Economic Integration In The Americas: 1975 - 1992

George Garman, (E-mail: garman@mscd.edu), Metropolitan State College of Denver
Janis Petersen, McCook Community College
Debora Gilliard, (E-mail: gilliard@mscd.edu), Metropolitan State College of Denver

Abstract

Latin American countries renewed their interest in regional trading blocs during the 1980s. According to Salgado, this renewed interest took the form of two phases: 1984-87, and from 1986 on. This paper uses a gravity equation to examine Latin American and Caribbean trade flows to ascertain the effectiveness of the Central American Common Market, Andean Pact and Latin American Integration Association, and to identify the factors affecting Latin American integration. Geographic distances are adjusted for the level of infrastructure development in an attempt to better proxy economic distance. A Chow Test is used to test for Salgado's two phases.

Introduction

Latin American interest in economic integration dates back to the 1950s when Raúl Prebisch and the United Nation's Economic Commission for Latin America (ECLA) envisioned the utilization of regional economic integration as a means of promoting economic growth and development in the Latin American and Caribbean countries. The Central American Common Market (CACM), the first of several such schemes, was established in 1958 by Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua who viewed the regional market as a means of achieving economies of scale and promoting industrialization and development. CACM was followed by the formation of the Latin American Free Trade Association (LAFTA) in 1960. Comprised of Mexico and all of the South American countries except Guyana, Suriname and French Guiana, LAFTA's original purpose was to stimulate trade rather than to promote

growth and development along the lines of the ECLA's plan. CACM and LAFTA appeared to be successful in their early years as indicated by Wionczek [1970, 54-55] who found a seven-fold increase in intra-regional trade for CACM members and a two and a third increase for LAFTA members. By the end of the decade both integration arrangements were experiencing difficulties due to an unequal distribution of the gains and benefits of integration.

These gains and benefits accrued mostly to the larger, more developed members of the regional groups. The dissatisfaction of the less developed LAFTA members led to the 1969 formation of the Andean Pact (AP) by Bolivia, Colombia, Chile, Ecuador and Peru (Venezuela joined in 1974; Chile withdrew in 1976). Although the AP's design was supposed to result in a more equitable distribution of gains and benefits and promote growth and development, it suffered from the same problems experienced by CACM and LAFTA. None of the three schemes was dissolved in the 1970s, but they were inef-

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fective, and for the most part dormant, in their objectives of achieving deeper integration.

The 1980s witnessed a renewed interest in economic integration in the Latin American and Caribbean countries. Stimulated by the success of the European Community (EC), the negotiation of the Canadian-American Free Trade Agreement (CAFTA), talks of a North American Free Trade Agreement (NAFTA) and the Enterprise for the Americas Initiative (EAI), and frustrated by the ineffectiveness of the Uruguay Round, most of the Latin American countries have negotiated trade and investment framework agreements with the United States and are involved in numerous integration attempts. The existing arrangements of the CACM, AP and the Latin American Integration Association (LAIA) were strengthened. New arrangements such as the Southern Cone Common Market (Mercosur), the Chile-Mexico free trade agreement and the Chile-Venezuela free trade agreement were formed and are being implemented.

Salgado has identified two phases that have occurred in the "reactivation" of economic integration in the Latin American countries during this period [1990, 139-141]. Phase One began in 1984 and lasted until 1987. This phase is characterized by attempts to revive the existing agreements of the AP, LAIA and CARICOM. Latin American and Caribbean countries were stimulated not only by world interest in the various forms of regional trading blocks but were also confronted by their own deteriorating economic situations which included massive debt, the widening technological gap, declining foreign investment, and unstable economies. The formation of regional trading blocks was viewed as a way of overcoming many of their problems. Salgado designates the 1986 Program for Economic Integration and Cooperation agreement between Argentina and Brazil as the beginning of Phase Two. In this phase, the Latin American countries' commitment to regional integration intensified as the existing arrangements were expanded and new initiatives were undertaken. The AP established a date and a plan for the implementation of its common market and began to

explore possibilities of trade liberalization arrangements with Mexico. The LAIA broadened the scope of its trade liberalization resulting in increased intra-regional trade flows in 1988 and 1989 (see Table 1). The CACM was also reactivated by the end of the decade.

