of the real exchange rate than their Latin American and African counterparts. Hence, the generalization that Asian economies are more outward oriented holds for this relatively large sample.

In Section IV this cross-country index of real exchange rate distortion is then used to investigate whether there is any empirical relationship between outward orientation and economic growth. The main finding is that there is a significant, negative relationship between distortion in the real exchange rate and growth of per capita GDP, after controlling for the effects of real exchange rate variability and investment level. The potential gains to Latin American and African economies of following more outward-oriented policies are quite large. Per capita GDP growth rate would increase an estimated 1.5–2.1 percentage points if these regions shifted to Asian-type trade policies. For both regions, such a gain would move them from negative to modestly positive growth rates. The robustness of these results is demonstrated in Section V, on sensitivity analysis.

II. Measuring Outward Orientation

In this section I develop a cross-country measure of outward orientation of the economy, based on the international comparisons of price levels compiled for 121 countries by Summers and Heston. They price the same basket of consumption goods in domestic currency in different countries and then convert the measure into U.S. dollars, using the official exchange rate. Using the United States as the benchmark country, the index of country i's relative price level (RPL) is

$$\mathrm{RPL}_i = 100 \times eP_i/P_{\mathrm{U.S.}}, \tag{1}$$

where e is the exchange rate (dollars per unit of domestic currency) and P_i is the consumption price index for country i. Note that this formulation is similar to the usual measure of the real exchange rate, except that here the price indices employed have the same weights in each country.

If all goods were tradable and there were no trade barriers, these measures would all be 100. (There might be short-term fluctuations if purchasing power parity did not hold continuously; however, over time the average value should be 100.) Hence, if there were no nontradables, cross-country variation in these price levels could be taken directly as a measure of inward or outward orientation caused by trade policy. For instance, a country sustaining a high price level over many

years would clearly have to be a country with a relatively large amount of protection (inward orientation).

The existence of nontradables, however, complicates the picture. Even with free trade, the relative price level indices will not all be 100 as long as there are nontradable goods whose prices differ across countries. In general, prices of nontradables will differ across countries based on relative factor endowments. It is possible in principle that countries with different endowments have the same factor prices, in which case the prices of nontradables would be the same. On the other hand, if factor-price equalization does not hold, then prices of nontradables would vary systematically with endowments, and relative price levels would similarly vary systematically with endowments.

To use the Summers and Heston price levels to measure outward/inward orientation, then, requires correcting for variation in the indices resulting from differences in factor endowments. This correction is accomplished by regressing the price levels on country endowments. The residuals from that regression indicate the extent to which a country's prices are high or low, given its endowments, and from these residuals can be constructed a cross-country index of real exchange rate distortion.

As noted, the relative price level may fluctuate in the short run for reasons other than import protection; hence, I choose to look at the price levels for the most recent 10 years covered by the Summers and Heston data set, 1976–85. In correcting for the effect of different endowments, ideally one should employ a large range of endowments: capital stock, different types of land and natural resources, different kinds of human resources, and so forth. In practice, however, it is difficult or impossible to compile the necessary data for the 117 countries for which price level data are available; hence, it is necessary to use as a proxy real per capita GDP. By definition, GDP is the value of factor services generated by an economy in a year, so that per capita GDP is a summary measure of relative per capita factor availability. It is also possible to include as an endowment in the cross-section regressions population density, which provides a rough indication of land availability relative to the labor force.

Basic characteristics of the data set are provided in table 1. Developing countries have been defined as those with per capita GDP of less than $6,000 (1980 prices) at the beginning of the period (1976).[6] The table groups the 95 developing countries geographically into Africa (43 countries), Asia (16), Latin America (24), and a remainder category (Europe/Middle East, with 12). There are 22 developed countries in the data set.[7] Ignoring Africa for the moment, the regional averages indicate a relationship between price level and per capita GDP, with higher-income countries having higher price levels. Note, however, that Africa is the poorest region, and yet its price level is well above

TABLE 1

BASIC CHARACTERISTICS OF THE DATA SET

	Number of Countries	Per Capita GDP 1976 (1980 U.S. Dollars)	Average Price Level, 1976–85 (Index, U.S. = 100)	Per Capita GDP Growth Rate, 1976–85 (Percentage)
Developing countries:				
Africa	43	840	68.6	−.4
Asia	16	1,751	46.5	3.4
Latin America	24	2,639	64.5	−.3
Europe/Middle East	12	3,359	66.2	1.4
Developed countries	22	8,312	107.0	1.5

SOURCE.—Summers and Heston.

NOTE.—Per capita GDP is calculated in 1980 international prices. Developing economies are defined as those with per capita income below $6,000 in 1976. The price level employed is that for consumption items. Values are simple averages per region.

the average for Asian developing economies and somewhat above the level of the much richer Latin American countries.

A positive relationship between income and price levels is what one would expect intuitively, if nontradables are relatively labor intensive and high-income countries relatively labor scarce. This argument is closely related to the old debate about whether purchasing power parity should hold absolutely. Balassa has argued that developed country exchange rates tend to be overvalued by purchasing-power parity (PPP) standards, because goods arbitrage at best will align prices of tradables. According to Balassa, the productivity advantages of developed countries tend to be greater in traded goods industries, which implies that nontraded goods will be more expensive in developed than in less developed countries when prices are compared through equilibrium exchange rates.[8] The approach I use here follows similar logic, assuming that there will be a systematic relationship between per capita GDP and price level. (The technique developed here does not prejudge the direction of the relationship, but it turns out in practice that Balassa was right: more developed countries have higher prices of nontradables.)

