

International Integration and Growth: A Further Investigation on Developing Countries

CLAIRE ECONOMIDOU*, VIVIAN LEI**, AND JANET S. NETZ

Abstract

The paper examines empirically the linkages between international integration and economic growth in a panel of 47 developing countries and 18 trade blocs over the period 1970–1989. Specifically, it attempts to identify through which channel(s) – notably, specialization according to comparative advantage and increased efficiency, exploitation of increasing returns from larger market, and technology spillovers through investment and trade–trade blocs can affect the economic growth of their member countries. The results suggest that (1) intra-bloc trade does not affect growth significantly; (2) income diversion among member countries contributes positively and significantly to growth; and (3) the size of the trade bloc does matter in the sense that the bigger is not always the better for the welfare of the member countries. (JEL F15, O47)

Keywords: international integration, economic growth, trade blocs, developing countries

Introduction

Economists and policymakers have been interested in understanding whether and how a country's welfare can be affected by international integration. In general, international integration is known to improve a country's income growth mainly through the following channels: (1) by increasing production efficiency and competition due to specialization; (2) by enlarging its potential market and thus increasing the rate of return on research and development (R&D); and (3) by boosting the volume of trade and investment and, therefore, diffusing technology between countries.¹

The latter part of the twentieth century witnessed a surge in the number and coverage of regional economic integration agreements (RIAs)² of various kinds. Interestingly, not much research has been done on regional integration, in general. Among what has been studied, the European Union, and its various integration schemes, have received the most attention. With only few exceptions [Landau, 1995], most of the empirical studies find evidence that the European Union and the European Free Trade Area have significantly increased their member countries' income growth rates over the past few decades [Ben-David, 1994; Kokko, 1994; Henrekson et al., 1997]. Technology diffusion, through increased trade, has been the main channel considered to cause this phenomenon.

*Utrecht University—The Netherlands, **University of Wisconsin-Milwaukee, and
***ApplEcon LLC—U.S.A.

However, what about those trade blocs formed mostly by developing countries? Work on this topic is even scarcer. Early assessments on a number of integration schemes among developing countries provide favorable outcomes, mainly through an increase of the intra-bloc trade volume [Balassa and Stoutjesdijk, 1975]. However, the effectiveness of regional integration among developing countries was severely questioned since most of the formal trade blocs among developing countries have failed to deliver any significant benefits, in part because the liberalization plans have not been actively carried out.³

Among recent empirical studies on the influence of international integration on growth is the study of Brada and Mendez [1988] who examine the dynamic effects of six regional integration schemes – most of them formed by developing countries – on the level of investment, factor productivity growth, and their influence on member countries' income growth over the period 1951–1977. The authors conclude that, although international integration does increase the level of investment and growth rate of productivity growth in some of the regional integration agreements, income growth rates of their member countries' are largely unaffected by these gains.

De Melo et al. [1992], test for long-run effects of international integration by estimating a simple growth equation where the growth rate of income is regressed against individual trade bloc dummies and some control variables. Their specification is estimated over the period 1960–1985, as well as various sub periods, and for 101 countries, OECD and developing. With one exception, none of the integration dummies prove to be significant.

Finally, Haveman et al. [2001] consider the impact of different avenues of international interactions, and aspects of trade arrangements on the growth rate of income of 74 countries, developing as well as developed, over the period 1970–1989. Their findings support that general openness, foreign direct investment, and membership in a trade bloc facilitate growth, the variation in income across member countries matters, and trade bloc size does not play any role in determining a country's growth rate. Overall, the approach adopted by the existing empirical literature in answering the question of whether international integration affects the economic growth of developing countries, and if so how, is rather piecemeal and, in most of the cases, provides conflicting results.

The purpose of this paper is, therefore, to investigate empirically, in a comprehensive manner, the effects of various forms of international integration on income growth in the case of developing countries. More specifically, it attempts to identify through which channel(s) mentioned above trade blocs affected developing countries' income growth. Do all of these channels have the effects implied by theory? If not, which of them has failed to deliver its benefit?

The investigation is limited over the period of 1970–1989; the longest period where the maximum information is available for all countries and variables in the analysis. During these 20 years, the results support that trade blocs facilitated growth mainly through improving production efficiency due to specialization. Further, the intra-bloc trade and foreign direct investment in general have an insignificant contribution. Finally, a bigger market size in fact was detrimental rather than beneficial, and its damage was far beyond the benefit associated with specialization.