Table 1
Intra-Regional Trade - Exports
(Millions of Dollars)

	LAIA	CACM	LAFTA/ AP
1970	\$ 1264.1	\$ 286.9	\$ 68.9
1975	4010.0	541.3	804.3
1980	10926.8	1173.8	1134.5
1981	11913.2	972.3	1195.3
1982	9934.1	786.8	1240.8
1983	6999.9	782.0	808.8
1984	8136.7	720.5	767.1
1985	7125.3	488.2	817.6
1986	7928.2	331.3	638.5
1987	8574.4	524.6	1028.1
1988	9764.1	550.3	990.5
1989	10865.4	631.8	1011.3
1990	11666.4	663.6	1282.4

Data Source: United Nations Statistical Yearbook for Latin America and the Caribbean, 1991

In agreeing to the Central American Plan for Economic Action, they reaffirmed their commitment to the common market and economic integration not only as a development vehicle but also as a means of integration into the world economy, according to Salazar, [1990]. CACM members have also entered into free trade agreements with Chile, Colombia, Mexico and Venezuela.

This paper empirically examines the effects of economic integration on trade flows in the CACM, AP, and LAIA during this period in an attempt to analyze the factors affecting the success of economic integration and to test Salgado's theory of the two phases. Success of an intra-regional trade agreement is defined as increased trade flows among member nations. A gravity equation, which estimates the value of trade among nations as a function of the domestic per capita incomes, domestic populations and economic distance between trading partners, is

used to analyze intra-regional trade flows and to evaluate the significance of each variable's contribution to trade. The Chow Test is used to test for Salgado's two phases of integration during the 1980s.

Background

The gravity equation is the accepted methodology for examining the effects of economic integration on intra-regional trade flows. The most common specification of the gravity equation used in the examination of intra-regional trade flows is expressed in log-linear form and presented below.

$$(1) X_{i,j} = C + a_1 Y_i + a_2 Y_j + a_3 N_i + a_4 N_j + a_5 D_{i,j} + DV + e_{i,j}$$

where,

- $X_{i,j}$ = U.S. dollar value of exports from country i to country j
- C = constant term
- Y_i, Y_j = exporter and importer per capita incomes
- N_i, N_j = exporter and importer populations
- $D_{i,j}$ = distance between country i and j
- DV = dummy variables designating membership in a preference area
- $e_{i,j}$ = error term

The model was originally formulated by Tinbergen in the 1960s and supported by studies performed by Linnemann [Bos, (editor), 1969] and others. More recent studies have included additional variables in the gravity equation. Thoumi in his study of LAFTA, CARICOM and CACM [Thoumi, 1989] and LAFTA, AP, CARICOM and CACM [Thoumi, 1989] added an exchange rate variable and a dummy variable for adjacency. Bergstrand [Bergstrand, 1989] includes variables for importer currency appreciation and exporter and importer wholesale price indices in his study of the EC and EFTA. Bergstrand's earlier work on the EC and EFTA [Bergstrand, 1985], included variables for the exchange rate, exporter and importer unit value

indices and GDP deflator in the gravity equation. Brada and Mendez [Brada and Mendez, 1983] examine the AP, CACM, EC, EFTA and LAFTA using pooled data and shift variables. They also included in the gravity equation a variable to measure exporter infrastructure development. Aitken [Aitken, 1973] has used the gravity equation to examine LAFTA and CACM trade and Aitken and Lowry [Aitken and Lowry, 1973] used the gravity equation in an examination of European trade. These studies demonstrate the effectiveness of the model. A theoretical justification of the gravity equation has been provided by Bergstrand [above] and Anderson [Anderson, 1979]. All of the above studies use geographic distance as a proxy for other aspects of the variable even though most agree that the distance variable should be more than just the number of miles or kilometers between the trading countries. According to Brada and Mendez, economic distance represents "resistance to trade and subsumes commercial policy, transportation costs and the lack of knowledge about foreign market opportunities which presumably increase with distance between countries." [1983, 590]. Aitken envisions "distance" as "natural trade resistance which in turn is a composite of transportation cost, transport time, and economic horizon" [Aitken, 1973, 882; Aitken and Lowry, 1973, 328]. Anderson speaks of "economic distance" [1979, 113] and Bergstrand of using geographic distance as a proxy for the "transport-cost factor" [1985, p. 478] and the "c.i.f./f.o.b. factor" [1989, 146]. Geraci and Prewo [Geraci and Prewo, 1977] discuss the limitations of using geographic distance as a proxy for transport costs and employ an errors-in-variables approach to estimate the elasticity of exports with respect to transport costs. They include in their trade resistance vectors dummy variables for preference group membership, language and adjacency and also have an equation for the "transport cost factor" consisting of the ratio of c.i.f. to f.o.b. values specified as a function of geographic distance.

