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Trade and Growth: Why Asia Grows Faster Than Latin America

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PREFACE

This paper, prepared by Manuel R. Agosin, the Department's Regional Economic Advisor, deals with a topic that has been amply debated in the development literature: the relationship between trade and growth. The paper's hypothesis is that what matters for growth is not merely openness to trade, or, for that matter, export growth *per se*. The key feature of countries that have surged ahead in recent decades is that fast export growth has been accompanied by export diversification.

The paper tests this hypothesis in the framework of an empirical growth model for the period 1980-2003. It finds considerable support for the hypothesis that diversified export growth is one of the keys to economic growth. The model has strong explanatory power and is able to show why rapidly growing Asian countries have done better than Latin American countries.

These findings have direct implications for the countries of Region II. Most of these countries experienced considerable export diversification during the nineties, but that effort has stalled during the current decade. Competition from Asian countries in general, and from China in particular (since becoming a full member of WTO in 2001 and, even more so, since the restrictions of the Textiles and Clothing Arrangement lapsed at the end of 2004) has taken its toll on export growth and diversification. In addition, the countries in the region are still struggling with the design of an appropriate strategy to continue to forge ahead with export-driven growth.

The policy prescriptions are clear: the competitiveness efforts of the region must encourage new sectors where comparative advantage can be acquired, without ignoring the benefits of continuing to strengthen those sectors which have been subjected to growing international competition. These policies acquire particular relevance with the entrance into effect of the free trade agreement between Central America, the Dominican Republic, and the United States (CAFTA-DR), expected to begin in March 2006. In order to take advantage of the new opportunities offered by this agreement, countries will need to design and implement stronger competitiveness policies.

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INTRODUCTION

It is already an accepted stylized fact of international development that Latin American countries (LACs) grow at more modest rates than the Asian exporters of manufactures. It is also true that the latter countries made a transition to export-oriented growth well before LACs; moreover, they have been considerably more successful in encouraging export growth and in diversifying their output and export mix.

This paper explores the connection between export expansion and GDP growth, with special reference to the differences observed between both regions. It will not attempt another go at the controversy of whether openness is positively associated with economic growth, a topic that has been dealt with exhaustively in the literature (see Rodríguez and Rodrik, 2000). By now, the issue seems to have been settled: many countries (Korea and Taiwan being the paradigms) were able to grow rapidly while maintaining high import barriers and relaxing them once export-oriented development had been consolidated; at the other extreme, others, among which there are several LACs, opened up their economies with much more modest effects either on exports or economic growth.

We are interested in the issue of whether export growth is associated with overall economic growth. In a statistical sense, the relation must hold, since exports are a part of GDP. Here the focus will be on whether there is a particular kind of export growth which can result in sustained growth both in exports and GDP. We posit that countries with diversified export structures are able to record consistently higher export growth than countries where exports are concentrated in a few products. Moreover, in economies with diversified export structures, export growth has more pervasive effects on the economy as a whole and, therefore, translates into higher rates of economic growth than in economies where exports are concentrated in a few products.

Section I presents some analytical considerations of why output and export diversification (OED) should be positive for growth. After looking at the export and growth experience for Latin America and Asia (section II), we show that, indeed, there seems to be a negative association between export concentration and growth through the effect of concentration on export and output volatility (section III). Then, in sections IV and V, we show that OED, as proxied by an export diversification index, is a strong explanatory variable in a simple empirical growth model estimated with cross section data for 1980-2003, the period for which the data on export composition is available. The coefficients yielded by the empirical model are used, in section VI, to estimate the contribution of different factors to growth in a sample of Asian and Latin American countries. Section VII recapitulates.

I. SOME ANALYTICAL CONSIDERATIONS

Why would export diversification be beneficial for growth? There are potentially two different types of effects:

1. The portfolio effect. The greater the degree of diversification the less volatile will be export earnings. Less volatile export growth is likely to be associated with lower variance of GDP growth. This is, in itself, a positive aspect of diversification, since countries with imperfect (or no) access to world financial markets will not be able to smooth consumption in the face of large fluctuations in exports and output. In addition, the variance and the mean of the growth rate may be negatively correlated. This adverse effect of volatility on average growth could result from hysteresis. Periods of contraction lead to the destruction of installed capacity and to deskilling of the labor force, both of which cannot be easily undone during the next boom. Also, countries whose exports are highly dependent on one or a few products tend to have more volatile real exchange rates than countries with diversified export structures, and real exchange rate volatility discourages investment in tradable goods or services.

2. Dynamic benefits of diversification. One of the single most important characteristics of countries with low per capita income is the fact that they have a comparative advantage in a very limited range of goods. In other words, because of the paucity of skills or lack of complementary inputs (some non-traded), these countries are unable to apply knowledge about production that exists elsewhere in the world. As a country develops, it becomes increasingly able to produce an ever wider range of goods and can begin to compete in international markets in them. While not the only one, the ability to export certainly can be judged to be an appropriate indicator of international competitiveness. Countries that are able to diversify their exports are also those that have been able to expand their range of comparative advantage. And a broad range of comparative advantages is synonymous with development.

In a sense, OED is only a proximate cause of growth and is itself a result of several phenomena associated with development and which have been highlighted in the endogenous growth literature. These include the accumulation of skills, learning by doing, positive pecuniary externalities that stem from the production of key non-traded inputs (e.g., infrastructure services), positive technological externalities associated with skill creation, and technological innovation. Here we will take OED to represent one of the visible symptoms that those phenomena have been at work in the economy.