The last finding seems quite astonishing and counter-intuitive. Understanding how trade bloc size is measured might be helpful to comprehend such a result. The size of the potential market is measured by the sum of GDP of all member countries net of country i 's own GDP. There are two possible ways to enlarge country i 's market size associated with regional integration agreements: (1) by increasing the number of member countries within a single trade bloc, and (2) by joining several trading blocs at a time. The former is likely to cause further cultural and political disparity, which could harm the efficiency of the trade bloc. As for the latter, Wonnacott [1996] proposes several potential

disadvantages associated with being a member of overlapping trade blocs, known as the hub-and-spoke (H&S) arrangement.⁴ For instance, trade barriers remain in an H&S arrangement; excess cost would have to occur whenever spoke–spoke trade is re-routed through the duty-free hub; n -fold trade diversion might offset the benefit generated by trade creation; and efficiency can be further damaged by rent seeking and policy inconsistency between countries within H&S or against nonmember countries. In addition, Freund and McLaren [1999] demonstrate significant adjustment costs that have occurred long before the launch date of a trading arrangement and argue that the bargaining power effects of anticipatory investment can magnify inefficiencies of distortionary trade policy and even reduce small-country partners the surplus from trade agreements.⁵

All of these factors would simply cause expanding preferential trading arrangements to generate smaller welfare gains or perhaps even losses. The estimate of the coefficient on the trade bloc size certainly implies that the losses as a result of expanding a trade bloc during 1970–1989 among developing countries might have been substantial. In other words, bigger is not necessarily better.

The remainder of the paper is organized as follows. The next two sections describe the empirical framework and the data, respectively. The empirical results are reported in the following section. Finally, the last section concludes.

Empirical Framework and Methodology

The following growth equation is estimated:

$$dy_{it} = \alpha + \beta y_{it-5} + \gamma C_{it} + \zeta T_{it} + \nu_i + \varepsilon_{it}, \quad (1)$$

where dy_{it} is country i 's growth rate of GDP per capita from period $t-5$ to period t ; y_{it-5} is country i 's GDP per capita in period $t-5$; C_{it} is a set of control variables that characterize country i 's state of the economy; T_{it} includes international integration variables; ν_i is a country-specific error term; and ε_{it} is a stochastic error term. Assuming that continuous variables affect growth nonlinearly all variables (except dummies) enter in the model in logarithmic form.

Following other empirical growth studies, C_{it} includes secondary schooling in period $t-5$ to proxy country i 's initial level of human capital stock, investment share of GDP, government expenditure share of GDP, and population growth rate. The coefficient on secondary schooling is expected to be positive. As pointed out by Lucas [1993] and Krueger and Lindahl [2001] a better-educated population augments a country's ability to absorb and adopt new technologies and to innovate, therefore, it is an important factor of growth.

The coefficient on investment is expected to be positive, as well. The neoclassical theory argues that an increase in investment raises the steady-state level of output per worker and, therefore, raises the growth rate of output while the endogenous growth explanation focuses on economies of scale and spillover effects to justify the way that increased investment promotes growth.

Government spending is also commonly used in the empirical growth literature to explain cross-country differences in per capita income. The effect of government spending on productivity, however, can be ambiguous as it depends on the nature of spending. According to Barro and Sala-i-Martin [1995] productive spending – spending on education, infrastructure, or some other form of productive capital – promotes growth, while a nonproductive spending could obstruct growth.

Population growth is expected to contribute negatively to income growth. A higher fertility rate implies that more resources should be devoted in raising the newborn

population rather than producing new goods and, thus, reducing the income growth. This is also in line with the neoclassical model, where a higher population rate impacts negatively on the steady-state level of output per worker.

The second set of control variables is T_{it} , which includes measures of international integration, such as foreign direct investment (FDI), measured as the flow of all inward FDI as a share of the recipient country's GDP, volume of trade as a share of GDP, membership of any trade bloc, types of trade blocs, and characteristics of trade blocs. FDI has been considered to be one of the major channels through which advanced technology is transferred between countries; therefore, the estimated coefficient on FDI is expected to be positive. However, empirical evidence of the impact of FDI on output growth remains inconclusive.⁶

The volume of trade is included in order to measure the effect of the extent to which a country is open to the rest of the world. Three different sets of trade volume measures are considered. Total trade as share of GDP is the first broad measure included in the model. As mentioned in Haveman et al. [2001], using such a broad measure of openness, one could unreasonably assume that exports and imports are equally important in determining a country's income growth, and that the source and destination countries do not matter.

This problem can be amended in two ways. First, to compare the relevance of exports *versus* imports, total trade share is divided into export share and import share of GDP. Second, in addition to the direction of trade flows, the source and destination countries are considered. Since the interest lies in knowing if the existence of preferential trading arrangements does increase intra-bloc trade and, thus, help member countries grow faster, the source and destination countries are divided into two categories: member countries and non-member countries.

In general, trade, either in the form of exports or imports, is a proxy of growth-enhancing interactions (specialization, exchange of ideas through exports, or acquiring foreign technology through quality imports) among countries acting as conduit for knowledge dissemination, and, therefore, more open economies should exhibit higher growth rates.⁷ Therefore, the estimated coefficient on trade share (or on export share and import share) in the specification is expected to be positive. However, recent studies tend to find that the effect of trade on growth – and income convergence – is rather ambiguous or insignificant [Rodriguez and Rodrik, 1999].

Finally, several variables characterizing trade bloc membership and trade bloc characteristics are included, such as a dummy variable whether a country is member of any trade bloc as well as other dummies indicating whether the trade bloc is a preferential trade agreement (PTA), a free trade area (FTA), or a custom union (CU).⁸ Specifically, the interest lies in examining which type of trade agreement promotes growth the most. A more integrated trade bloc would facilitate the flow of both trade and FDI between member countries and, therefore, could generate a higher income growth rate of the member countries.⁹ The coefficients on all types of trade blocs are expected to be positive.