Methodology

The specification of the gravity equation

used in this study is shown below.

$$(2) \log X_{i,j} = \log \text{Constant} + a_1 \log \text{PCGDP}_i + a_2 \log \text{PCGDP}_j + a_3 \log \text{POP}_i + a_4 \log \text{POP}_j + a_5 \log \text{DIST}_{i,j} + \beta_1 \text{LANG} + \beta_2 \text{CACM} + \beta_3 \text{AP} + \beta_4 \text{LAIA} + \log e_{i,j}$$

where,

- $X_{i,j}$ is the value of the exports from the i th to the j th country.
- PCGDP_i and PCGDP_j are the per capita Gross Domestic Products of the i th and j th countries.
- POP_i and POP_j are the respective populations in countries i and j .
- $\text{DIST}_{i,j}$ is the economic distance between the i th and j th countries.
- LANGUAGE is a dummy variable that equals one if the official language of the two countries is the same and zero otherwise.
- CACM , AP , and LAIA , are dummy variables for membership in a preference area.
- $\log$ is the natural log.
- $e_{i,j}$ is a log normal error term.

The per capita GDP variable measures the productive capacity of the exporting country, and as such, the variable captures the exporter's level of technology economies of scale, etc. For the importing country, per capita GDP is a measure of purchasing ability. The coefficients of the per capita GDP variables are expected to have a positive sign indicating that exports should increase with productive capacity and that imports should increase with purchasing ability.

The population variables are a measure of country size. Larger countries are endowed with more resources and thus would be more self-sufficient, resulting in fewer exports and fewer imports. This would imply negative coefficients for both the population of the exporting and importing countries. Newer theories [see Venables, 1987; Krugman, 1980] suggest that larger countries are better able to absorb imports than are smaller countries. This indicates a direct relationship between imports and popula-

tion. Also, larger countries are better able to experience economies of scale and thus develop a comparative advantage in their export industries than are smaller countries. Therefore a direct relationship should exist between a country's size and the country's exports. Hence the signs of the population coefficients cannot be determined *a priori*.

The distance variable is a proxy for transportation costs and time, access to market information, access to markets, and other factors that make it difficult for nations to engage in trade. Greater distance requires increased expenditures on transportation cost, higher information costs and other factors contributing to increased trade resistance. This implies a negative coefficient for the economic distance variable.

The language dummy is a proxy for cultural differences and attitudes between countries. Trade should be easier for countries having a common language and culture. Trade resistance may result from cultural and language differences between countries. Countries having a common language are assumed to have similar cultures and attitudes toward trade. The language dummy measures the willingness to trade with others speaking the same language. The variable is expected to have a positive sign if language-based trade resistance exists.

The preference dummy variables measure trade flows among members of a preference area relative to trade flows with non-member nations. If the integration scheme is effective in increasing trade flows between members relative to non-members, the coefficient should be positive. The greater the magnitude of the coefficient, the more successful is the integration.

Equation (2) was estimated using OLS for the above sample for the years 1970, 1975 and 1980 through 1990.

Economic Distance Variable

The economic distance variable was constructed from the geographic distance be-

tween trading nations, and the relative level of infrastructure development in the country. Geographic distance was measured as the kilometers between the economic trading centers of each pair of countries. In cases where a country has more than one economic center, the shortest distance was used. Also, when the country relies primarily on marine traffic, a port city was used.

While geographic distance is an approximation to transportation cost, information, economic horizon, etc., the geographic distance should be adjusted for the relative development of the infrastructures in the trading countries. Therefore, the distance variable used in this study is an attempt to make the variable a better approximation of the economic distance between trading partners.

Although several measures of determining infrastructure are possible, this paper focuses upon three measures that, if well developed, could reduce transportation costs and time, improve information and access to markets, etc. thus making it easier for the nations to trade. These measures are roads, railroads, and telephones. An index for the level of infrastructure was developed from information contained on 223 countries in the World Fact Book [Central Intelligence Agency, 1992]. In countries with populations concentrated at or near economic centers, such as coastal populations in Guyana, roads and railroads are not needed to reach into the low population areas of the interior. Hence, measures of roads per person per square kilometer and railroads per person per square kilometer are used. The last measure is the number of telephones per capita. The mean (m) and standard deviation (s) of the 223 countries for each measure were computed and standardized by $(X - m)/s$. The standard normal deviates for each measure were computed and are presented in Table 2. The composite index was constructed from the standard deviates and is also shown in Table 2. The geographic distance is multiplied by the composite index to provide the estimate of economic distance.

The normal standard deviate for each measure of infrastructure (Roads, Railroads and Telephones) was computed from the worldwide listing of countries. First, Roads and Railroads were divided by the population density in each country. The mean of each was computed by summing the adjusted variable and dividing by the total number of countries. The standard deviation was computed for each variable. Each variable was standardized by subtracting its value from the mean and dividing by the standard deviation. This is the normal standard deviate found in Table 2. The Composite is a simple average of the three measures (Roads + Railroads + Telephones) divided by three.