The accumulation of skills is not a totally exogenous phenomenon. Sometimes it may be the result of deliberate policies; in other cases it may be interdependent with the establishment of plants producing new export goods. For example, the establishment of Intel in Costa Rica to produce micro chips for foreign markets led to an increase in computer programming education (in part subsidized by Intel itself). That education benefits not only Intel but has positive spillovers on related sectors (software, for example) and even on other unrelated sectors that can raise their productivity through investments in information technology.

Learning by doing lowers the costs of production to the firm where it is taking place. But it could also have externalities for other firms in the sector or even for producers in other sectors. In a low-skill economy, the very fact that a new good is being produced may have positive technological externalities for other firms in the sector (through the building up of industry-specific skills) or even for firms in totally unrelated sectors (through the creation of non-specific skills that are essential for modern production in general).

Learning by doing can also have pecuniary externalities by lowering the costs of production of firms using inputs newly produced in the economy. Perhaps transport costs are too high for importing the input. As domestic production increases and costs are lowered, this may render competitive sectors that use the product as an input.

One might object that the hypothesis that export diversification leads to faster growth on the grounds that it flies in the face of international trade theory, be it Ricardian, Hecksher-Ohlin, or Krugman-Helpmann. Traditional trade theory stresses the comparative-advantage benefits of specialization, which presumably increases welfare and real incomes. The new trade theories, by emphasizing economies of scale, would also appear to favor specialization, at least on an intra-industry basis. It should be noted, though, that all highly specialized economies are poor. Per contra, all developed economies are highly diversified, both in their production and export structures.

Is OED another aspect of long-term growth that occurs spontaneously as a result of market forces? Can it be induced as a deliberate objective of development policy? All developed economies exhibit OED, and in this sense OED may be the result of a long process of market-driven development. This was the case with the transformation of the Scandinavian countries from natural resource exporters to producers and exporters of a wide array of manufactures goods (see Meller and Blomstrom, 1991). For developing countries that have succeeded in growing rapidly in the postwar period, OED was the explicit policy of governments intent on rapid industrialization. The best-known examples are Korea and Taiwan.[1] There are other less spectacular examples. In spite of its reputation for market-oriented reforms, Chile's success in diversifying its exports away from copper were partly the result of deliberate policies of promoting production of new goods for international markets (Agosin, 1999).

Is import substitution industrialization (ISI) a necessary first stage of OED? Many countries began diversifying their production structures through ISI. This is true both of countries that were very successful and of those that did less well (like some LACs). The Asian exporters of manufactures began their industrialization drive with protectionism; later, when new manufacturing sectors had emerged under the shelter of ISI, they switched to export promotion (EP). The skills acquired during ISI were essential for the success of EP. In a sense, this was also true of the larger LACs (especially Brazil), although the path they followed was considerably rockier.

[1] The classic chronicles are Amsden's (1989) account of Korean industrialization and the description of Taiwan's experience by Wade (1990). See also Rodrik (1995). Interestingly, a recent paper by Jäntti, Saari, and Vartiainen (2005) shows that, during the postwar period, Finland followed a model that had much in common with that of Korea.

Several studies address the question of whether firms become more competitive by exporting or those who export do so because they have lower costs or higher productivity in the first place appears to have been settled in favor of a self-selection view in which firms that succeed in export markets have superior technologies, are able to produce profitably quality products, or employ higher-skilled workers.[2] Many studies conclude that learning by exporting is not an important factor explaining permanence in international markets This would seem to favor the hypothesis that firms learn by producing for the domestic market and then attempt to break into international markets.

However, studies using a different methodology and a production-function approach yield exactly the opposite result. In a recent paper, Herzer and Nowak-Lehmann (2004) estimate a production function with a VAR technology using time series for Chilean macroeconomic variables over the period 1963-2001. In this model, the number of exported goods and the share of industrial goods in total exports are treated as proxies for the accumulation of knowledge, the presence of positive knowledge spillover effects, and learning by exporting. Using a different methodology but still within a time-series, macroeconomic framework, Amin Gutiérrez de Piñeres and Ferrantino (2000) also find that, in the long-run, export diversification and growth are positively correlated in Chile (chapter 4) and Colombia (chapter 5).

It would seem that it is an ISI stage is not the only way of achieving OED. Some countries have diversified their production mix directly by exporting, especially when the first firms are fully or partly foreign-owned. This has been the experience of Chile, a country that has based its export diversification on new goods.[3] China's export oriented growth of recent decades seems to have also followed this pattern, since the goods produced owe little to previous industrialization. The importance of foreign direct investment has been paramount, but multinational firms have been required to enter into joint ventures with national firms, first state-owned but increasingly private (Rodrik, 2006).

Subcontracting arrangements have also been used as a way around the need to incur in large sunk costs in marketing and product design. The recent Chinese export boom seems to have relied heavily on these two mechanisms. Much of what is exported is produced directly for foreign markets and consumed in relatively small amounts or not at all in the domestic market. In this way, China has gone from being a relatively closed economy with an import-to-GDP ratio of less than 10 percent in the early eighties to about 35 percent at present.

So, in a sense, the issue of whether ISI or EP is to be preferred as a development strategy is a straw man. There are many paths to Rome. The correct strategy is contingent on the characteristics of the country applying it. Since economies of scales are very important in manufacturing (and even in most modern services), large countries are more likely to benefit from protection than very small economies. ISI was successful in creating entrepreneurial and

[2] There is an extensive literature on this subject. For an analysis of Chilean industry, see Álvarez and López (2005). Evidence from Morocco, Mexico, and Colombia can be found in Clerides, Lach and Tybout (1998). Roberts and Tybout (1997) present further evidence for Colombia.