The last set of international integration variables measures the characteristics of trade blocs, in terms of size of the potential market of the bloc and how diversified a trade bloc is. The potential market size is measured by the sum of all member countries' GDP net of country i 's GDP, while the income diversion of a trade bloc is simply measured by the standard deviation of its members' per capita incomes divided by the average per capita income of the trade bloc. The later attempts to capture the benefit of specialization, which should increase productive efficiency and also the likelihood of

trade creation *versus* trade diversion. A positive estimate on this variable is expected. Finally, since a bigger market size implies larger economies of scale for countries to exploit and bigger returns to R&D, the estimate on the trade bloc size is expected to be positive as well [Rivera-Batiz and Romer, 1991].

In general, the effects of the macroeconomic variables under examination on growth should be expected to vary over time and across countries. So, before embarking on the estimation procedure, there is a need to test for possible heterogeneity in the sample. The dynamic heterogeneity, i.e., variation of the intercept over countries and time, across a cross-section of the relevant variables can be examined using standard Chow-type F tests. Heterogeneity in cross-sectional parameters is indicated if the results reject the null hypothesis, which asserts no heterogeneity across countries and time. White's tests for group-wise heteroskedasticity are also employed to control for heterogeneity error variance across groups. The results of these tests, which are reported in Table A1 in Appendix, indicate that the relationship under investigation is characterized by heterogeneity of dynamics and error variance across groups, supporting the employment of panel data analysis.

A panel data approach is adopted to fully exploit the cross-section and time-series variation. The fixed-effect 'within' estimator is the most appropriate way to exploit the panel nature of the data set without making strong assumptions.¹⁰ There are two possible drawbacks to the estimator: weakness of estimating time-invariant factors and potential lack of efficiency. Since the data set is sufficiently large, this problem can be ignored. Together with the econometric robustness, the fixed-effect estimator has a great advantage. The within estimator exploits variation over time and, therefore, answers the policy question of interest – the (time-series) question of what is the growth effect of a country joining a regional integration agreement, which can be contrast with the (cross-sectional) question of how much more countries, which belong in various regional integration agreements, grow.

Finally, to avoid any spurious regression results, the examination of whether the variables in the model are stationary or not, i.e., where the individual series contain unit roots is necessary. The approach suggested by Im et al. [2003]-IPS thereafter is adopted since it is powerful as shown from Monte Carlo simulations and less restricted than other approaches [Levin et al., 2002]. The test proposed by IPS allows for heterogeneity between units in a dynamic panel framework and is based on individual Augmented Dickey-Fuller (ADF) regressions.¹¹ The results of the panel unit root test are presented in Table A2 in Appendix and are reported with a trend. The variables were tested in levels, and as it can be inferred from this table, the null hypothesis is rejected at 1% level of significance. Therefore, the series are characterized as an I(0) process.

Data

Annual data from various sources are used. The core dataset is derived from the *Penn World Table 5.6* dataset,¹² which has been commonly used for empirical growth studies. Data on foreign direct investment and on trade flows are obtained from the International Monetary Fund's (IMF) [2002] *International Financial Statistics*. Data on trade flows are derived from World Bank's [2002] *Direction of Trade Statistics*. Data on human capital are from Barro and Lee [1996]. However, the Barro-Lee data set are provided quinquennially from 1960 to 1990. Since the human capital dataset is available only every five years, the data is averaged in five-year time intervals. All variables, measured in currency units, are expressed in US dollars.

A sample of 47 developing countries is employed. Among these countries, six of them belong to no regional integration schemes, while the rest belong to one or more of the 18 regional integration schemes (trade-blocs) included in the sample. The panel of the countries includes almost all different income categories for developing countries: low-income, middle-income, and high-income.

The time period investigated in this study covers from 1970 to 1989 – the longest time period for which all variables were available for the widest selection of developing countries that are members of any regional integration agreement. Table 1 lists the countries in the sample and the trade blocs that they belong to.¹³

TABLE 1
Developing Countries and Regional Integration Agreements (RIAs)¹ over 1970–1989

Country	RIA(s)	Country	RIA(s)
Algeria	ACM ^c , AMU ^c	Kenya	ACM, EAC ^a , ESAS-PTA ^a
Argentina	LAFTA ^b (later as LAIA)	Korea	BANGKOK AGR ^a .
Barbados	CARICOM ^c	Malaysia	ASEAN
Benin	CEAO ^c , ECOWAS ^b	Malawi	SADCC ^a , ESAS-PTA
Bolivia	ANDEAN ^b , LAFTA	Mali	ACM, CEAO, ECOWAS
Brazil	LAFTA	Mauritius	ESAS-PTA
Cameroon	CEEAC ^c , UDEAC ^b	Mexico	LAFTA
Chile	ANDEAN, LAFTA	Pakistan	
China		Panama	
Colombia	ANDEAN, LAFTA	Papua New Guinea	
Costa Rica	CACM ^b	Paraguay	LAFTA
Dom. Republic		Peru	ANDEAN, LAFTA
Ecuador	ANDEAN, LAFTA	Philippines	ASEAN, BANGKOK AGR.
Egypt	ARABCM ^b	Senegal	CEAO, ECOWAS
El Salvador	CACM	Sierra Leone	ECOWAS, MRU ^c
Fiji		Sri Lanka	BANGKOK AGR.
The Gambia	ECOWAS	Thailand	ASEAN, BANGKOK AGR.
Ghana	ACM, ECOWAS	Togo	ECOWAS
Guatemala	CACM	Trinidad & Tobago	CARICOM
Guyana	CARICOM	Tunisia	AMU
Haiti	CBERA ^a	Uruguay	LAFTA
Honduras	CACM	Venezuela	ANDEAN, LAFTA
Indonesia	ASEAN ^a	Zambia	ESAS-PTA, SADCC
Jordan	ARABCM		