The Composite provides us with a standardized distribution with a mean of zero and a standard deviation of unity. Any positive value represents a Composite that exceeds the world mean and any negative value represents a Composite that is below the world mean. For example, Brazil has a composite ranking of about 85 which indicates that it is .85 standard deviations above the world average. According to the normal distribution, about eighty percent of the countries have Composite scores lower than Brazil and thirty percent have scores higher. The Composite for Honduras is about -.38 or .38 standard deviations below the world mean. The normal distribution shows that about thirty-five percent of the countries have lower composite scores and sixty-five percent have higher composite scores than Honduras.

The Composite index is based on a mean standard of unity. Since higher Composite scores should lower distance and lower composite scores should expand distance, the lower the index the lower the distance. If a Composite score exceeds zero, the composite index will be less than unity. For example, Brazil's Composite of .85 translates into about thirty percent above the mean. Therefore, the Composite index is lowered about thirty percent below unity (to about .7). Since Honduras is about fifteen percent below the world mean, its Composite index is raised about fifteen percent above unity (to about 1.15).

Table 2
Standard Normal Deviates for Infrastructure Measurement

	Standard Normal Deviates			Composite Composite	Index
	Roads	Railroads	Telephones		
Brazil	0.77321	2.25096	-0.46832	0.85195	0.6971210
Argentina	1.64855	0.35521	-0.38472	0.53968	0.7947090
Barbados	-0.19477	0.0	0.84763	0.32643	0.8720499
Mexico	0.09292	-0.05274	-0.43592	-0.13191	1.0524728
Uruguay	-0.14191	-0.10698	-0.26208	-0.17032	1.0676222
Chile	0.03428	-0.05605	-0.49383	-0.17187	1.0682284
Bolivia	0.11247	-0.01195	-0.66389	-0.18779	1.0744799
Suriname	-0.20953	-0.09109	-0.44654	-0.24906	1.0983419
Venezuela	-0.23746	-0.08713	-0.43473	-0.25311	1.0999073
Costa Rica	-0.24320	-0.18710	-0.33390	-0.25473	1.1005354
Panama	-0.24841	-0.18657	-0.35528	-0.26342	1.1038876
Colombia	-0.17887	-0.11620	-0.50144	-0.26550	1.1046888
Trinidad	-0.19386	0.0	-0.36936	-0.28161	1.1108794
Peru	-0.18629	-0.07145	-0.64515	-0.30096	1.1182786
Guyana	-0.21730	-0.12490	-0.58675	-0.30965	1.1215866
Jamaica	-0.19234	-0.25243	-0.52183	-0.32220	1.1263499
Paraguay	-0.20031	-0.13797	-0.68142	-0.33990	1.1330341
Ecuador	-0.23672	-0.17205	-0.62084	-0.34320	1.1342778
Dominican	-0.19241	-0.24618	-0.63831	-0.35897	1.1401895
Nicaragua	-0.24504	-0.16767	-0.68332	-0.36534	1.1425719
El Salvador	-0.25178	-0.19367	-0.65882	-0.36809	1.1435959
Guatemala	-0.24677	-0.18562	-0.70850	-0.38030	1.1481376
Honduras	-0.24176	-0.18862	-0.72268	-0.38436	1.1496429
Haiti	-0.19451	-0.25321	-0.72863	-0.39211	1.1525126

(Note: Barbados and Trinidad & Tobago do not have railroads. The railroads component was eliminated from the index for these two countries).

The figures for geographic and adjusted distance for Argentina vis-a-vis all other countries included in the study are presented in Table 3.

Results

The parametric estimates for equation (2) for 1970, 1975 and 1980-90 are presented in Table 4 (see page 8). The adjusted R²s range from a low of 0.5599 in 1980 to a high of 0.6705 in 1990. These values are acceptable for a cross-sectional study and are comparable to those obtained in other studies employing the gravity equation to examine intra-regional trade flows in the Latin American countries. Higher R²s are reported in studies of the EC and EFTA.

come variables are positive and significant in all years. In every year the coefficient and t-value for the exporter is greater in magnitude than that for the importer indicating that the income elasticity of intra-regional trade is more elastic with respect to the exporting country's income than it is to the importing country's income. Although the magnitude is greater than those reported by Brada and Mendez, they are comparable to those obtained by Thoumi and Aitken in their studies of Latin American trade, but smaller in magnitude than those reported in the studies of European trade. These results also confirm Thoumi's conclusion that richer countries tend to have bilateral trade surpluses with poorer countries, and that the costs and benefits of integration are unevenly distributed among members.

The coefficients of the per capita in-

The declining magnitude of the coeffi-

cients of the importing country, from 0.61 to 0.39, in the 1985-90 time period indicate an increasing inelasticity of intra-regional trade with respect to the income of the importing country. The elasticity of exports with respect to income remained rather constant, declining slightly in 1989 and 1990. Figures for intra-regional exports and imports as a percent of total exports and imports are presented in Table 5.