[3] However successful, the experience of Chile has had some unfortunate characteristics. Much of the skills developed during the ISI period (1940s through 1973) were destroyed during the import liberalization period (1973-79). Agosin and Ffrench-Davis (1995) argue that more pragmatic policies similar to those followed by Korea may have allowed firms to survive and orient their output to foreign markets.

worker skills in countries with a minimum market size, but was much less so, and exhausted its potential much faster, in smaller countries.

The real capabilities of a country to absorb or adapt a foreign technology in a relative short period of time, together with the speed at which the technology is changing in the leading countries, is another element to be taken into account. The Brazilian informatics policy of the 1980s, consisting in protecting the domestic market for information technology products and requiring foreign investors to form joint ventures with domestic interests, proved to be an expensive failure, because Brazil, at the time, did not have the capability to catch up quickly with Silicon Valley and the technology was itself evolving rapidly. India's more selective approach of fostering software development has been much more successful.

We will present evidence in favor of the hypothesis that export diversification is positively associated with growth. We posit that export diversification, coupled with high export growth rates, has been a trait of recent growth success. High rates of export growth do not guarantee high economic growth: they must be accompanied by export diversification. Undoubtedly, there are other factors behind successful growth experiences, but this paper will not deal with them in detail.

Export diversification is not necessarily the same thing as exports of manufactures. Some countries whose exports are heavily concentrated on primary commodities may diversify into other natural-resource-based industries rather than into manufactures. Conversely, export concentration is not synonymous with primary commodity exports. However, historically export concentration has tended to be associated with concentration in one or a few primary commodities. Heavy export concentration in one or a few manufactures is an anomaly.[4] And diversification has been associated always with the production and export of goods with higher-skill and higher-knowledge intensity.

What does the literature tell us? All recent papers find that diversification is good for growth. However, none is able to distinguish between the portfolio effects and the dynamic benefits of OED on growth. In fact, these are difficult if not impossible to disentangle. Lederman and Maloney (LM, 2003) calculate a Hirschman-Herfindahl index (HHI) of export concentration at the four digit SITC level and, together with other variables of trade structure (the share of natural resources in total exports and the Grubel-Lloyd index of intra-industry trade), plug it into an empirical model of growth. The results are consistent with the hypothesis that is at the core of the current paper. The objective of the LM paper is to show that natural resource abundance is beneficial to growth and not inimical to it, as some authors have claimed (for example, Sachs and Warner, 1995). The HHI is used mainly as a control variable. However, their results with regard to export concentration are not robust to model specification, a problem that they share with those obtained by Amin Gutiérrez de Piñeres and Ferrantino (2000, chapter 7).

[4] The only examples that come to mind are clothing exports from Central American export processing zones and heavy concentration on micro chips in Costa Rica since the establishment of an Intel plant in the late 1990s.

II. TRADE AND GROWTH IN LATIN AMERICA AND ASIA, 1980-2003

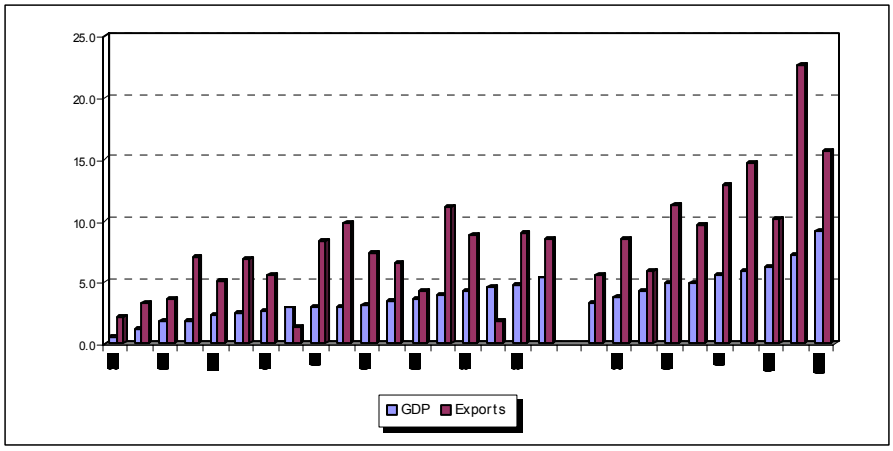
As shown in table 1 and figure 1, the Asian exporters of manufactures grew much faster during 1980-2003 than LACs. Asian output and exports grew more than twice as fast as Latin America's. Even if one excludes the 1980s, the "lost decade" in Latin America, these differences also apply to the period since 1990, although the Asian average rates of growth of output and exports are somewhat lower than twice the ones recorded by LACs. However, even during the period 1990-2003, the country with the highest rate of growth of GDP in Latin America (Chile) was surpassed by five of the ten Asian countries included in the sample.

Table 1
GDP and export growth in Latin America and Asia, 1980-2003
(percentage annual change in GDP and real exports of goods and services)

	1980-2003		1990-2003	
	GDP	**Exports**	**GDP**	**Exports**
Growth rates				
Latin America	2.4	5.3	3.0	6.2
Asia	5.9	11.1	5.5	11.7
GDP-export elasticity				
Latin America	0.49		0.45	
Asia	0.47		0.53	

Source: Author's calculations, based on World Bank, World Development Indicators.
Notes**:** Exports refer to real exports of goods and services (nominal values deflated by the GDP deflator of exports of goods and services). Countries included are, in Latin America, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela; in Asia, Bangladesh, China, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Thailand, and Vietnam.