ACM African Common Market; AMU Arab Maghreb Union; ANDEAN Andean Pact; ARABCM Arab Common Market; ASEAN Association of Southeast Asian Nations; BANGKOK AGR. Bangkok Agreement; CACM Central American Common Market; CARICOM Caribbean Community and Common Market; CBERA Caribbean Basin Economic Recovery Act; CEAO Communauté Economique de l' Afrique de l' Oest; CEEAC Communauté Economique des Etats de l' Afrique Centrales; EAC East African Community; ECOWAS Economic Community of Western African States; ESAS-PTA Eastern and Southern African States Preferential Trade Area; LAFTA Latin American Free Trade Association; MRU Mano River Union; SADCC Southern African Development Coordination Conference; UDEAC Customs and Economic Union of Central Africa and
^{1a}PTA; ^bFTA; ^cCU

Estimation Results

Table 2 presents the results for all 47 countries in the sample. The baseline model, in which international integration is not controlled for, is given in column (1). Column (2) adds FDI into the baseline model. Aspects of general openness and trade blocs are presented in columns (3)–(4) and columns (5)–(7), respectively.

A significantly negative coefficient on the log of initial GDP confirms the existence of conditional convergence¹⁴ across the sample. That is, countries with low initial levels of income per capita grow faster toward their own steady states.

Further, the findings indicate that the share of government expenditures consistently undermines a country's growth performance, while population growth and secondary schooling have no significant influence on growth. Moreover, domestic investment appears to play a more important role than foreign direct investment in a developing country's growth process. Columns (1) and (2) show that the estimated coefficient on domestic investment share of GDP is significantly positive, while that on FDI is, though positive, insignificant. Hence, when FDI is the only international integration variable that is controlled for, developing countries seem to benefit significantly from domestic investment, but not from foreign investment. However, both variables lose their significance as soon as trade flows and trade blocs are taken into account.

Considering the impact of trade on growth, column (3) shows that more trade leads to higher growth. Column (4) reveals that it is exports rather than imports that play a dominant role in determining a country's growth performance. Finally, since both domestic and foreign investment lose their significance as soon as trade flow variables are included, it seems that international trade rather than international investment are more beneficial for developing countries' welfare.

According to Narula [2001], Balasubramanyam et al. [2002], and Xu [2000], benefits from FDI only occur when there is a certain level of domestic investment (especially in terms of an efficient labor force, including a threshold level of human capital), and when, in general, the "absorptive capacity" (macroeconomic management-inflation, debt, openness-infrastructure, educational level, etc.) of the host economy is such to exploit the positive externalities from FDI – and most of the least developing countries (LDC) do not meet these requirements. In the absence of a certain level of economic development and appropriate economic structure, regional integration arrangements may do little to attract FDI. In such a case, developing countries would fail to exploit the benefits from the FDI inflow.

Columns (5) and (6) add dummy variables that indicate ties to a trade bloc. The exports share of GDP remains to contribute positively even when trade bloc dummies are controlled for. Being a member of any trade bloc does not necessarily increase a country's income growth rate. Dividing the trade blocs according to their types, it is shown that free trade areas during the period of 1970–1989 had helped their member countries to grow faster compared to countries belonged to preferential trade agreements or customs unions during the same period.

This finding is interesting in that it seems to contradict with what is commonly believed: the tighter a trading bloc, the better for the growth of its member countries. According to this conventional wisdom, a country should be better off by joining a customs union rather than a free trade area or a preferential trade agreement.

However, this argument might fail to be true because the majority of the customs unions in the sample are in Africa. Intra-bloc trade in Africa has been less than 10% of all African trade over years. Moreover, customs unions in Africa tend to overlap with one another. Overlapping memberships create not only internal inconsistencies but also

