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Panama's Entrance into the Central American Common Market: The Macroeconomic Effects

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Abstract

Panama and the Central American countries have discussed their economic integration for a long time, but thus far no viable mechanism has been agreed on. Their mutual trade remains based on preferential trade agreements on a reduced number of products. One factor that may inhibit advancing on their trade relationships is the lack of studies that quantify the impacts of deeper economic integration. This paper presents a six country interdependence model, representing each of the Central American countries plus Panama. Panama's entrance into the Central American Common Market is simulated by an increase in its marginal propensity to export to Central America. An equation that expresses the increment in the GDP vector due to such change is derived. The model is calibrated with 1992 national accounts and trade data. The results indicate that Panama and Central America would gain from establishing a reciprocal free trade regime in the framework of the Central American Common Market.

I. Introduction

Panama and the Central American countries have maintained close commercial relations that have led to increasing trade levels in recent years.

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The bulk of this trade follows bilateral agreements that Panama has established with said countries. Panama has been an active participant in the subregion's political and economic fora and has joined some of the subregional organizations, such as the Central American Parliament. However, it has not formally joined the free trade framework known as the Central American Common Market, CACM, that exists in the subregion, with ups and downs, since 1960. Recently, Panama's economic authorities have indicated their preference for undertaking economic reforms that would pave the way for an eventual docking with NAFTA.

The trade relations between Central America and Panama has received considerable attention in the literature ⟨Loher [1991], Salazar-Xirinachs [1990]⟩. Some authors have stressed that the difference in economic structure between Central America and Panama constitutes an obstacle to their integration ⟨Thoumi [1994]⟩. Others have suggested that integration should rest on the service sector, given Panama's comparative advantage in that field ⟨Lachman *et al*, [1991], [1992]⟩. Recent studies based on the estimation of gravity models ⟨Caceres [1995], ECLAC [1994]⟩ have shown that an intraregional free trade regime would increase Panama's exports substantially so that it would eliminate its trade deficit with Central America (See Table 1). However, these deficits are much smaller than those experienced with the rest of the world (Table 2), so that a balanced intraregional trade

Table 1

Central America and Panama: Value of Intraregional Trade

(Million US Dollars)

	Exports			Imports		
Country	1991	1992	1993	1991	1992	1993
Guatemala	362.3	421.8	447.7	187.7	279.0	272.3
El Salvador	203.6	282.5	321.6	255.4	367.5	333.5
Honduras	33.8	39.8	70.1	89.0	106.8	194.8
Nicaragua	54.8	48.3	60.5	168.7	259.4	224.5
Costa Rica	229.9	369.9	348.1	179.0	207.2	232.1
Panama	46.2	59.2	65.5	80.8	96.2	112.9

Source: ECLAC (1994b).

Table 2
Central America and Panama: Value of Trade with Rest of the World
(Million US Dollars)

Country	Exports			Imports		
	1991	1992	1993	1991	1992	1993
Guatemala	877.9	893.9	920.4	1,634.4	2,223.1	2,364.1
El Salvador	390.7	326.2	421.5	1,164.5	1,393.9	1,585.4
Honduras	563.8	641.1	658.9	870.3	942.2	1,103.1
Nicaragua	214.9	194.8	210.4	564.6	679.0	557.7
Costa Rica	1,317.2	1,461.6	1,561.0	1,725.6	2,077.8	2,678.0
Panama	396.1	415.4	438.6	1,614.0	1,922.3	2,047.2

Source: ECLAC (1994b).

may not necessarily represent a respite on the overall balance of trade.

This paper presents a model that permits to estimate the macroeconomic impacts on Panama and Central America derived from the former's joining the CACM. This model is simulated using 1992 national accounts and trade data. The results show that the macroeconomic impact on Panama would be significant.

II. Macroeconomic Impact Derived from Panama's Entering the Central American Common Market

The impact of reducing tariffs in a preferential trade arrangement has traditionally been analyzed from a welfare economics point of view, that relies on quantifying the trade creation and trade diversion effects.[1] This approach requires the availability of information on demand and supply elasticities, which are not readily available in most developing countries.