Figure 1
Latin America and Asia: Growth of GDP
and of exports of goods and services, 1991-2003
(percentage average annual rates of growth)



Source: Author's calculations, based on World Bank, World Development Indicators.
Note: Country abbreviations are as follows: in Latin America, Argentina (AR), Bolivia (BO), Chile (CH), Colombia (CO), Costa Rica (CR), Dominican Republic (DR), Ecuador (EC), El Salvador (ES), Guatemala (GU), Honduras (HO), Mexico (ME), Nicaragua (NI), Panama (PN), Paraguay (PA), Peru (PE), Uruguay (UR), and Venezuela (VE); in Asia, Bangladesh (BA), China (CHI), Hong Kong (HK), India (IN), Indonesia (INDO), Korea (KO), Malaysia (MA), Philippines (PH), and Vietnam (VI).

What is interesting about these figures is that the Asian countries consistently grew faster than LACs, both with regard to GDP *and* to exports. In fact, the ratio of GDP growth to export growth is practically identical in the two regions for the two periods shown.

Of course, this does not mean that faster export growth is the key to the success of the Asian countries relative to their Latin American counterparts, since there are many other differences between them, but faster export growth, and the factors that underlie it, do appear to have played a role.

There is evidence that OED has been a trait in the development pattern of Asia. The proxy for OED that we use here is the HHI[5], taken form UNCTAD's *Handbook of Trade and Development Statistics* and measured at the three-digit SITC level. This indicator is detailed enough to capture, however imperfectly, both vertical and horizontal diversification. By vertical diversification is meant the shift from exporting, say, primary commodities to exporting manufactures. Horizontal diversification refers to the broadening of the export basket by diversifying into goods within the same broad category of goods; for example, from grapes with seeds to seedless grapes, or from coffee for the mass market to gourmet coffee.

As can be seen from table 2, in 1980 Asian countries, on average, had much lower HHI than LACs; during the period up to 2002 the index declined consistently in all Asian countries, with the exception (surprisingly) of Taiwan. However, in 2002 even this latter economy exhibited a lower HHI than most LACs. Indonesia, a country whose exports were heavily concentrated on oil in 1980, had a dramatic fall in its HHI over the 1980-2002 period, from 0.53 to 0.12. China, also, while starting with a relatively low HHI in 1986, experienced an important decrease to less than 0.10, which is a level observed in most developed countries. Most of the Asian exporters of manufactures are rapidly approaching HHI's that are very similar to those of developed countries.

[5] The HHI for country j is defined in the following manner: $HHI_j = \sum_i (\frac{x_{ij}}{x_j})^2$, where x_{ij} is the value of exports of good i by country j and x_j represents the value of total exports of country j.

Table 2
Selected Latin American countries and Asian exporters of manufactures: Hirschman-Herfindahl export concentration index, 1980-2002

	1980	1986	1992	1998	2002
Latin America [a]	**0.36**	**0.40**	**0.30**	**0.26**	**0.25**
Argentina	0.15	0.17	0.15	0.13	0.14
Brazil	0.15	0.12	0.09	0.09	0.09
Bolivia	0.39	0.52	0.32	0.20	0.25
Chile	0.41	0.37	0.31	0.28	0.27
Colombia	0.58	0.58	0.24	0.25	0.22
Costa Rica	0.32	0.39	0.30	0.19	0.21
Ecuador	0.55	0.45	0.47	0.35	0.39
El Salvador	0.38	0.71	0.24	0.24	0.13
Guatemala	0.31	0.47	0.22	0.24	0.19
Honduras	0.37	0.50	0.46	0.44	0.20
Mexico	0.48	0.27	0.15	0.11	0.13
Nicaragua	0.37	0.52	0.29	0.32	0.18
Panama	0.26	0.37	0.45	0.30	0.31
Paraguay	0.28	0.40	0.36	0.43	0.38
Peru	0.26	0.25	0.27	0.22	0.25
Uruguay	0.24	0.20	0.18	0.17	0.19
Venezuela	0.67	0.57	0.56	0.49	0.75
Asia [a]	**0.22**	**0.17**	**0.13**	**0.14**	**0.14**
China	..	0.17	0.08	0.07	0.09
Hong Kong	0.16	0.16	0.15	0.18	0.12
Taiwan	0.12	0.10	0.09	0.14	0.15
India	0.11	0.16	0.14	0.14	0.13
Indonesia	0.53	0.34	0.19	0.16	0.12
Korea, Republic of	0.09	0.10	0.11	0.15	0.15
Malaysia	0.30	0.23	0.16	0.20	0.22
Thailand	0.20	0.14	0.09	0.11	..

Source: UNCTAD, *Handbook of Trade and Development Statistics*, Geneva.

[a] Unweighted average of countries shown.