TABLE 2
Fixed-Effect Estimates

(Dependent Variable)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Real GDP per Capita Growth)							
ln(initial GDP)	-0.433*** (0.057)	-0.549*** (0.077)	-0.547*** (0.076)	-0.509*** (0.074)	-0.520*** (0.074)	-0.484*** (0.077)	-0.760*** (0.099)
ln(govt. share)	-0.182** (0.071)	-0.159* (0.093)	-0.137 (0.092)	-0.163* (0.088)	-0.161* (0.087)	-0.167* (0.083)	-0.145 (0.091)
ln(dom. invest. share)	0.131*** (0.038)	0.090* (0.053)	0.453 (0.057)	0.072 (0.051)	0.076 (0.050)	0.030 (0.050)	0.009 (0.058)
ln(pop. growth)	-0.032 (0.036)	-0.067 (0.048)	-0.063 (0.048)	-0.047 (0.045)	-0.039 (0.046)	-0.041 (0.046)	-0.033 (0.050)
ln(secondary schooling)	-0.021 (0.027)	-0.047 (0.038)	-0.057 (0.038)	-0.029 (0.036)	-0.035 (0.036)	-0.017 (0.036)	-0.029 (0.040)
ln(FDI share)		0.013 (0.021)	0.012 (0.021)	0.013 (0.020)	0.012 (0.020)	0.021 (0.019)	0.028 (0.021)
ln(trade share)			0.142* (0.074)				
ln(exports share)				0.173*** (0.053)	0.176*** (0.053)	0.214*** (0.051)	0.139* (0.067)
ln(imports share)				-0.029 (0.031)	-0.030 (0.031)	-0.039 (0.030)	0.047 (0.088)
Trade bloc member					0.070 (0.051)		
PTA						0.016 (0.049)	0.819*** (0.216)
FTA						0.136*** (0.050)	0.893*** (0.210)
CU						0.080 (0.091)	0.664*** (0.184)
Rest bloc size							-0.516*** (0.123)
Std. dev. of member incomes							0.180** (0.070)
Observations	185	143	143	142	142	142	112
R ² within	0.446	0.482	0.502	0.515	0.525	0.584	0.699
F-test	3.85	3.68	3.48	3.71	3.79	4.24	4.73

Standard errors in parentheses. Country-fixed effects omitted for brevity. *Significant at 1% level, **significant at 5% level, and ***significant at 10% level.

conflicting regulations and rules, not to mention the fact that custom unions need much more coordination among member countries than other types of trade blocs.¹⁵ All these problems can work against member countries' well-being and, thus, make customs unions less-beneficial.

Column (7) includes not only types of trade blocs but also their characteristics. The coefficient on the standard deviation of member per capita incomes is significantly positive suggesting that by joining a more diversified trade bloc, a country can increase its production efficiency and, thus, its income growth rate. In other words, the benefit of trade creation is more likely to occur when trade bloc members are more diversified in terms of income and production.

On the other hand, the coefficient on the size of the bloc is significantly negative. After controlling for FDI, trade flows, and trade bloc types, a country's income growth is reduced as the size of the bloc increases. This result seems to be disturbing. Not surprising, the problem is rooted in the fact that, to aim for increasing its potential market, a developing country can join either several blocs at a time or a single trade bloc along with a lot of other participating countries. A country that belongs to several regional integration agreements will have to face the drawbacks associated with overlapping blocs discussed earlier. On the other hand, having a large number of member countries might not be a good thing either for the trade bloc growth. As the size of a bloc increases, difficulties in coordination may arise, decreasing the effectiveness of the trade bloc in promoting growth among members.

In sum, the finding shows that size does matter, and that bigger is not always better. After controlling for the size and income deviation of the trade bloc, the estimated coefficients on all three types of trade blocs become significantly positive. More important, their magnitudes are significantly greater than the estimated coefficients on other explanatory variables in column (7). In other words, compared to domestic economic environment and to most of the avenues of international integration, being a member of a regional trading arrangement can in fact generate a tremendous and positive impact on a country's income growth, as long as some criteria about the bloc's characteristics are satisfied.

As an additional analysis, the trade flow variables are disaggregated to exports to and imports from trade bloc member countries and non-member countries. The results are presented in Table 3. All previous results still hold. Additionally, the share of exports to non-member countries is found to be the only trade flow variable that has significantly positive contribution to growth. Finally, while the characteristics of trade blocs consistently appear to affect growth positively, the coefficients on both intra-bloc trade variables are not statistically significant.¹⁶

How can these seemingly opposite results be reconciled? If a country were not able to benefit significantly from the intra-bloc trade, how the membership in a regional trading arrangement could improve its welfare?

The empirical results show that, during the period 1970–1989, the developing countries in the sample might have benefited primarily from increased production efficiency due to specialization. While it might be the case that little technology is transmitted among member countries due to a limited volume of intra-bloc trade or FDI inflows, one certainly should not rule out the possibility that innovation and R&D activities are more likely to occur when firms specialize in producing what they are good at. Compared to technology introduced from abroad, the 'homegrown' technology may be even more appropriate in improving a country's production efficiency and, thus, its income growth. The positive and statistically significant coefficient on the standard deviation of members' per capita income provides such evidence.¹⁷