In order to grasp the macroeconomic implications of Panama's joining the CACM, this section presents an economic interdependence model, similar to the well known Metzler [1950] model. The proposed model comprises six economies, each one having Gross Domestic Product, Y_i, is defined as:

1. For an assessment of this methodology, see Markheim [1994].

$$Y_i = C_i + G_i + I_i + E_{oi} - M_{oi} + \sum_j (E_{ij} - M_{ij}) \quad (1)$$

where:

C_i = private consumption

G_j = public consumption (exogenous)

I_j = total investment

E_{oj} = exports destined outside the interdependent system (exogenous)

M_{oj} = imports originating out the system

E_{jj} = i country's exports destined for country $j = M_{ji}$

It is assumed that private consumption, investment and extra-regional imports are determined by GDP:

$$C_i = n_i Y_i \quad (2)$$

$$M_{oi} = m_{oi} Y_i \quad (3)$$

$$I_i = g_i Y_i \quad (4)$$

Exports and imports between regional countries are also determined by GDP:

$$E_{ij} = x_{ij} Y_j \quad (5)$$

$$M_{ij} = m_{ij} Y_i \quad (6)$$

Substituting equations (2) – (6) in identity (1), this can be written as:

$$(1 - d_i + \sum_j m_{ij}) Y_i - \sum_j x_{ij} Y_j = E_{oi} + G_i \quad (7)$$

where: $d_i = n_i + g_i - m_{oi}$

For the 6 country system, identity (7) can be written in matrix form as:

$$AY + BY = (A + B) Y = W$$

Where A is a diagonal matrix with elements $A_{ii} = 1 - d_i + \sum_j m_{ij}$ and B is a matrix with off-diagonal element equal to $B_{ij} = -x_{ij}$, Y is the national income vector, $(A + B)$ is the Metzler matrix and W is the exogenous variables vector: $W_i = E_{oi} + G_i$

The national income vector can be obtained from expression (9):

$$Y = (A + B)^{-1}W = (T)^{-1}W \tag{11}$$

Where $T^{-1} = (A + B)^{-1}$ is the multiplier matrix.

This model permits to compute the impact of a structural change, such as Panama joining the CACM. This can be reflected by a change in all its marginal propensities to export and import from Central America, assuming that other structural parameters remain unaltered:

$$\Delta Y = \frac{\partial Y}{\partial x}dx = \frac{\partial (A+B)Y}{\partial x}dx = \frac{\partial W}{\partial x}dx = 0 \tag{12}$$

$$\Delta Y = \left[\frac{\partial A}{\partial x}dx + \frac{\partial B}{\partial x}dx\right]Y + (A+B)\frac{\partial Y}{\partial x}dx = 0 \tag{13}$$

And solving for: $\frac{\partial Y}{\partial x}dx$

ΔY is obtained:

$$\Delta Y = \frac{\partial Y}{\partial x}dx = (T)^{-1}\left[-\frac{\partial A}{\partial x} - \frac{\partial B}{\partial x}\right]dx(T)^{-1}W \tag{14}$$

Likewise, one can compute the change in the income vector resulting from a reduction in the marginal propensity to import extraregionally:

$$\Delta Y = \frac{\partial Y}{m_o}dm_o = (T)^{-1}\left(-\frac{\partial A}{\partial m_o}dm_o\right)(T)^{-1}W \tag{15}$$

III. Empirical Estimates

Based on 1992 national accounts and trade data, the Metzler matrix was calculated (Table 3):[2]

From this matrix, the multiplier matrix was obtained (Table 4):

The multiplier matrix indicates that, for example, if Honduras' extraregional exports increase by $100, its own GDP would increase by $218.63

2. The source of data is ECLAC (1994b).

Table 3
Metzler Matrix (T)

	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panamá
Guatemala	0.24700	−0.2860	−0.01950	−0.04280	−0.01430	−0.00440
El Salvador	0.01240	0.24580	−0.00760	−0.01350	−0.00820	−0.00140
Honduras	−0.00100	0.00240	0.45760	−0.00220	−0.00018	−0.00050
Nicaragua	−0.00140	−0.00320	0.00410	0.41680	−0.00260	−0.00017
Costa Rica	−0.00600	−0.00680	−0.00590	−0.04240	0.61620	−0.00700
Panama	−0.00038	−0.00190	−0.00100	−0.00100	−0.00460	0.56310

Table 4
Multiplier Matrix (T^{-1})

	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica	Panamá
Guatemala	4.07880	0.48535	0.18728	0.44614	0.10331	0.03466
El Salvador	0.20840	4.09722	0.07917	0.16068	0.06016	0.01268
Honduras	0.01010	0.02275	2.18626	0.01345	0.00125	0.00210
Nicaragua	0.01567	0.03364	0.02290	2.40317	0.01097	0.00109
Costa Rica	0.04323	0.05264	0.02526	0.17168	1.62544	0.02075
Panama	0.00385	0.01468	0.00452	0.00654	0.01357	1.77612

and Guatemala's, Costa Rica's and Panama's GDP's would increase by $18.73,$2.53 and $0.45, respectively. Likewise, if Panama's extraregional exports increased by $100, its own GDP would increase by $177.61 and Costa Rica's, El Salvador's and Guatemala's would increase by $2.08, $1.27 and $3.47, respectively.