The population coefficients are positive and significant in all years. The positive sign indicates that country size is directly related to trade. Larger countries export more and have a greater capacity to absorb imports than do their smaller counterparts. The larger countries are able to experience economies of scale and develop a comparative advantage in their export industries, whereas smaller countries are not able to. This results in an uneven distribution of costs and benefits of integration in favor of the bigger countries that will industrialize more rapidly. This is consistent with the newer theories of international trade which emphasize the important effect of imperfectly competitive markets and economies of scale on trade patterns [see Venables, 1987; Krugman, 1980].

The distance variable has the expected negative sign and is highly significant in every year indicating the importance of economic distance as a variable affecting trade flows.

The language dummy has the expected positive sign and is significant in all years. A surprising result is that the magnitude of the coefficient increases yearly in the 1985-1990 time period. This would indicate that language and culture are increasing in importance as a factor creating trade resistance.

The dummy variables for membership in a trade preference scheme give mixed results. For CACM, the coefficients are positive for all years, and statistically significant in all years except 1985, 1988 and 1989. CACM, which appeared strong in the 1960s and began to disintegrate in the 1970s, experienced a drastic decline in intra-regional exports in the 1980s (see Table

Table 3
Examples of Geographic and Adjusted Distance
Between Argentina and Other Countries
(in kilometers)

	Geographic	Adjusted
Bolivia	2235.4	1908.8
Brazil	1685.0	933.5
Chile	1126.5	956.3
Colombia	4697.7	4124.1
Costa Rica	5644.0	4936.0
Ecuador	4353.3	3924.2
El Salvador	6270.0	5698.3
Guatemala	6435.8	5872.0
Guyana	4604.3	4104.0
Honduras	6205.6	669.4
Mexico	7385.3	6177.2
Nicaragua	5965.8	5417.1
Panama	5325.3	4671.8
Paraguay	1049.3	944.8
Peru	3128.6	2780.4
Suriname	4517.4	3942.9
Uruguay	214.0	181.6
Venezuela	5106.4	4463.5
Barbados	5309.3	4424.7
Jamaica	6159.0	5915.9
Trinidad	5043.7	4805.7
Haiti	6031.3	5931.0
Dominican Rep	6030.3	5834.0

Table 5
Intra-Regional Trade in LAIA and CACM

	Intra-Regional Exports (Percent of Total Exports)		Intra-Regional (Percent Imports of Total Imports)	
	LAFTA/ LAIA	CACM	LAFTA/ LAIA	CACM
1970	12.5	28.4	11.0	32.1
1980	15.4	27.6	13.3	32.8
1982	15.2	26.9	14.6	40.4
1985	11.0	18.3	13.4	30.3
1986	13.2	13.6	14.0	23.2
1987	13.5	19.2	13.4	29.1
1988	12.4	19.9	13.1	26.2
1989	13.2	20.5*	13.5	28.0*
1990	12.7*	19.2*	12.8*	25.4*

Source: United Nations Statistical Yearbook for Latin America and the Caribbean 1991, pp. 150-151.