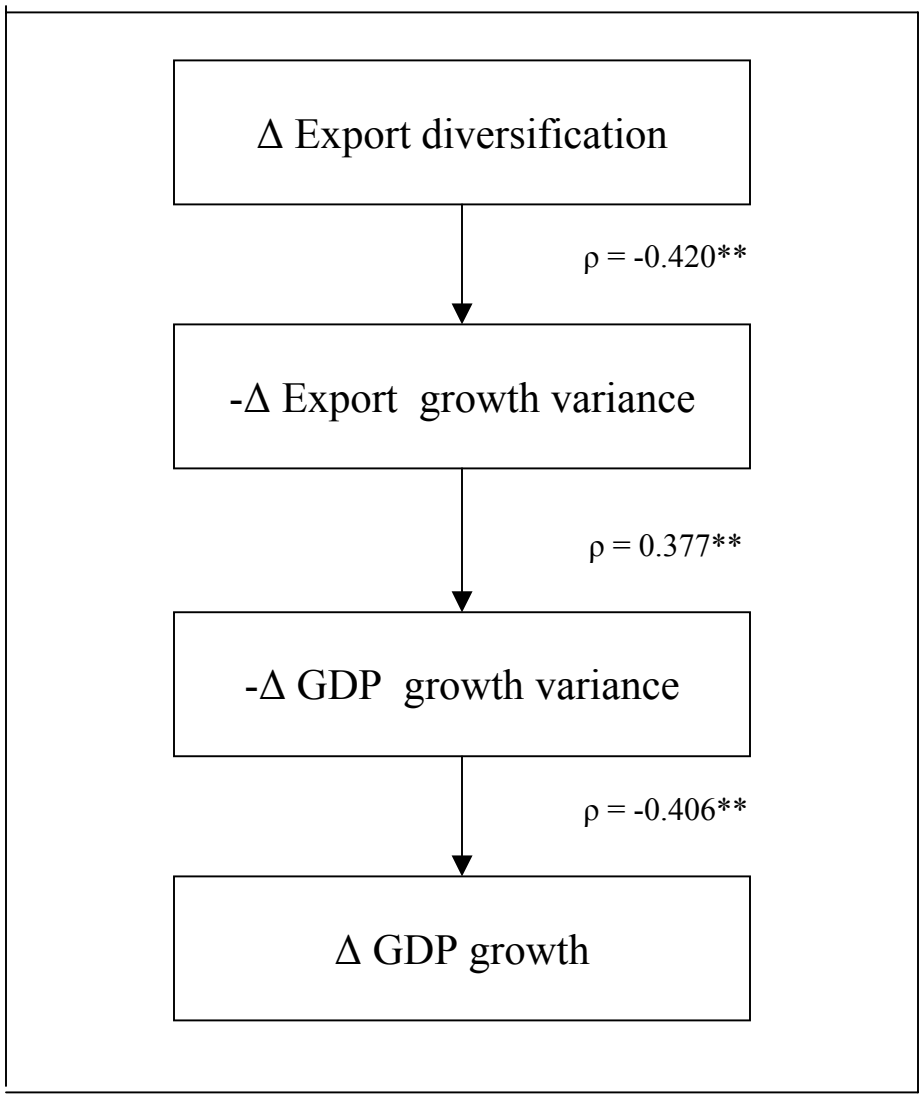
Several LACs have been going through a diversification of their exports. Particularly impressive has been the decline in the HHI of Mexico, Colombia, and, to a lesser extent, Chile. However, their exports remain more concentrated than those of the Asian exporters of manufactures.

Practically the same picture emerges if one looks at the number of goods exported, also at the three-digit level. The maximum number of positions in the SITC classification of international trade at three digits is 239. Practically all Asian countries are fast approaching that number. While an increase in the number of goods exported can also be seen in Latin America, that increase has been more modest, so that the average number of goods exported remains at about one-half the maximum.

III. EVIDENCE IN FAVOR OF THE PORTFOLIO EFFECT

The portfolio effect of OED on growth claims that export diversification should be associated with faster growth. The causal relationships are summarized below with the aid of a simple flow chart (figure 2). Export diversification is related positively to growth through its effects on reducing the variance of export and GDP growth. As already stated, less GDP growth volatility should have a positive effect on GDP growth.

Figure 2
The portfolio effect of export diversification on growth in 1980-2003: a simple flow chart



The values of ρ represent the correlation coefficients between the variables in the two adjacent boxes measured without the Δ's. All of them are significant at the 1 percent level. The data used are for 106 countries over the 1980-2003 period. The data are from World Bank, *World Development Indicators*; and UNCTAD, *Handbook of Trade and Development Statistics*. Export growth refers to goods and services in 2000 US dollars. GDP growth data are in 2000 US dollars.

These hypotheses are not falsified by the data available for the period 1980-2003. The flow chart above would lead one to expect a negative correlation between export diversification and the variance of export growth, a positive correlation between the variance of export growth and the variance of GDP growth, and a negative correlation between the variance of GDP growth and the rate of GDP growth.

This is precisely what the data show (see correlation coefficients in figure 2). All correlation coefficients are of the expected sign and are significantly different from zero at the 1 percent level. Export diversification is measured as $DIV = 1 - HHI$. Increases in *DIV* are highly correlated with declines in the variance of export growth. In turn, a lower variance of export growth is highly correlated with a lower variance of GDP growth. Finally, a lower variance in GDP growth is strongly associated with higher GDP growth.

Of course, many things other than export growth and export diversification affect the growth rate of GDP. But the data do not allow one to reject the hypotheses that export diversification, through its impact on reduced instability of exports and output, leads to higher growth.