To estimate the relationship between price level and endowments, I use different specifications of the following basic regression equation:

$$\mathrm{RPL}_{it} = a + b_t d_t + c\mathrm{GDP}_{it} + f\mathrm{DENS}_{it}, \qquad (2)$$

where the d_t's are year dummies for each year other than 1976. This pooled, cross-section regression is estimated over 1,170 observations. Quadratic and interactive terms are also employed to investigate the possibility of nonlinearities. Results with eight different specifications are presented in table 2.

TABLE 2

PRICE LEVEL AS A FUNCTION OF COUNTRY ENDOWMENTS, 1976–85 (Pooled, Cross-Section Regressions with 117 Countries and 10 Years)

Regression Number	Constant	GDP	GDP^2	Population Density (DENS)	$DENS^2$	GDP × DENS	Latin America	Africa	R^2
(1)	58.3	.005	. . .	−.02	. . .	.002	. . .	. . .	.47
		(21.98)		(4.93)		(3.37)			
(2)	41.9	.007	. . .	−.01	. . .	−.00004	5.0	21.9	.54
		(26.37)		(1.35)		(.08)	(3.08)	(13.12)	
(3)	37.2	.010	−.003	−.01	−.00004	. . .	4.3	24.3	.55
		(12.10)	(3.73)	(1.40)	(.57)		(2.62)	(13.99)	
(4)	37.0	.009	−.002	. . .	. . .	. . .	5.7	24.9	.53
		(11.20)	(3.02)				(3.49)	(14.42)	
(5)	40.7	.007	. . .	. . .	. . .	. . .	6.3	23.0	.53
		(27.79)					(3.90)	(14.26)	
(6)	59.4	.002	.002	. . .	. . .	. . .	. . .	. . .	,45
		(3.21)	(3.37)						
(7)	64.5	.002	. . .	. . .	. . .	. . .	. . .	. . .	.24
		(8.43)							
(8)*	37.2	.011	−.004	. . .	. . .	. . .	. . .	. . .	.64
		(12.10)	(4.87)						

SOURCES.—All data are from Summers and Heston, except for area data used to calculate population density, which are from *World Development Report, 1988*.

NOTE.—Dependent variable: price level of a basket of consumption goods, relative to the U.S. level. All regressions include intercept dummies for each year (except 1976) as well as an intercept dummy for the four countries located primarily above the sixtieth parallel. Figures in parentheses are *t*-statistics.

* Africa is omitted from regression (8), leaving 74 countries (and 10 years).

There is no clear relationship between price level and population density. Intuitively, one would expect more densely populated countries to have higher prices of nontradables, to the extent that nontradables include housing services. This relationship, however, does not show up in the data. In regression (1), for instance, there is the opposite relationship (negative association of density with price level). However, the relationship varies in different specifications and is nowhere very strong.

The relationship between price level and per capita GDP, on the other hand, is strong and consistent regardless of specification. There is a potential problem, however, of bias between this key explanatory variable and what we are trying to measure (trade orientation). The problem can be understood by referring to figure 1, which examines price level as a function of per capita GDP. The figure indicates the simple average for the developing countries of each region and for the developed countries. Regression (6) is also plotted; this is the quadratic regression with density omitted. Africa clearly has the effect of pulling the regression line up and flattening it. Regression (4) includes an intercept dummy for Africa (and a separate dummy for Latin America), and the figure shows that the estimated relationship is quite different. (If Africa is completely omitted, the result, regression [8], is very similar to regression [4].)

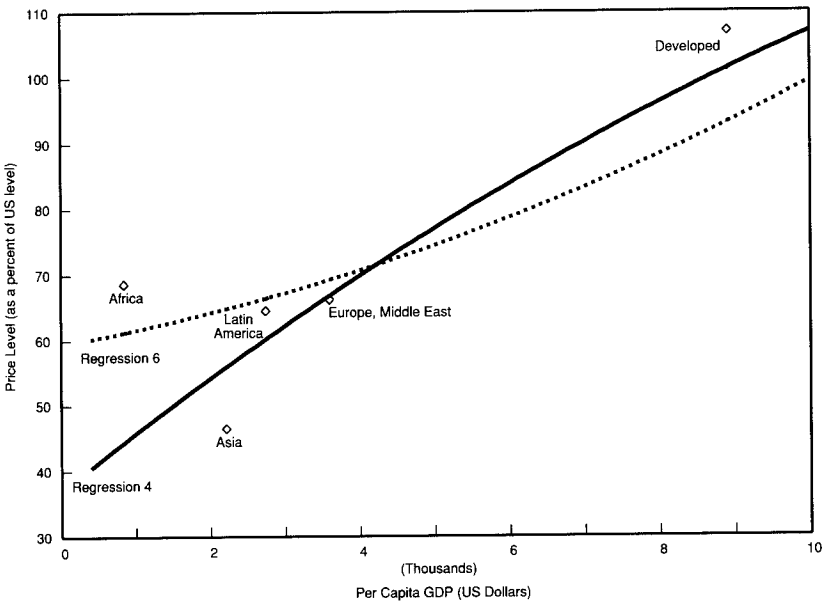

FIG. 1.—Estimated relationships between price level and per capita GDP

Suppose we take regression (6) as the true relationship: orientation is measured as deviation from the regression line. A country above (below) the line has a higher (lower) price level than can be justified by its endowments and is taken to be relatively inward (outward) oriented. Africa is thus found to be inward oriented; Latin America, mildly outward oriented; and Asia, very outward oriented. But if Africa is inward oriented and also has the lowest per capita GDP, then clearly there is a bias introduced into the measure of orientation. If an attempt is made to control for the bias by omitting Africa or employing a dummy, then the measured relationship (i.e., regression [4]) is quite different. Assuming regression (4) to be the true relationship, Africa is found to be extremely inward oriented; Latin America, mildly inward oriented; and Asia, moderately outward oriented. The measurement of orientation appears to depend heavily on the choice of specification.