* Estimate

Table 4
OLS Estimates of Equation 2

	1970	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
CONSTANT	-4.242530 -2.789400	-4.716535 -2.591300	-3.609625 -1.735500	-5.388147 -2.772700	-5.492074 -2.748800	-6.422689 -2.972500	-5.192017 -2.536600	-4.584521 -2.248400	-8.883807 -4.359900	-5.116403 -2.810500	-6.231163 -3.406800	-4.018210 -2.165000	-5.321923 -3.015800
LOG.PCGDP1	1.148910 10.016800	1.394241 10.144600	1.357011 9.025300	1.531840 11.026400	1.558922 11.055100	1.529151 9.920300	1.597099 10.871700	1.623771 11.020200	1.654620 11.427700	1.639012 13.020300	1.647485 12.725000	1.496093 11.521900	1.499849 12.258600
LOG.PCGDP2	0.469313 4.543900	0.694226 5.733500	0.567241 4.263400	0.678175 5.495600	0.846098 6.723800	0.754436 5.561600	0.570216 4.417100	0.613342 4.791600	0.568860 4.489900	0.501276 4.465000	0.412976 3.631100	0.416673 3.641300	0.394880 3.659600
LOG.POP1	0.753762 12.153100	0.790760 11.955600	0.740780 9.730200	0.939258 13.088800	0.832854 11.534900	0.885640 11.623800	0.977196 13.415800	1.009944 13.988200	1.071711 14.932400	0.927391 14.699900	1.136018 17.201100	1.009897 15.038900	1.086504 16.936600
LOG.POP2	0.347550 5.583200	0.457234 6.873800	0.487109 6.358000	0.511531 7.077400	0.511328 7.020000	0.466503 6.073400	0.436973 5.952300	0.418820 5.762600	0.398375 5.505700	0.362416 5.699600	0.439897 6.606100	0.510249 7.535900	0.514389 7.951500
LOG.Distance	-1.544101 -13.534200	-1.977752 -15.023600	-1.959380 -12.660800	-2.229307 -15.227200	-2.265768 -15.374200	-2.078436 -13.388300	-2.186213 -14.743900	-2.325954 -15.745900	-1.847638 -12.574000	-2.017532 -14.759800	-2.106442 -15.453800	-2.181268 -15.718500	-2.094767 -15.776000
Language	0.588451 3.478900	0.565584 3.028200	0.835618 3.824300	0.951963 4.617900	0.736065 3.529200	0.589557 2.680600	0.642681 3.063400	0.635172 3.033100	0.671692 3.224000	0.721263 3.712900	0.815544 4.229700	0.921658 4.687900	1.065954 5.661000
PAREA.CACM	3.296182 5.763300	1.437889 2.740200	1.689491 2.743800	1.495910 2.576900	1.675042 2.849400	2.314103 3.726500	1.767716 2.987100	1.054373 1.782600	1.843714 3.133400	1.453232 2.666200	1.035745 1.908400	0.978905 1.770600	1.062211 2.007700
PAREA.Andean	-0.260103 -0.666900	0.597703 1.405400	-0.064734 -0.110800	-0.205794 -0.373600	-0.050984 -0.091600	0.088855 0.151200	-0.098908 -0.176000	-0.126813 -0.226600	-0.247342 -0.444400	-0.058357 -0.113200	0.162245 0.315600	-0.381372 -0.727700	-0.181977 -0.562900
PAREAL.LAIA	1.622331 6.120700	1.598152 5.510800	2.052057 6.134900	1.624821 5.147000	1.627932 5.100300	1.456162 4.324200	1.438013 4.479900	0.913574 2.852500	1.331283 4.153600	1.519903 5.061400	1.023460 3.451400	1.511215 5.013000	1.431680 4.976100
R ² - (Adjusted)	0.604200	0.615700	0.559900	0.620700	0.605000	0.560500	0.596400	0.588800	0.595300	0.637100	0.647100	0.638800	0.670500
Standard Error	1.823563	1.984849	2.321582	2.189088	2.212858	2.333751	2.227942	2.221535	2.209452	2.055442	2.042036	2.079390	1.990347

1). In 1990, the region's exports had still not attained their 1980 level. Only Costa Rica and Honduras saw an increase in their total exports during this period.

Members of this group also suffered from the burden of the debt, currency misalignments and balance of payments problems, and internal strife. In 1984 and 1985, Costa Rica, Guatemala, Honduras, and Nicaragua rescheduled their debt. Honduras and El Salvador did not sign a peace treaty officially ending the 1969 "soccer war" until 1980. During this eleven year period, Honduras did not participate in the CACM. This, along with Sandinista rule in Nicaragua until 1990, civil war in El Salvador (which began in 1981), and military coups in 1982, 1983 in Guatemala, (which did not return to civilian rule until 1986) meant that CACM members had many internal problems and that economic integration was not a top priority during this period. This is indicated by the smaller magnitude of the coefficients in all years from their 1970 high.

Coefficients for the dummy variables for the Andean Pact are insignificant in all years and negative in all years except 1975, 1983 and 1988, indicating the ineffectiveness of this group as an integration scheme during the 1980s. AP members were impacted by the debt burden, as was the rest of the third world. The purpose of the AP was to promote equitable development based on import-substitution. The group suffered from non-compliance on the part of member countries and the failure of the import-substitution model as a method of development which resulted in its dormancy during the 1980s, as evidenced by the results. In addition, its members were also riddled with internal problems in the 1980s and did not make integration a top priority.

LAFTA/LAIA is the only preference group having significant coefficients with the correct sign in 10 of the 13 years of this study (t-values are insignificant in 1970, 1975 and 1990) indicating its effectiveness in increasing trade flows among its members. LAIA's effec-

tiveness can be attributed to its restructuring in 1980 which resulted in a less lopsided distribution of costs and benefits. LAIA members were severely impacted by the debt and following austerity programs, in addition to severe macroeconomic instability, and saw a decline in intra-regional exports from their 1981 high. Intra-regional exports, as a percent of total exports were 11-15.4% during the decade, reaching their lowest level in 1985. During the same period, intra-regional imports, as a percent of total imports were in the 13-14% range. This is the only preference scheme in this study that was actively involved in trade liberalization during the most of the years of this study.