IV. GROWTH EMPIRICS: DOES EXPORT DIVERSIFICATION ADD ANYTHING?

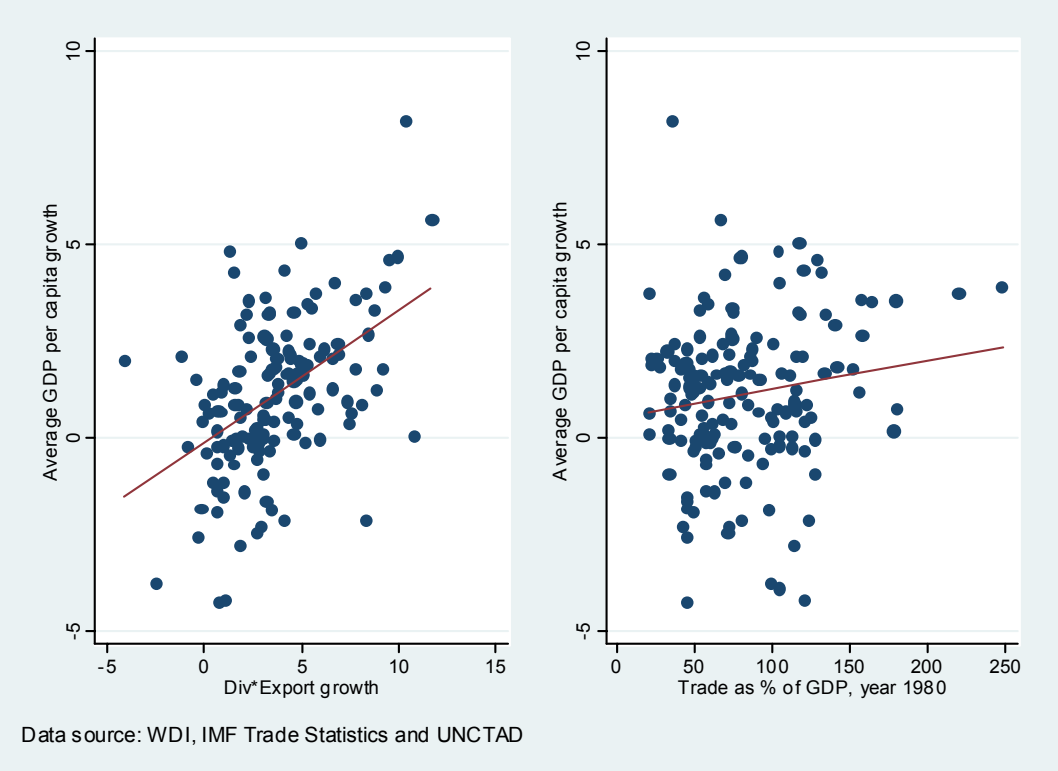
In this section, we explore whether export diversification has any explanatory power in a standard empirical model of growth. Two different variables were used. One was *DIV* by itself, a second *DIV* interacted with export growth (*RX*DIV*). As will be noted below, while DIV has the correct sign and is highly significant, it is the interactive variable that has the most explanatory power. The intuition behind the inclusion of this interactive variable is that diversification is more powerful when a country's exports are growing rapidly than just by itself. Note the difference between Colombia and Malaysia: both wind up in 2002 with a *DIV* of 0.78 (*HHI* of 0.22), but Malaysia's exports grew at a rate of 10.7% in the period 1980-2003, while Colombia's grew only at an average rate of 5.7%. GDP growth in Malaysia averaged 6.4%, while it only reached 3.1% in Colombia.

The estimation strategy is to add *DIV* and *RX*DIV* to an otherwise standard empirical growth model. The variables considered were initial GDP per capita, initial openness (trade as a percentage of GDP), average fixed capital formation during the period, and the rule of law index (developed by Kaufmann, Kraay, and Mastruzzi, 2003).[6]

For starters, the interaction between export growth and diversification appears to be a more appropriate proxy for growth-enhancing participation in the international economy than the degree of openness measured by exports plus imports as a share of GDP. As can be seen in figure 3, which plots the rate of growth of GDP per capita in 1980-2003 against openness and against *RX*DIV*, this latter variable appears to be more correlated with growth than the degree of openness.

[6] A host of different controls were also used, including the average years of schooling in the population aged 15 through 64, but they were not found to add anything to the equation.

Figure 3
GDP growth, openness, and export diversification, 1980-2003



Source: Author's calculations, based on World Bank, *World Development Indicators*; and UNCTAD, *Handbook of Trade and Development Statistics*.

The results of the exercise are shown in table 3. When one controls only for initial GDP per capita and openness, *DIV* and *RX*DIV* are of the correct sign and highly significant when they are entered individually into the regression, as in equations (1) and (2). But they both affect the significance of initial GDP. Openness, so far, appears to be significantly correlated with growth of income per capita. The inclusion of both *DIV* and *RX*DIV*, in equation (3) renders *DIV* not significantly different from zero, while the coefficient associated with *RX*DIV* remains almost unchanged and is still highly significant. In addition, *RX*DIV* has a much greater explanatory power (the R squared jumps significantly when this latter variable replaces *DIV*). Thus *RX*DIV* would appear to be our preferred variable. It is also quite robust to changes in specification.