The problem is not as great as it appears, however, as the hierarchy among the regions does not change. All of the specifications result in the conclusion that Africa is most inward oriented and Asia most outward oriented. It will be shown in the section on sensitivity analysis that the fundamental results are not influenced by the choice of specification. I use regression (4) as the standard against which to measure orientation for the exposition in the next section but then show later that this choice does not play any major role in the results.

III. Outward Orientation Measures for 117 Countries

It was argued in the previous section that the estimated relationship between price level and country characteristics can be used to calculate a measure of the extent to which the real exchange rate is distorted away from a hypothetical free-trade level. Employing regression (4), the appropriate price level for each country and each year can be calculated, given the country's per capita GDP. The actual price level divided by this predicted price level is the index of distortion. For each country, I averaged these measures over 10 years to eliminate the effect of short-term fluctuations.

Table 3 reports the averages for each region. As noted, African developing economies are found to be highly distorted, with an average index value of 160. Latin America (at 114) is also considerably overvalued relative to Asia (86). The results for all 117 countries are listed in Appendix table A1. The results for many individual developing countries are consistent with other work that has attempted to sort countries by trade orientation; however, there are also some significant anomalies.[9] "Good" results include the findings that Zambia and Tanzania are far more distorted than Senegal or that Argentina and Bolivia are highly distorted compared to Colombia or Mexico. Among the major anomalies are the results that Korea and Taiwan have the highest distortion measures of the Asian developing economies or that Peru

TABLE 3

INVESTMENT RATES AND MEASURES OF OUTWARD ORIENTATION, 1976–85
(Simple Averages by Region)

	Real Exchange Rate Distortion*	Real Exchange Rate Variability†	Investment Rate‡
Developing countries:			
Africa	160	.15	15.0
Asia	86	.11	19.1
Latin America	114	.22	17.8
Europe/Middle East	104	.15	23.7
Developed countries	108	.11	25.0

* Index of price level adjusted for per capita income level by the coefficients of regression (4), table 2, averaged over the period 1976–85.

† Coefficient of variation in the index of price level adjusted for per capita income level.

‡ Investment as a percent of GDP, calculated in international prices by Summers and Heston, averaged over the period 1976–85.

is found to have a low level of distortion. It should also be noted that the technique finds developed countries to be less distorted than the vast majority of developing countries (which is probably true); however, the rankings within the developed country group are not very plausible.

There are a number of possible explanations for these anomalies. First, there are likely to be some errors in the Summers and Heston price data (as there are in any data set). Peru, for instance, is reported to have an implausibly low price level. Second, there are likely to be some relevant country characteristics that are difficult to control for. Several of the countries that have surprisingly high price levels (i.e., Japan, Korea, and Taiwan) are very densely populated. As noted in the previous section, across all countries there is no strong relationship between density and price level. Nevertheless, it is possible that there is in reality a systematic relationship (perhaps highly nonlinear) that cannot be detected with the data at hand.

The number of anomalies declines substantially if the real exchange rate distortion measure is combined with real exchange rate variability to produce an outward orientation index. Table 3 also includes a measure of variability of the real exchange rate. This measure is simply the variation of each country's real exchange rate distortion index around its mean during the period 1976–85. It indicates that Asian developing economies demonstrate low variability as well as a low level of distortion. It is interesting that quite a few African economies are very overvalued but have little variability of the real exchange rate. In Appendix table A1, Cameroon, Central African Republic, Congo, Gambia, Ivory Coast, Niger, and Zimbabwe all have distortion

index levels of 150 or above but coefficients of variation of less than .10. This is possible if an overvalued exchange rate is well protected by import barriers. The average coefficient of variation for Africa (.15) is only modestly above the level for Asia (.11). Latin American countries have considerably more variation (.22) in the real exchange rate than their counterparts in Asia and Africa. Hence, it appears that in Latin America, volatility in the real exchange rate has been a problem, whereas in Africa inward orientation results from exchange rates that are overvalued as a result of protection but are rather stable.

To create an orientation index that combines both effects, distortion and variability of the real exchange rate, I take a weighted average of the two measures. The specific weights employed will be discussed in the next section. Using this weighted average, I have ranked the 95 developing economies in decreasing order of openness and then divided them into four quartiles. The four groups are listed in table 4. Within each group, countries are listed in decreasing order of openness.

This division of countries is highly consistent with the David Greenaway and Chong Hyun Nam categorization and with other stud-

TABLE 4

OUTWARD ORIENTATION RANKINGS FOR 95 DEVELOPING COUNTRIES

Most Open Quartile	Second Quartile	Third Quartile	Most Inward Quartile
Malta	Kenya	Gambia	Algeria
Thailand	Chile	Malawi	Paraguay
Colombia	Philippines	Suriname	Haiti
Sri Lanka	India	Senegal	Mauritania
South Africa	Tunisia	Zimbabwe	Zambia
Pakistan	Madagascar	Iran	Burundi
Bangladesh	Burkina Faso	Lesotho	Liberia
Malaysia	Togo	Central African Republic	Rwanda
Korea	Brazil	Trinidad and Tobago	Guinea
Mexico	Syria	Ecuador	Honduras
Singapore	Turkey	Swaziland	Guyana
Portugal	Burma	Ivory Coast	Tanzania
Nepal	Benin	Cameroon	Egypt
Cyprus	Mali	Venezuela	Nicaragua
Fiji	Indonesia	Dominican Republic	Angola
Hong Kong	Panama	Argentina	Zaire
Ireland	Barbados	Niger	Sierra Leone
Peru	Costa Rica	Yemen	Somalia
Spain	Greece	Congo	El Salvador
Papua New Guinea	Botswana	Jamaica	Iraq
Jordan	Uruguay	Mozambique	Ghana
Taiwan	Chad	Gabon	Uganda
Mauritius	Ethiopia	Guatemala	Bolivia
	Morocco	Sudan	Nigeria

ies focusing on smaller samples.[10] All four of the Asian tigers are in the most open quartile, as are Thailand and Malaysia as well as Colombia and Mexico. The second quartile includes Chile, Tunisia, Brazil, and Turkey. The third quartile consists of some of the less open South American countries (Argentina, Ecuador) and African countries such as Cameroon, Senegal, and Ivory Coast. The most inward group includes many countries well known to be highly distorted: Zambia, Burundi, Tanzania, Bolivia, Ghana, Uganda, and Nigeria.