The Chow Test

As mentioned above, Salgado [Salgado, 1990] identified two phases occurring in the economic integration process in Latin America during the 1980s. Phase One, from 1984-1987, involved attempts to reactivate the existing arrangements, while Phase Two, beginning in 1986 with the negotiation of the Argentina-Brazil Program for Economic Integration and Cooperation agreement, was characterized by attempting to achieve higher degrees of integration in the existing schemes and the negotiation of new integration arrangements.

An F-statistic (see equation 3) is used to measure potential differences in the structure of the equations. Results for 1981 through 1983 were compared with results from 1984 through 1986 and results for 1984 through 1986 were compared with results from 1987 through 1989. The following formula was used to compute the F-statistics.

$$(3) F_{k,n+m-2k} = \frac{(SSEc - SSE1 - SSE2)/K}{(SSE1 + SSE2)/(n + m - 2K)}$$

where,

- SSEc is the combined sum of squared errors during the time period
- SSE1 is the sum of squared errors for the

time period immediately preceding the impact.

- SSE2 is the sum of squared errors for the time period immediately after the impact.
- n is the number of observations before the impact.
- m is the number of observations after the impact.
- K is the number of explanatory variables.

The first null hypothesis is that the values of the coefficients in the 1981-1983 time period are not significantly different from the values of the coefficients in the 1984-1986 time period. The second null hypothesis is that the values of the coefficients in the 1984-86 time period are not significantly different from the values of the coefficients in the 1987-1989 time period. The F-statistics are reported in Table 6 below. These results indicate a statistical difference between the coefficients in the two time periods and are significant at the 95% level. On the basis of the computed F-statistics, we reject both null hypotheses. This tends to support Salgado's claim of the existence of two distinct phases.

Table 6
Results of Chow Test
($\alpha = 0.05$)

	Time Period	
	1981-1986	1984-1989
F-Statistic	2.679297	2.38859
Critical Value	1.900000	1.90000

Conclusions

This study was performed with several objectives in mind: 1) to evaluate the factors contributing to successful economic integration in the Latin American countries; 2) to examine the effectiveness of the CACM, AP and LAIA in achieving economic integration; and 3) to empirically ascertain the existence of Salgado's two phases of reactivation occurring in the integration process. Employing a gravity equation in the analysis of intra-regional trade flows reveals some interesting observations concerning Latin

American trade and integration arrangements, such as the importance of language and culture as determinants of trade resistance.

The empirical results are, for the most part, consistent with our expectations, especially since the decade of the 1980s was one of recession and stagnation for the economies of the Latin American countries. Indeed, the period is referred to by many as the "lost decade" as most countries suffered the burden of the debt and deteriorating economic conditions. However, most made the transition to democracy during this period.

The coefficients for per capita GDP, population and distance had the expected signs and magnitudes. This confirms the results of other studies and indicates the important role of country wealth, size, and economic distance between trading partners as factors affecting trade and integration. The results of the language dummy also support this conclusion. The biggest surprise of this study is the importance of cultural and language differences as inhibitors of trade and integration. This would tend to support the belief that the more similar countries are, the more likely it is that their integration scheme will be successful.

The results of the Chow Test give statistical support to Salgado's identification of the two phases that occurred in the 1980s. In the first part of the decade, countries tried to work within the framework of the existing trade preference arrangements. In the latter half of the decade, they began to change the structure of the existing agreements intending to promote deeper integration. They also began to form new arrangements. Only time will tell if members of any of these agreements achieve their objectives.

Suggestions For Future Research

Latin American integration schemes have demonstrated both successes and failures during the past thirty years. The economic and political instability of the region has impacted the effectiveness of the schemes but has not led to

the collapse of the trade agreements or the desire to integrate. Latin American countries renewed their commitment to integration in the mid-1980s, and agreements for new arrangements began to emerge in the latter part of the decade. As mentioned above, the CACM and AP are currently attempting to achieve more advanced stages of integration.

This rapidly evolving economic and political climate provides many opportunities for the investigation of the success (or failure) of economic integration. Economic models, such as the gravity equation used in this study, should provide researchers with a consistent methodology to track the trade flows of the region.

Appendix 1 - Data Sources

The countries included in the study and the preference areas to which they belong are as follows. LAIA: Argentina, Bolivia, Brazil, Colombia, Chile, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela. CACM: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. AP: Bolivia, Colombia, Chile (until 1976), Ecuador, Peru, and Venezuela (1974-90). Non-Members: Barbados, Guyana, Jamaica, Trinidad & Tobago, Haiti, Panama, Dominican Republic, and Suriname.

Bilateral trade figures, in millions of U.S. dollars, were obtained from the United Nations, Statistical Yearbook for Latin America and the Caribbean, 1989 and 1991.