TABLE 3
Fixed-Effect Estimates

ln(Real GDP per Capita Growth) (Dependent Variable)	(1)	(2)	(3)	(4)
ln(initial GDP)	-0.515*** (0.076)	-0.522*** (0.076)	-0.462*** (0.078)	-0.742*** (0.110)
ln(govt. share)	-0.158* (0.089)	-0.152* (0.088)	-0.158 (0.083)	-0.145 (0.093)
ln(dom. invest. share)	0.062 (0.053)	0.060 (0.053)	0.000 (0.053)	-0.010 (0.064)
ln(pop. growth)	-0.050 (0.046)	-0.036 (0.047)	-0.039 (0.046)	-0.039 (0.050)
ln(secondary schooling)	-0.029 (0.036)	-0.034 (0.036)	-0.025 (0.036)	-0.034 (0.041)
ln(FDI share)	0.012 (0.020)	0.010 (0.020)	0.015 (0.019)	0.028 (0.023)
ln(exports share to members)	0.058 (0.048)	0.037 (0.050)	-0.003 (0.049)	0.038 (0.056)
ln(exports share to non-members)	0.152*** (0.049)	0.158*** (0.049)	0.211*** (0.048)	0.116* (0.060)
ln(imports share to members)	-0.026 (0.033)	-0.037 (0.034)	-0.036 (0.033)	-0.018 (0.035)
ln(imports share to non-members)	-0.020 (0.032)	-0.018 (0.031)	-0.028 (0.030)	0.060 (0.083)
Trade bloc member		0.082 (0.058)		
PTA			0.063 (0.058)	0.822*** (0.224)
FTA			0.189*** (0.061)	0.893*** (0.217)
CU			0.074 (0.092)	0.644*** (0.190)
Rest bloc size				-0.507*** (0.131)
Std. dev. member incomes				0.169** (0.071)
Observations	142	142	142	112
R^2 Within	0.520	0.531	0.598	0.700
F -test	3.50	3.53	3.96	4.08

Standard errors in parentheses. Country-fixed effects coefficients omitted for brevity. *Significant at 1% level, **significant at 5% level, and ***significant at 10% level.

Conclusion

The impact of international integration on economic growth in a sample of developing countries over the period 1970–1989 is explored. More specifically, the attempt is to identify through which channel(s) international integration have impacted on developing countries' income growth.

The results suggest the following. First, intra-bloc trade does not affect growth significantly. This implies that there little technology diffusion, if any, among trade bloc

participants. Second, income diversion among member countries' incomes contributes positively and significantly to growth. This result provides evidence that specialization enhances production efficiency and possibly, further, promotes innovation. Finally, size does matter, in the sense that bigger is not better. This seems to indicate that there ought to be an optimal market size associated with preferential trading arrangements for developing countries to fully exploit the growth benefits.

When the number of participants in a bloc gets too large or when several trade blocs overlap with each other, the benefit of enlarging the potential market could then be offset by its cost. It is conjectured that this optimal size may depend upon factors such as cultural and political differences, the domestic trade policies in force prior to establishing an international trade agreement, the government's management ability to enforce the laws, etc.

APPENDIX

TABLE A1
Tests of Dynamic Heterogeneity Across Groups

	ADF(4)	AR(5)	White's test
Variables of estimating equation	24.09*	19.63*	49.72*

The ADF(4) column reports the parameter equality test (F test) across all relationships in the panel. The AR(5) column reports the F test of parameter equality conducted in a fourth-order autoregressive model of the relationships under study. Finally, the White's test reports White's test of equality of variances across the investigated relationships in the panel. The White's test was computed by regressing the squared residual of the ADF(4) regression on the original regressor(s) and its (their) square(s), and *Significant at 1%

TABLE A2
Panel Unit Root Tests

Variable	IPS Results (for Levels)
Income growth	-14.5373*
Initial GDP	-12.33091*
Government share	-42.8886*
Domestic investment share	-30.9852*
Population growth	-50.4876*
Secondary schooling	-14.50162*
FDI share	-33.1072*
Trade share	-47.5279*
Exports share	-30.7666*
Imports share	-25.6058*
Exports share to members	-31.1626*
Exports share to non-members	-32.1975*
Imports share to members	-26.8734*
Imports share to non-members	-26.2314*
Rest bloc size	-66.4508*
Std dev. member incomes	-65.6401*

*Significant at 1%.

Footnotes

¹See Rivera-Batiz and Romer [1991].

²Regional integration refers to all kinds of preferential trade agreements defined by geographic region. However, for the purposes of this paper, the term is used to capture a variety of preferential trade agreements whether or not they confined to a specific geographic region. As such, regional integration and international integration are used interchangeably throughout the paper.

³See, for example, Vaitsos [1978].

⁴H&S arrangement: For example, if countries A and B had negotiated a bilateral A–B FTA this may overlap with an existing B–C bilateral FTA with country B becoming a Hub with A and C Spokes.

⁵See Maggi and Rodriguez-Clare [1998] and McLaren [1997] for the theoretical background.

⁶For example, empirical evidence, both at firm and national level [Aitken and Harrison, 1999; Borensztein et al., 1998], find the net effect of FDI on output growth quite small, while United Nations Conference on Trade and Development [UNCTAD, 1999] argue that FDI can be positively or negatively related with output growth depending on the variables that enter the equation under estimation.

⁷See Grossman and Helpman [1991a, 1991b, 1995], Edwards [1992], Sachs and Warner [1995], and Frankel and Romer [1999], among others.