The main remaining anomalies are low-income Asian economies that are found to be surprisingly open: Bangladesh and Nepal in the top quartile and India in the second quartile. What the data may be picking up here is that those economies are in fact quite open relative to other very low income countries. Also, Peru (in the most open quartile) still seems miscategorized.

In summary, an outward orientation index that combines both distortion and variability of the real exchange rate succeeds fairly well in sorting countries into broad categories of trade orientation. The results accord quite well with studies that rely on fewer countries but have more data about each country. Compared to those studies, the procedure developed in this article seems to produce more anomalies; on the other hand, it has the advantage of being easily applied to a large number of countries.

IV. Outward Orientation and Growth

With the measures of real exchange rate distortion and variability developed in previous sections, it is possible to address the question of whether outward-oriented economies grow more rapidly. To do this properly, it is necessary to control for other variables that may influence growth. I estimate a simple model in which per capita GDP growth over the period 1976–85 is a function of investment rate, real exchange rate variability, and the index of real exchange rate distortion. The implicit model underlying the regressions is that the investment rate affects the per capita availability of capital, whereas outward orientation accelerates the technological development of the economy. Both should produce more rapid growth. Outward orientation is achieved through a low level of protection and a stable real exchange rate.

The investment rate that I use here is the share of investment in GDP, as calculated by Summers and Heston, averaged over the period 1976–85. Averages for each region are reported in table 3. The growth rates that are to be explained are listed in table 1. For regions as a whole, investment rates actually differ little, with Asia at 19.1%, Latin America at 17.8%, and Africa at 15.0%. As noted earlier, growth rates differ much more, with Asia significantly ahead of the other regions.

The linear regression of per capita growth on the three explanatory variables is reported in table 5. This cross-sectional regression is carried out across the 95 developing economies in the data set. The justification for focusing on developing countries only (and omitting the 22 developed countries) is that the effect of openness on growth is likely to be substantially different for backward and advanced economies. An outward-oriented strategy may accelerate the pace at which developing economies are able to adopt technologies already in use in advanced economies. For the industrial countries, it is not likely that openness would have the same effect.

Regression (1) shows that growth is positively associated with investment rate and negatively associated with distortion and variability of the real exchange rate. All of the *t*-statistics are above 3.0, and the R^2 is .38.[11] All of the relationships hold up (and are strengthened) in univariate regressions (reported in the table).[12]

Figure 2 plots growth against real exchange rate distortion for the 95 countries. The average value of the index for these countries is around 130. The most remarkable feature of this figure is that there are only four countries with index values above the mean that have any significant positive growth at all. All four of these outliers are in Africa. In regressions (2) and (5), the effect of these outliers is eliminated (through an intercept dummy). Figure 2 also shows the estimated

TABLE 5

PER CAPITA GDP GROWTH, 1976–85, AS A FUNCTION OF INVESTMENT RATES AND OUTWARD ORIENTATION, FOR 95 DEVELOPING ECONOMIES

REGRESSION NUMBER	CONSTANT	REAL EXCHANGE RATE		INVESTMENT	DUMMY*	R^2
		Distortion	Variability			
(1)	1.65	−.017	−.08	.14	. . .	.38
		(3.06)	(3.23)	(3.93)		
(2)	2.61	−.024	−.07	.11	4.45	.46
		(4.29)	(3.09)	(3.37)	(3.74)	
(3)	4.80	−.021	−.10	. . .	. . .	.28
		(3.32)	(3.91)			
(4)	3.84	−.026	. . .	. . .	. . .	.15
		(4.13)				
(5)	4.52	−.033	. . .	. . .	5.87	.31
		(5.58)			(4.52)	
(6)	2.50	. . .	−.12	. . .	. . .	.19
			(4.66)			
(7)	−2.70	. . .	. . .	.18	. . .	.21
				(4.95)		

NOTE.—Dependent variable: average growth rate of per capita GDP, 1976–85. Figures in parentheses are *t*-statistics.

* Intercept dummy for four large outliers in Africa (Algeria, Cameroon, Congo, and Egypt).

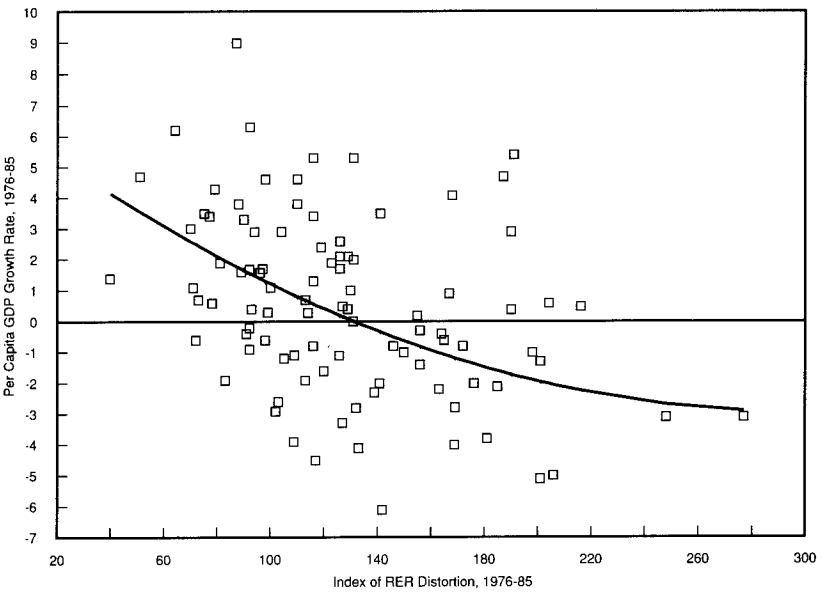

FIG. 2.—GDP growth and real exchange rate distortion in 95 LDCs

quadratic relationship between growth and real exchange rate distortion (when the outlier dummy is included in the regression).