Table 3
An empirical model of growth
Dependent variable: Average annual rate of growth of GDP per capita, 1980-2003
Method of estimation: OLS

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
log YPC80	-0.210* (-1.72)	.007 (0.08)	-0.006 (-0.06)	0.247*** (-2.64)	-0.596*** (-5.16)	-0.593*** (-4.96)
TRADE80	0.012*** (2.95)	0.013*** (4.16)	0.013*** (4.07)	-0.008* (-2.07)	0.005* (1.66)	0.004 (1.61)
I				0.213*** (7.95)	0.149*** (6.05)	0.149*** (5.97)
RL				0.633*** (3.25)	1.104*** (5.87)	1.108*** (5.79)
DIV	4.846*** (5.68)		0.221 (0.24	2.757*** (3.47)		-0.090 (-0.12)
RX*DIV		0.526*** (9.58)	0.515*** (7.28)		0.315*** (6.39)	0.319*** (5.23)
Adj. R2 No. of obs.	0.215 119	0.474 115	0.455 115	0.530 109	0.707 106	0.704 106

Sources: All data are from World Bank, *World Development Indicators*, except for HHI, which is from UNCTAD, *Handbook of Trade and Development Statistics*. Underlying GDP and export data are in constant 2000 U.S. dollars. Exports refer to goods and services. The rule of law index is from Kaufman, Kraay, and Mastruzzi (2005) and is measured in 1996.

Constant not shown; t ratios in parenthesis.
* Significantly different from zero at the 10 percent level.
** Significantly different from zero at the 5 percent level.
*** Significantly different from zero at the 1 percent level.

Definition of variables:

YPC80 = GDP per capita in 1980
TRADE80 = exports plus imports divided by GDP in 1980
I = gross fixed capital formation (average for the period), as a share of GDP
RL = rule of law index (1996)
DIV = export diversification index (1 – HHI)
RX*DIV = rate of growth of exports multiplied by DIV

Next, we introduce *DIV* and *RX*DIV* into a more completely specified model, one that includes gross fixed investment and the rule of law index. This is done in equations (4) and (5). It can be seen that this parsimonious model is quite powerful. Initial GDP per capita becomes highly significant, the significance of the openness variables diminishes considerably (which suggests that openness is a stand-in for other effects), and investment and the rule of law are both of the correct sign and also highly significant. These results confirm the finding in the literature that growth is positively related to investment, a hypothesis that goes back to the Harrod-Domar model and is corroborated in some of the more recent endogenous growth literature. The results also lend credence to the more recent emphasis on institutions as important determinants of growth. Other things being equal, countries where the government is perceived as working for the good of society as a whole experience higher economic growth than those where this is not the case.

When the two variables associated with OED are introduced into this model, the interaction of export growth and export diversification (RX*DIV) turns out to be highly significant and of the correct sign, whether the diversification index by itself is entered into the equation as an additional variable or is left out. Moreover, the value of the coefficient of RX*DIV is very robust to changes in the specification of the model.

V. THE INCIDENCE OF CRISES

The 1980s were marked by external and domestic financial crises in Latin America. These crises were protracted and affected most countries in the region. The external debt crises was in many cases accompanied by bank failures, falling GDP, and surging unemployment. It was, indeed, a "lost decade". On the other hand, during the late 1990s several rapidly growing exporters of manufactures in Asia experienced similar crises, albeit shorter-lived than those of LACs in the 1990s. From 1998 to 2002, partly as a consequence of contagion from the Asian and Russian financial crises, several LACs again suffered either a contraction of output or a sharp deceleration in their rates of growth. Mexico, the Central American countries, and those in the Caribbean were severely affected by the slowdown in the United States in 2000-2002. These factors certainly have had an impact on long-term growth, but are not reflected in the model presented above.

In this section, we incorporate into the model two crisis variables, which turn out to be very significant; they both improve the explanatory power of the model. One is derived from the database of Caprio and Klingebiel (2003) for banking crises. This variable (*CK*) is the proportion of the 24 years in the sample (1980-2003) during which countries were affected by banking crises. The alternative crisis variable (*CRISIS*) is the proportion of years during which each country had growth rates that were lower than the sample average minus 1.5 times the standard deviation of growth in 1980-2003.

Both variables yield similar results (table 4). The diversification variable used in these regressions (*RX*DIV*) again proves to be very robust to the inclusion of the crises variables. All other control variables are also robust and extremely significant, with the exception of the ratio of trade to GDP, which even switches signs when the definition of crisis is changed.

Table 4
Introducing crises
Dependent variable: Average rate of growth of per capita GDP, 1980-2003
Method of estimation: OLS

Explanatory variables	(1)	(2)
log YPC80	-0.711***	**0.522*** **
	(-5.91)	**(-4.55)**
TRADE80	-0.006*	**0.005***
	(-1.75)	**(1.77)**
I	0.206***	**0.139*** **
	(8.20)	**(5.74)**
RL	1.247***	**0.875*** **
	(5.80)	**(4.41)**
RX*DIV	0.104***	**0.312*** **
	(3.82)	**(6.47)**
CK	-0.012**	
	(-2.05)	
CRISIS		**-6.162** **
		(-2.85)
Adj. R2	0.809	**0.727**
No. of observations	**75**	**106**

Sources: All data are from World Bank, *World Development Indicators*, except for HHI, which is from UNCTAD, *Handbook of Trade and Development Statistics*. Underlying GDP and export data are in constant 2000 U.S. dollars. Exports refer to goods and services. The rule of law index is from Kaufman, Kraay, and Mastruzzi (2005) and is measured in 1996. The banking crisis data are from Caprio and Klingebiel (2003).

Constant not shown; t ratios in parenthesis.
* Significantly different from zero at the 10 percent level.
** Significantly different from zero at the 5 percent level.
*** Significantly different from zero at the 1 percent level.