⁸Types of trade agreements considered here: (1) preferential trade agreements (PTA), the loosest type of trade agreements, where the tariff level is reduced among partners but not necessarily eliminated; (2) free trade areas (FTA) where tariffs and other restrictions removed between members, however, each country maintains her own tariffs with non-members; and (3) custom unions (CU) where members remove trade barriers among themselves (as in FTAs) while set a level of trade barriers (common external tariffs and other common restrictions) against non-member countries.

⁹See Haveman et al. [2001].

¹⁰Optimally, the GLS random-effects estimation technique could be used that fully exploits the variation in the data. However, GLS random-effects estimation requires the country-specific error term to be independent of the regressors in order the estimated coefficients to be unbiased and consistent. Applying Hausman specification tests the assumption of independence of the country-specific error term from the regressors is strongly rejected, and therefore, the fixed-effects estimator technique is used, which does not require this independence assumption.

¹¹Following Im et al. [2003], the equation for the panel unit root tests is formulated as $\Delta y_{it} = P_i y_{it-1} + \sum_{j=1}^p \varphi_{ij} \Delta y_{it-j} + \gamma z_{it} + \varepsilon_{it}$ where y_{it} stands for each variable under consideration in our model, p is the number of lags for correlation-free residuals, z_{it} indicates the vector of determinist variables in the model – including any fixed effects or individual trends – and γ the corresponding vector of coefficients. The null hypothesis of unit root ($\rho_i = 0$ for all i) versus the alternative of no unit root ($\rho_i < 0$ for some $i = 1, 2, \dots, N_1$ and $\rho_i = 0$ for $i = N_1 + 1, \dots, N$, where N is the number of cross-sections) is then tested. Instead of pooling the data and assuming that ρ_i is the same for all members [Levin et al., 2002], IPS use separate unit root tests for the N cross-sections units. The test statistic in a panel context suggested by IPS, denoted as \bar{t} , is the average of individual ADF statistics and is defined as: $\bar{t} = \frac{1}{N} \sum_{i=1}^N (t_{pi})$, where t_{pi} is the individual t -statistic for testing the null hypothesis. Under the null hypothesis of non-stationarity IPS shown that the \bar{t} -statistic follows asymptotically a standard normal distribution. IPS provide simulated critical values for \bar{t} or different number of cross-sections N , series length T and Dickey-Fuller regressions containing intercepts only or intercepts and linear trends.

¹²See Summers and Heston [1991] for a description.

¹³More details (year of agreement, member countries, and possible dissolution) about the regional integration schemes under investigation can be found in the Appendix of Haveman et al. [2001].

¹⁴In the terminology of Mankiw et al. [1992], a group of countries displays conditional β -convergence when in a cross-sectional regression of growth on the level of initial income, controlling for a number of additional variables, the coefficient on initial level of income is negative (while if the coefficient on initial level of income is negative in a univariate regression, then the group of countries displays absolute convergence). With conditional convergence, each country is converging towards its own steady state (while in absolute convergence, countries are converging to a common steady state).

¹⁵See more detailed discussion in this regard in Sharer [1999].

¹⁶This finding is in line with similar findings in previous studies [Brada and Mendez, 1983; Sharma and Chua, 2000]. The answer actually may rest on the structural characteristics of trade of developing countries. When it comes to the composition of output in developing countries, the output of agricultural and service sector is predominant, while the contribution of the manufacturing sector is rather low. Therefore, given the weight of non-traded goods in the output, integration does little to stimulate trade among of developing countries.

¹⁷The results do not alter significantly in using different sample divisions (e.g., dividing countries under investigation by continent and income).

References

- Aitken B. J.; Harrison, A. "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela," *American Economic Review*, 89, 1999, pp. 605–18.
- Balassa, B.; Stoutjesdijk, A. "Economic Integration among Developing Countries," *Journal of Common Market Studies*, 14 (1), 1975, pp. 37–55.
- Balasubramanyam, V. N.; Sapsford, D.; Griffith, D. "Regional Integration Agreements and Foreign Direct Investment: Theory and Preliminary Evidence," *Manchester School*, 70 (3), 2002, pp. 460–82.
- Barro, R. J.; Lee, J-W. "International Measures of Schooling Years and Schooling Quality," *American Economic Review (Papers and Proceedings)*, 86 (2), 1996, pp. 218–23.
- Barro, R. J.; Sala-i-Martin, X. *Economic Growth*, Boston, Massachusetts: McGraw Hill Inc, 1995.
- Ben-David, D. "Income Disparity among Countries and the Effects of Free Trade," In: Pasinetti, Luigi L., Solow, R. M. *Economic Growth and the Structure of Long Run Development*, London: Macmillan, 1994, pp. 45–64.
- Borensztein, E.; De Gregorio, J.; Lee, J-W. "How Does Foreign Direct Investment Affect Economic Growth," *Journal of International Economics*, 45, 1998, pp. 115–35.
- Brada, J. C.; Mendez, J. A. "Regional Economic Integration and the Volume of Intra-Regional Trade: A Comparison of Developed and Developing Country Experience," *Kyklos*, 36 (4), 1983, pp. 589–603.
- . "An Estimate of Dynamic Effect of Economic Integration," *Review of Economics and Statistics*, 70 (1), 1988, pp. 163–8.
- De Melo, J.; Montenegro, C.; Panagariya, A. "Regional Integration Old and New: Issues and Evidence," World Bank manuscript, 1992.
- Edwards, S. "Trade Orientation, Distortions, and Growth in Developing Countries," *Journal of Development Economics*, 39 (1), 1992, pp. 31–57.
- Frankel, J.; Romer, D. "Does Trade Cause Growth?" *American Economic Review*, 89 (3), 1999, pp. 379–99.
- Freund, C. L.; McLaren, J. "On the Dynamics of Trade Diversion: Evidence from Four Trade