Thus, we find that there is a statistically significant relationship between growth and outward orientation. The question remains, however, whether the estimated relationship is of a significant magnitude. One answer to this question can be provided by the following counterfactual experiment: if Latin America and Africa could achieve the levels of real exchange rate distortion, real exchange rate stability, and investment found in Asia, what would happen to their growth rates, according to the coefficients from the cross-sectional regression?

According to the coefficients from regression (2), reduction of the real exchange rate distortion to the Asian level would add 0.7 percentage points to Latin American growth and 1.8 percentage points to African growth. Reaching the Asian level of real exchange rate stability would add a further 0.8 percentage points to Latin American, and 0.3 percentage points to African growth. Hence an outward orientation with a stable real exchange rate could have added 1.5 percentage points to Latin American growth and 2.1 points to African growth. Given actual growth of -0.4% in Africa and -0.3% in Latin America during 1976–85, the estimated gains are quite large and would shift these regions from negative to modestly positive growth. Finally, it should be noted that differences in investment rates can explain very little of the difference in regional growth rates, because investment rates vary

relatively little. Increasing their investment rates to the Asian level would add 0.1 percentage points to Latin American, and 0.5 percentage points to African growth.

As with any econometric exercise, the results should be interpreted with some caution. It is possible that there are important omitted variables, so that the correlation of growth rates with these outward orientation measures may be spurious. There is also the possibility that the causation runs in the other direction: from poor growth performance to inward orientation. During the time period under examination, many countries in Latin America and Africa suffered debt crises accompanied by slow or negative growth. It is possible to view these debt crises as exogenous shocks that cause both slow growth and inward orientation, in which case the correlations revealed in table 5 would have interpretations different from those presented above.[13] The model underlying my interpretation of the results implicitly assumes that trade orientation has a causal relationship with debt problems; that is, inward-oriented countries are more likely to have debt crises and the resulting slow growth. Outward-oriented countries that borrowed externally, such as Korea, on the other hand, typically do not have debt crises.

V. Sensitivity Analysis

The results of this econometric exercise are quite encouraging in that they imply that developing economies may be able to grow more rapidly if they make policy adjustments that are easily within their reach. Furthermore, the largest predicted gains would go to some of the poorest countries in Africa if they can liberalize their trade regimes and devalue their real exchange rates. However, there are a number of reasons to doubt the robustness of these results. As always with econometric work, one wonders to what extent results depend on particular specifications of equations. A second issue concerns the coverage of the data set. Because the Summers and Heston data cover virtually all countries in the world, there is no problem with selection bias. However, there may be a problem with carrying out cross-sectional investigation with countries that are so different. In the interest of maximizing degrees of freedom, "developing country" is defined here to allow for the inclusion of economies as developed as Spain, Ireland, and Singapore. At the other end of the spectrum are the very poor countries of Africa. Can these very poor countries really benefit from outward orientation? These questions concerning the robustness of the results are addressed in this section.

A. Alternative Specifications

The issue of the specification of the equation used in calculating the index of outward orientation was briefly addressed in Section II. How

Africa is treated has a large effect on the estimated relationship between per capita income and price level. There is good reason to think that not making some adjustment for Africa will result in a biased estimate of the relationship. The results reported in Sections III and IV come from a specification in which there is a dummy for Africa. How do the results change if the specification chosen has no such adjustment for Africa (i.e., regression [6] in table 2 and fig. 1)?

With this alternative specification, the average distortion index is 112 for Africa, 97 for Latin America, and 70 for Asia. The absolute level of this index has no meaning at all; what is important is the relationship among countries and regions. Africa is still found to be substantially overvalued relative to Asia (by 60% rather than 86%, as in the original specification). Latin America is 39% overvalued relative to Asia in this new formulation, compared to 33% with the original specification. The new specification compresses the distance between Asia and Africa but does not change the basic ordering.

Table 6 reports the regression of per capita growth rate on the three explanatory variables when this alternative specification is employed. It can be seen that there is still a significant relationship between growth and the distortion index. The size of the coefficient has

TABLE 6

SENSITIVITY ANALYSIS

REGRESSION NUMBER	CONSTANT	REAL EXCHANGE RATE		INVESTMENT	DUMMY*	R^2
		Distortion	Variability			
N = 95 developing countries:						
(1)	1.84	−.033	−.08	.18	. . .	.40
		(3.55)	(2.90)	(5.24)		
(2)	2.87	−.045	−.07	.16	4.66	.49
		(4.91)	(2.71)	(5.20)	(4.01)	
N = 48 poorest countries:						
(3)	1.23	−.029	.02	.20	. . .	.38
		(4.02)	(.64)	(3.53)		
(4)	2.17	−.033	.03	.15	5.24	.57
		(5.45)	(.96)	(3.05)	(4.37)	
N = 24 poorest countries:						
(5)	1.86	−.027	.04	.08	. . .	.26
		(2.60)	(.86)	(.96)		

NOTE.—Figures in parentheses are t-statistics. The 48 poorest countries are those with 1976 per capita income below $1,200 (in 1980 international prices). The 24 poorest are those with 1976 income below $600. Dependent variable: average growth rate of per capita GDP, 1976–85.