Per capita GDP figures were computed from total GDP figures and population. Total GDP, in millions of U.S. dollars, was obtained from the United Nations, Statistical Yearbook for Latin America and the Caribbean, 1989 and 1991.

Population figures for 1970, 1980, 1984-1990 were obtained from the United Nations, Statistical Yearbook for Latin America and the Caribbean, 1989 and 1991. Figures for 1981-1983 were computed from the total and per capita GDP found in the above publications.

The 1975 figure for Suriname was calculated based on the United Nations projected growth rate of 1.7%; 1981-83 figures were obtained from the IMF's International Financial Statistics.

Distances were found in various atlases and government publications. The figures for kilometers of roads, railroads, and the total number of telephones per country were obtained from the Central Intelligence Agency's The World Factbook 1992.

References

1. Aitken, Norman D., "The Effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis," *American Economic Review*, December 1973, 881-92.
2. _____, Norman D. and William R. Lowry, "A Cross-Sectional Study of the Effects of LAFTA and CACM on Latin American Trade," *Journal of Common Market Studies*, June 1973, 326-36.
3. Anderson, James E., "A Theoretical Foundation for the Gravity Equation," *American Economic Review*, March 1979, 106-116.
4. Bergstrand, Jeffrey H., "The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade", *Review of Economics and Statistics*, February 1989, 143-53.
5. _____, "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence," *Review of Economics and Statistics*, August 1985, 474-81.
6. Brada, Josef C. and Jose A. Mendez, "Regional Economic Integration and the Volume of Intra-Regional Trade: A Comparison of Developed and Developing Country Experience," *Kyklos*, 1983, 589-603.
7. Central Intelligence Agency, *The World Factbook 1992*, Washington, D.C., 1992.
8. Chow, G. C., "Tests of Equality between Sets of Coefficients in Two Linear Regressions," *Econometrica*, Vol. 28, 1960,

- 591-605.
9. Csernok, A., E. Ehrlich and Gy. Szilagyi, "Numerical Results of an International Comparison of Infrastructure Development Over the Last 100 Years," *European Economic Review*, Vol. 4, 1973, 63- 65.
10. de la Torre, Augusto and Margaret R. Kelly, "Regional Trade Agreements," Occasional Paper 93, Washington:IMF, March 1992.
11. Finch, M. J., "The Latin American Free Trade Association," in *International Economic Integration*, edited by Ali M. El-Agraa, New York: St. Martin's Press, 1982.
12. Fisher, F. M., "Tests of Equality between Sets of Coefficients in Two Linear Regressions: An Expository Note," *Econometrica*, Vol. 38, 1970, 361-366.
13. Geraci, Vincent J. and Wilfried Prewo, "Bilateral Trade Flows and Transport Costs," *Review of Economics and Statistics*, 59(1), 1977, 67-74.
14. International Monetary Fund, *International Financial Statistics*, Washington D. C., IMF, various years.
15. Krugman, Paul, "Scale Economies, Product Differentiation, and the Pattern of Trade," *American Economic Review*, Dec. 1980, 950-959.
16. Linnemann, Hans, "Trade Flows and Geographical Distance, or the Importance of Being Neighbors," in *Towards Balanced International Growth*, edited by H. C. Bos. New York: John Wiley & Sons, 1969, 111-128.
17. Salgado, Germánico, "Latin American Integration and External Openness, *Cepal Review*, December 1990, 135--155.
18. Thoumi, Francisco E., "Bilateral Trade Flows and Economic Integration in Latin America and the Caribbean," *World Development*, March 1989, 421-429.
19. _____, "Trade Flows and Economic Integration Among the LDCs of the Caribbean Basin," *Social and Economic Studies*, June 1989, 215-233.
20. United States Department of Commerce, *Statistical Abstract of the United States* 1991, 111th ed., Washington: U. S. Department of Commerce, 1991.
21. _____, *Statistical Abstract of the United States* 1992, 112th ed., Washington: U.S. Department of Commerce, 1991.
22. United Nations, *Statistical Yearbook* 1988/89, 37th Issue, New York: United Nations, 1992.
23. _____, *Statistical Yearbook for Latin America and the Caribbean* 1989, New York: United Nations, 1990.
24. _____, *Statistical Yearbook for Latin America and the Caribbean* 1991, New York: United Nations, 1992.
25. Venables, Anthony J., "Customs Unions and Tariff Reform under Perfect Competition," *European Economic Review*, February/March 1987, 103-110.
26. Wionczek, Miguel S., "The Rise and the Decline of Latin American Economic Integration," *Journal of Common Market Studies*, September 1970, 49-66.
27. World Bank, *World Development Report*, New York: Oxford University Press, 1989, 1990, 1991, 1992.