- Blocs," Board of Governors of the Federal Reserve System, International Discussion Paper 637, 1999.
- Grossman, G.; Helpman, E. *Innovation and Growth in the Global Economy*, Boston: MIT Press, 1991a.
- . "Trade, Knowledge Spillovers, and Growth," *European Economic Review*, 35, 1991b, pp. 517–26.
- . "Technology and Trade," In: Grossman, G., Rogoff, K. *Handbook of International Economics*, vol. III, Amsterdam: Elsevier, 1995, pp. 1279–337.
- Haveman, J. D.; Lei, V.; Netz, J. S. "International Integration and Growth: A Survey and Empirical Investigation," *Review of Development Economics*, 5 (2), 2001, pp. 289–311.
- Henrekson, M.; Torstensson, J.; Torstensson, R. "Growth Effects of European Integration," *European Economic Review*, 41, 1997, pp. 1537–57.
- Im, K.; Pesaran, H.; Shin Y. "Testing for Unit Roots in Heterogeneous Panels," *Journal of Econometrics*, 115, 2003, pp. 53–74.
- International Monetary Fund (IMF). *International Financial Statistics*, CD-ROM, 2002.
- Kokko, A. "Sweden: EU Membership, Investment and Growth," *World Economy*, 17, 1994, pp. 667–78.
- Krueger, A.; Lindahl, M. "Education and Growth: Why and for Whom?" *Journal of Economic Literature*, 39 (4), 2001, pp. 1101–36.
- Landau, D. "The Contribution of the European Common Market to the Growth of its Member Countries: An Empirical Test," *Weltwirtschaftliches Archiv*, 131, 1995, pp. 774–82.
- Levin, A.; Lin, C. F.; Chu, C. "Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties," *Journal of Econometrics*, 108, 2002, pp. 1–25.
- Lucas, R. E. Jr. "Making a Miracle," *Econometrica*, 61 (2), 1993, pp. 251–72.
- Maggi, G.; Rodriguez-Clare, A. "The Value of Trade Agreements in the Presence of Political Pressures," *Journal of Political Economy*, 106 (3), 1998, pp. 574–601.
- Mankiw, N. G.; Romer, D.; Weil, D. N. "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics*, 107 (2), 1992, pp. 407–37.
- McLaren, J. "Size, Sunk Costs, and Judge Bowker's Objection to Free Trade," *American Economic Review*, 87 (3), 1997, pp. 400–20.
- Narula, R. "Multinational Firms, Regional Integration and Globalizing Markets: Implications for Developing Countries," MERIT-Infonomics Research Memorandum Series, The Netherlands, 2001, pp. 2001–36.
- Rivera-Batiz, L. A.; Romer, P. M. "Economic Integration and Endogenous Growth," *Quarterly Journal of Economics*, 106 (2), 1991, pp. 531–56.
- Rodriguez, F.; Rodrik, D. "Trade Policy and Economic Growth: A Skeptic's Guide to Cross-National Evidence," National Bureau of Economic Research (Cambridge, Massachusetts) Working Paper No. 7081, 1999.
- Sachs, J.; Warner, A. "Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity*, 1, 1995, pp. 1–95.
- Sharer, R. "Trade: An Engine of Growth for Africa," *Finance and Development*, 36 (4), 1999, pp. 26–9.
- Sharma, S. C.; Chua, S. Y. "ASEAN: Economic Integration and Intra-Regional Trade," *Applied Economics Letters*, 7, 2000, pp. 165–9.
- Summers, R.; Heston, A. "Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–1985," *Quarterly Journal of Economics*, 106, 1991, pp. 327–68.
- United Nations Conference on Trade and Development (UNCTAD). *World Investment Report, Foreign Direct Investment and the Challenge of Development*, New York: United Nations, 1999.
- Vaitsos, C. V. "Crisis in Regional Economic Cooperation (Integration) Among Developing Countries: A Survey," *World Development*, 6, 1978, pp. 719–69.
- Wonnacott, R. J. "Free-Trade Agreements: For Better or Worse?" *American Economic Review (Papers and Proceedings)*, 86 (2), 1996, pp. 62–6.
- World Bank. *Direction of Trade Statistics*, CD-ROM, 2002.
- Xu, B. "Multinational Enterprises, Technology Diffusion, and Host Country Productivity Growth," *Journal of Development Economics*, 62, 2000, pp. 477–93.