* Intercept dummy for four large outliers in Africa (Algeria, Cameroon, Congo, and Egypt).

increased, which is not surprising because the new index has a smaller range of values. If the counterfactual experiment conducted in the previous section is repeated with the estimated coefficients from regression (2), the results are broadly similar. Achieving Asian levels of real exchange rate distortion would add 1.2 percentage points to Latin American growth and 1.9 points to African growth. Achieving Asian levels of real exchange rate stability would add a further 0.8 percentage points to growth in Latin America and 0.3 percentage points in Africa. The combined effect (2.0 percentage points for Latin America and 2.2 percentage points for Africa) is actually stronger than that indicated in the earlier analysis.

The estimated effects reported in the previous section thus appear, if anything, to be low estimates. The use of alternative specifications (including others that have not been specifically discussed here) has no effect on the main qualitative result: outward-oriented developing economies grow more rapidly.

B. Relevance to the Poorest Countries

There still remains the question of whether effects estimated across the whole data set are relevant for the very poorest countries. In order to investigate this question, the data set was divided in half on the basis of per capita GDP in 1976. Table 6 reports two regressions explaining growth for the 48 poorest countries (those with per capita income below $1,200 in 1976). Equations (3) and (4) are the same specifications as equations (1) and (2), respectively, in table 5, and it can be seen that the coefficients are broadly similar. The major difference is that the coefficient on variability is now slightly positive and statistically insignificant, while the coefficient on real exchange rate distortion has increased in size and has a larger *t*-statistic.

From this group the poorest 24 countries (with per capita income below $600) were then extracted and the basic regression repeated (also reported in table 6). The interesting result here is that the only thing that explains variation in growth rates for the poorest countries is real exchange rate distortion; real exchange rate variability and investment rate have virtually no explanatory power. Figure 3 shows the relationship between growth and real exchange rate distortion for these poorest countries. Most of these countries are in Africa but four of them are in Asia (Bangladesh, Burma, India, and Nepal). Note that the four Asian economies are clustered in the upper left quadrant (outward orientation and high growth), whereas the African countries tend to be in the lower right quadrant (inward orientation and slow growth). No doubt some will be surprised to see Bangladesh and India cited as examples of outward-oriented economies. But the price level data indicate that they are more outward oriented than other very low income countries. The estimated coefficients in regression (5) suggest

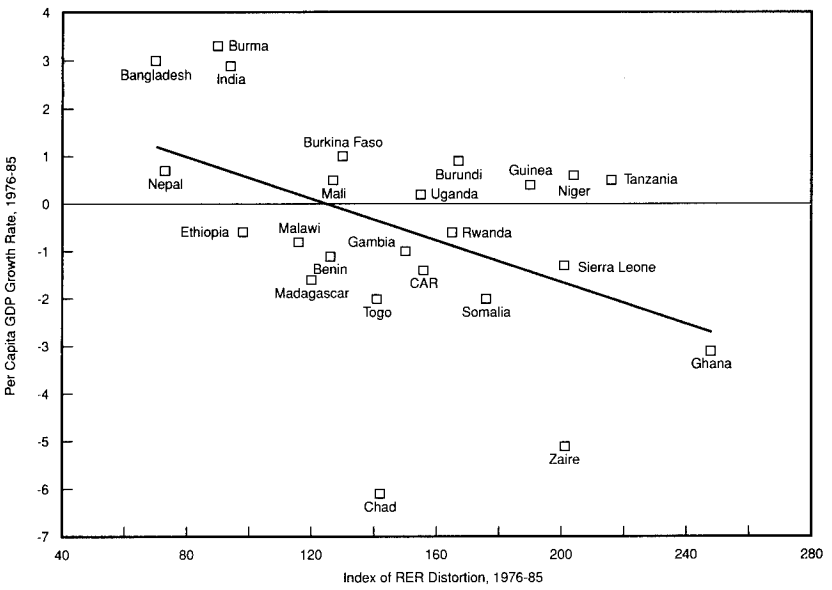

FIG. 3.—GDP growth and real exchange rate distortion in 24 poorest LDCs.

that Sierra Leone could add 3.5 percentage points to its growth rate if it adopted the trade policies and real exchange rate of Bangladesh, while Ghana could add almost 5.0 percentage points to its growth. For these African countries, this would mean the difference between per capita income increasing at 2.0% per year or declining at 2%–3% per year as it has been.

VI. Conclusions

The price data compiled by Summers and Heston indicate that Asian developing economies really are more outward oriented than their counterparts in Africa and Latin America. After controlling for differences in levels of development, Asian economies generally have low price levels, whereas Latin American countries have moderately high price levels and African economies have extremely high price levels. High price levels indicate strong protection and incentives geared to production for the domestic market, whereas low price levels reflect relatively modest protection and incentives oriented to external markets. It is also the case that Asian economies evidence low variability of these real exchange rate distortion measures, whereas Latin American economies, in particular, have been plagued by a high degree of volatility.

On the basis of real exchange rate distortion and variability, an

index of outward orientation can be constructed. This outward orientation measure is highly correlated with per capita GDP growth in a large sample of 95 developing countries. For the period 1976–85, the most open quartile of countries had a per capita growth rate of 2.9%; the next quartile, 0.9%; the third quartile, −0.2%; and the most closed quartile, −1.3%. These results strongly imply that trade liberalization, devaluation of the real exchange rate, and maintenance of a stable real exchange rate could dramatically improve growth performance in many poor countries. The estimated gains of shifting to an Asian level of outward orientation and real exchange rate stability are increases of 1.5 percentage points in Latin America's per capita growth and 2.1 percentage points in Africa's.