Definition of variables:

YPC80 = GDP per capita in 1980
TRADE80 = exports plus imports divided by GDP in 1980
I = gross fixed capital formation (average for the period), as a share of GDP
RL = rule of law index (1996)
RX*DIV = rate of growth of exports multiplied by DIV
CK = proportion of years in which a country experienced a banking crisis
CRISIS = proportion of years in which a country's growth rate was below the sample average growth rate minus 1.5 times the sample's standard deviation

Even though the equation incorporating the variable derived from Caprio and Klingebiel has somewhat greater explanatory power, we prefer the one using the alternative measure. Falling GDP or growth slowdowns happen for a variety of reasons, and not all of them are due to banking crises. In addition, the second crisis variable allows us to use the entire database, while use of the variable derived from Caprio and Klingebiel shrinks the sample from 106 to 75.

VI. HOW IMPORTANT ARE DIFFERENT FACTORS IN EXPLAINING GROWTH?

The contributions to growth of the various factors identified in the preceding sections can be estimated multiplying the coefficients of equation (2) in table 5 by the observed values of the explanatory variables and expressing the results as a share of the observed rate of growth of per capita GDP. Interest centers on the export diversification variable, investment, the rule of law, and crises.

As can be seen in table 5, the higher growth rates of Asian countries appear to be explained by a larger contribution of export diversification and investment. These two variables together pretty much explain the differences in growth performance. The rule of law variables makes a less negative contribution in Asia than in Latin America; crises have been significantly less prevalent in Asia, subtracting less from the contribution to growth of the positive factors than in Latin America.

Table 5
Contributions to growth, 1980-2003
(percentage annual growth rates and participation in growth rates)

Country	Observed growth	Predicted growth	Contribution of			
			Diversification	Investment	Rule of law	Crises
L. America						
Argentina	0.1	-0.7	1.4	2.5	0.2	-1.0
Bolivia	-0.3	-0.2	0.9	2.2	-0.6	0.0
Brazil	0.6	1.1	2.4	2.9	-0.2	-0.5
Chile	3.5	2.4	1.7	3.3	1.1	-0.3
Colombia	1.0	0.4	1.1	2.6	-0.4	0.0
Costa Rica	1.2	1.9	1.7	3.1	0.6	-0.3
Ecuador	0.1	0.5	0.9	2.9	-0.3	-0.3
El Salvador	0.0	-0.9	0.8	2.1	-0.4	-0.5
Guatemala	-0.1	-1.0	0.4	2.1	-0.6	0.0
Honduras	-0.2	0.5	0.2	3.5	-0.7	0.0
Mexico	0.8	1.4	2.5	3.1	-0.1	-0.5
Nicaragua	-1.3	0.7	0.6	3.5	-0.6	-0.3
Panama	1.2	0.6	0.3	3.1	0.2	-0.5
Paraguay	0.1	0.7	1.0	3.3	-0.4	-0.3
Peru	0.0	-0.1	0.9	3.1	-0.3	-0.8
Uruguay	0.4	-0.8	1.0	2.0	0.5	-0.8
Venezuela	-1.9	-2.1	0.2	2.6	-0.6	-0.8
Asia						
Bangladesh	2.0	2.0	2.1	2.6	-0.6	0.0
China	8.2	6.2	3.2	5.2	-0.4	0.0
Hong Kong	3.9	4.8	2.9	3.9	1.5	-0.3
India	3.7	3.7	2.6	3.1	0.0	0.0
Indonesia	3.6	2.0	1.0	3.6	-0.3	-0.3
Korea	5.6	5.1	3.7	4.4	0.7	-0.5
Malaysia	3.6	4.5	2.4	4.3	0.7	-0.3
Philippines	0.4	1.3	1.5	3.1	-0.1	-0.5
Thailand	4.7	5.2	3.1	4.4	0.4	-0.3

Source: Author's calculations, based on equation (2) in table 5. Data are as described in table 5.

It should be noted that all the contributions identified in table 5 exceed the observed growth rates. This is because some factors have been omitted (conspicuously, the role of convergence, as measured by initial per capita GDP) and because the equation yields a large and negative constant (-3.2), indicating the probable presence of unexplained factors.

VII. CONCLUSIONS

This paper has shown that export growth can be important to overall economic growth, and that the key to success is not export growth per se but export growth together with diversification. The channels through which diversified export growth stimulates output growth appear to be two. One of them we have called the portfolio effect. Diversification of exports leads to less export volatility, which in turn results in lowered output volatility. Countries with highly unstable economies grow more slowly than countries that exhibit more dampened cyclical fluctuations. The data do not contradict this chain of causation.

The second effect is associated with the fact that export diversification is likely to be a proxy for the widening of comparative advantages that come with a more diversified economy. OED is associated with knowledge acquisition and spillovers, enhanced abilities to carry out research, on-the-job training that has positive externalities, etc. Once a critical level is reached, OED may acquire a self-sustaining character, with further OED occurring spontaneously.

The empirical results are congruent with this model. In a cross-country econometric model of growth, the proxy for OED used (the interaction between export growth and export diversification) is highly significant and makes an important contribution to explaining variations in growth rates across countries.

The empirical model shows that variables other than export diversification also play a role in explaining differences in economic growth between countries. Investment certainly takes pride of place. It has already been noted that the dynamic Asian economies have rates of investment that are quite higher than those of the Latin American countries. The strength of investment could well be associated with export growth and export diversification.[7] If export growth is sustained over long periods of time, as has been the case in Asia, fast export growth could well be a powerful stimulus to investment. Export diversification is also likely to be beneficial to investment, since the more diversified exports are the stronger will be the linkages between some exporting activities and the rest of the economy.

[7] However, investment and export diversification are not so highly correlated that their joint inclusion in the econometric model renders one of them not significant. In fact, the coefficient of the diversification variable is quite robust to the introduction of investment

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