Appendix

TABLE A1

OUTWARD ORIENTATION AND OTHER MEASURES FOR 117 COUNTRIES

	1976 GDP PER CAPITA	REAL EXCHANGE RATE		GDP GROWTH (% of GDP)	INVESTMENT RATE (% of GDP)
		Distortion	Variability		
Africa:					
Algeria	1,643	190	.11	2.9	31.4
Angola	653	172	.27	−.8	5.6
Benin	582	126	.08	−1.1	10.1
Botswana	1,093	131	.09	5.3	33.9
Burkina Faso	344	130	.06	1.0	12.8
Burundi	318	167	.20	.9	8.1
Cameroon	718	187	.06	4.7	16.1
Central African Republic	491	156	.09	−1.4	10.5
Chad	441	142	.07	−6.1	7.5
Congo	825	191	.08	5.4	26.9
Egypt	820	168	.27	4.1	18.2
Ethiopia	327	98	.16	−.6	5.4
Gabon	3,986	169	.14	−2.8	26.7
Gambia	575	150	.08	−1.0	25.8
Ghana	463	248	.28	−3.1	8.1
Guinea	436	190	.19	.4	10.2
Ivory Coast	1,113	185	.06	−2.1	14.7
Kenya	600	131	.04	.0	16.1
Lesotho	609	126	.15	2.6	19.6
Liberia	702	169	.21	−4.0	15.7
Madagascar	573	120	.08	−1.6	7.1
Malawi	416	116	.15	−.8	12.2
Mali	339	127	.09	.5	6.6
Mauritania	603	198	.13	−1.0	21.4
Mauritius	1,552	126	.05	2.1	18.6
Morocco	1,032	123	.11	1.9	11.0
Mozambique	711	127	.22	−3.3	5.6
Niger	408	204	.05	.6	16.0
Nigeria	771	277	.31	−3.1	17.8
Rwanda	359	165	.24	−.6	10.6
Senegal	811	146	.09	−.8	8.2

TABLE A1 (*Continued*)

	1976 GDP per Capita	Real Exchange Rate		GDP Growth (% of GDP)	Investment Rate (% of GDP)
		Distortion	Variability		
Sierra Leone	449	201	.25	−1.3	10.8
Somalia	416	176	.34	−2.0	18.8
South Africa	4,107	72	.10	−.6	21.4
Sudan	656	163	.16	−2.2	14.8
Swaziland	1,048	140	.14	1.4	20.6
Tanzania	338	216	.17	.5	18.5
Togo	583	141	.04	−2.0	21.2
Tunisia	1,579	104	.11	2.9	15.9
Uganda	342	155	.50	.2	4.0
Zaire	332	201	.22	−5.1	10.5
Zambia	918	206	.12	−5.0	15.0
Zimbabwe	981	164	.06	−.4	16.1
Asia and Oceania:					
Bangladesh	492	70	.11	3.0	6.2
Burma	413	90	.15	3.3	13.3
Fiji	2,798	93	.10	.4	19.6
Hong Kong	5,216	64	.16	6.2	21.3
India	579	94	.13	2.9	18.1
Indonesia	830	98	.15	4.6	18.9
Korea	2,013	110	.04	4.6	30.0
Malaysia	2,430	88	.08	3.8	29.1
Nepal	493	73	.13	.7	9.2
Pakistan	846	77	.09	3.4	11.0
Papua New Guinea	1,527	105	.09	−1.2	16.4
Philippines	1,380	92	.13	−.2	15.7
Singapore	4,380	87	.10	9.0	37.8
Sri Lanka	1,004	51	.14	4.7	16.0
Taiwan	2,227	116	.07	5.3	24.0
Thailand	1,384	75	.07	3.5	18.6
Latin America:					
Argentina	4,125	113	.23	−1.9	24.4
Barbados	3,712	110	.13	3.8	20.7
Bolivia	1,530	181	.46	−3.8	11.0
Brazil	2,805	97	.13	1.7	21.0
Chile	3,168	100	.11	1.1	26.3
Colombia	2,191	81	.07	1.9	17.3
Costa Rica	2,744	91	.17	−.4	15.5
Dominican Republic	1,685	129	.19	.4	21.1
Ecuador	2,245	113	.19	.7	25.3
El Salvador	1,539	132	.44	−2.8	8.3
Guatemala	1,773	109	.27	−1.1	9.3
Guyana	1,895	117	.35	−4.5	25.5
Haiti	614	114	.27	.3	11.1
Honduras	936	156	.27	−.3	14.3
Jamaica	2,121	139	.19	−2.3	14.0
Mexico	3,624	71	.12	1.1	20.5
Nicaragua	2,503	103	.41	−2.6	12.0
Panama	2,406	129	.09	2.1	23.9
Paraguay	1,459	141	.21	3.5	16.5
Peru	2,509	83	.13	−1.9	10.2
Suriname	3,009	126	.13	1.7	16.5
Trinidad and Tobago	5,958	96	.22	1.6	29.7

TABLE A1 (*Continued*)

	1976 GDP per Capita	Real Exchange Rate		GDP Growth (% of GDP)	Investment Rate (% of GDP)
		Distortion	Variability		
Uruguay	3,762	92	.17	−.9	16.3
Venezuela	5,020	109	.23	−3.9	16.7
Europe/Middle East:					
Cyprus	3,010	92	.10	6.3	29.8
Greece	3,971	116	.12	1.3	26.6
Iran	5,112	102	.19	−2.9	20.2
Iraq	4,056	133	.51	−4.1	27.0
Ireland	4,189	119	.05	2.4	29.1
Jordan	1,562	116	.07	3.4	26.7
Malta	3,615	79	.04	4.3	25.0
Portugal	3,204	92	.09	1.7	21.9
Spain	5,568	89	.12	1.6	15.6
Syria	2,755	78	.17	.6	19.2
Turkey	2,455	99	.13	.3	21.8
Yemen	816	131	.20	2.0	21.6
Developed countries:					
Australia	7,895	129	.05	1.3	28.6
Austria	7,310	100	.11	2.2	23.7
Bahrain	8,959	101	.06	−1.0	32.9
Belgium	8,367	100	.19	1.7	21.2
Canada	10,663	83	.08	1.5	22.6
Denmark	8,849	112	.15	2.3	22.8
Finland	7,159	126	.08	2.8	32.4
France	8,750	98	.13	1.4	25.0
Germany	8,609	109	.15	2.4	25.4
Iceland	7,908	116	.09	1.5	28.2
Israel	6,059	110	.07	.4	23.7
Italy	6,068	92	.06	2.2	22.0
Japan	6,816	118	.09	3.6	37.1
Luxembourg	9,124	91	.16	1.6	24.7
Netherlands	8,449	105	.13	.8	21.7
New Zealand	7,497	101	.07	.7	21.9
Norway	9,110	107	.11	3.6	28.2
Oman	9,609	129	.21	−2.3	21.8
Sweden	8,298	142	.14	2.0	21.0
Switzerland	9,358	127	.10	1.4	27.7
United Kingdom	7,413	99	.11	1.7	16.4
United States	10,598	90	.06	1.9	21.4

Notes

* I would like to thank Edward Leamer, Kenneth Sokoloff, and an anonymous referee for helpful comments on an earlier draft. Opinions expressed are mine and do not necessarily reflect the views of the World Bank or its member countries.

1. Jeffrey D. Sachs, "External Debt and Macroeconomic Performance in Latin America and East Asia," *Brookings Papers on Economic Activity* 2 (1985): 523–64, quote on 525.

2. See, e.g., Bela Balassa, "Exports and Economic Growth: Further Evidence," *Journal of Development Economics* 5 (June 1978): 181–89; or Anne O. Krueger, "Trade Policy as an Input to Development," *American Economic Review* 70 (May 1980): 288–92.

3. For instance, a number of studies have found an empirical relationship between exporting and total factor productivity growth. See Mieko Nishimizu and Sherman Robinson, "Trade Policies and Productivity Change in Semi-industrialized Countries," *Journal of Development Economics* 16 (September–October 1984): 177–206; or David Dollar and Kenneth Sokoloff, "Patterns of Productivity Growth in South Korean Manufacturing Industries, 1963–1979," *Journal of Development Economics* 33 (October 1990): 309–27. Other empirical studies of the relationship between exports and growth include Michael Michaely, "Exports and Growth: An Empirical Investigation," *Journal of Development Economics* 4 (March 1977): 49–53; and Rati Ram, "Exports and Economic Growth: Some Additional Evidence," *Economic Development and Cultural Change* 33 (January 1985): 415–25.

4. Joaquin A. Cottani, Domingo F. Cavallo, and M. Shahbaz Khan ("Real Exchange Rate Behavior and Economic Performance in LDCs," *Economic Development and Cultural Change* 39 [October 1990]: 61–76) calculate misalignment for a sample of developing countries and demonstrate its negative relationship with growth.

5. Robert Summers and Alan Heston, "A New Set of International Comparisons of Real Product and Price Levels: Estimates for 130 Countries, 1950–1985," *Review of Income and Wealth* 34 (March 1988): 1–25.

6. Measuring per capita GDP in a common set of international prices results in estimates higher than those derived with market exchange rates (as, e.g., in the *World Development Report*). By the Summers and Heston measure, the poorest country in 1976 was Burundi, with per capita income of $318. The median income for the 95 developing countries was $1,113. The richest countries were the United States and Canada with incomes of around $10,600.

7. The price data for Afghanistan were incomplete in the 1980s. Also, the three capital-surplus oil exporters were dropped, since their price levels are extraordinarily high because of their special endowments. These deletions reduce the 121 countries to 117.

8. Bela Balassa, "The Purchasing-Power Parity Doctrine: A Reappraisal," *Journal of Political Economy* 72 (December 1964): 584–96. See also Lawrence H. Officer, "The Purchasing-Power-Parity Theory of Exchange Rates: A Review Article," *International Monetary Fund Staff Papers* 23 (March 1976): 1–60, for a survey of the debate about absolute PPP.

9. Recent articles that sort countries by trade orientation include David Greenaway and Chong Hyun Nam, "Industrialization and Macroeconomic Performance in Developing Countries under Alternative Trade Strategies," *Kyklos* 41 (August 1988): 419–35; and Edward Leamer, "Measures of Openness," in *Trade Policy Issues and Empirical Analysis,* ed. Robert Baldwin (Chicago: University of Chicago Press, 1988). Greenaway and Nam employ several different criteria to sort 41 countries into four categories of openness. Leamer uses residuals from a predicted trade model to form a continuous ranking of openness for 26 countries.

10. If countries in the four Greenaway and Nam categories for the period 1973–84 are assigned 1–4 points, the rank correlation with the ordering in table 4 is .51. Leamer's results have two major differences with those presented in table 4: his method finds Ivory Coast to be very open and Colombia very closed, whereas table 4 has the opposite result. Omitting those two anomalies, the rank correlation between Leamer's openness measure and the ordering in table 4 is .41.

11. When the 22 developed countries are included, regression coefficients are remarkably similar to those reported in table 4. It is interesting, however, that similar regressions carried out only across the developed countries indi-

cate no relationship between growth and any of the explanatory variables. Variation in growth rates across developed countries cannot be explained at all by outward orientation or by investment rate.

12. The weights that were employed to form the weighted average of real exchange rate distortion and variability in the previous section were taken from the regression coefficients in eq. (3), table 5.

13. Sam Laird and Julio Nogues ("Trade Policies and Highly Indebted Countries," *World Bank Economic Review* 3 [May 1989]: 241–61) provide evidence that highly indebted countries became more protectionist in the early 1980s in response to their debt crises. In subsequent years, however, many of these countries have undergone significant liberalizations and have become more open than before the onset of the debt crisis.