It can be seen that Panama's economic links with the other Central American countries are tenuous. In fact, when summing the off-diagonal elements along rows and columns, it can be seen that Panama imparts, and receives, the lowest multipliers (Table 5).

Guatemala and El Salvador receive the largest multiplier impacts, while El Salvador and Nicaragua exert the largest ones. The multiplier received by Panama is of the same order of magnitude as that received by Honduras. The sum of multipliers received from the rest of the region depends on the given country's interregional trade flows as well as on its consumption,

Table 5
Panama's Economic Links with Other Central American Countries

Country	Multiplier received from rest of region	Multiplier exerted on rest of region
Guatemala	1.2565	0.2911
El Salvador	0.6208	0.6088
Honduras	0.0494	0.3189
Nicaragua	0.0840	0.7982
Costa Rica	0.3133	0.1890
Panama	0.0429	0.0710

investment and extraregional imports, as denoted by the system equations presented above. However, it can be expected that countries with larger extraregional export sectors would receive larger multipliers, given that a large export sector would facilitate investment and the accumulation of skills conducive to diversifying and expanding intraregional exports. As can be seen in Table 5, Guatemala the country that has the largest extraregional export sector, receives the largest multiplier from Central America. However, for the other countries there does not exist a clear proportional relationship between extraregional exports and magnitude of the multiplier received.

Thus, there are other factors, such as distance and transport costs, which influence intraregional multipliers. In effect, it can be seen in Graph 1 that there is a tendency for the multipliers received by Panama to decrease as the distance to importing countries increase, except for the case of El Salvador that exerts the largest multiplier, despite its long distance to Panama. The multipliers received by Guatemala and El Salvador also reflect the attenuating impact of distance.

The multiplier matrix permits computing income "spillover" effects generated by exogenous expenditure in a given country. Assuming that public consumption experiences a one unit increase in country i, the relative spillover effect is given by: $\frac{dY_i}{dG_i} / \sum_{j \neq i}^{n} \frac{dY_j}{dG_i}$

Table 6
Spillover Effects

Country	Spillover effect
Guatemala	14.51
El Salvador	6.72
Honduras	6.86
Nicaragua	3.01
Costa Rica	8.60
Panama	25.01

Values corresponding to each country are shown on Table 6. The lower this effect is, the larger is the spillover effect toward other countries. It can be seen that Panama exerts the lowest spillover effect.

Another interdependence index is the ratio:[3] $\frac{dY_i}{dG_i} / \sum_{j \neq i}^{n} \frac{dY_i}{dG_i}$. This index is equal to the own-country multiplier divided by the row sum of the corresponding country. The larger this index, the larger will be the GDP increase of the country where this exogenous expenditure takes place. This index is presented in Table 7.

Table 7
The Ratio of Interdependence Index

Country	Increase in GDP due to own exogenous expenditure relative to increase induced by exogenous expenditures in other countries
Guatemala	3.25
El Salvador	6.59
Honduras	44.43
Nicaragua	5.19
Costa Rica	8.60
Panama	41.39

3. These two "spillover" indexes were originally presented by Engerman [1965].

Recent studies have shown that if Panama joined the CACM its intraregional exports and imports would increase ⟨Caceres [1995]; ECLAC [1994]⟩. The resulting macroeconomic impact can be computed by means of equation (14). Such event would lead to a rearrangement of all intraregional trade relationships and, thus, the change dx implied by equation (14) would comprise all of Panama's exports to and imports from Central America. Since this is a linear model the total effect can be found aggregating the results derived from the application of equation (14) to all changes in the marginal propensities to export and import. However, for the sake of clarity, in what follows only the impact of Panama's increased exports to Costa Rica is analyzed. Thus, if Panama's exports to Costa Rica were doubled, increasing from US$29.1 to US$58.2 million, in this case $dx = 0.0046$. Then:

$$\frac{\partial A}{\partial x} dx = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} (0.046)$$

$$\frac{\partial B}{\partial x} dx = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 0 \end{bmatrix} (0.046)$$

Applying expression (14) one obtains:

$$\Delta Y = \begin{bmatrix} -1.98 \\ -1.32 \\ 0.02 \\ 0.28 \\ -46.33 \\ 50.85 \end{bmatrix}$$

This result indicates that if Panama's exports to Costa Rica were doubled, its GDP would increase by $50.85 million.

The impact of a reduction in Panama's extraregional imports can be calculated as well. If this reduction were of $27 million, the change in the income vector, using expression (15), is given by:

$$\Delta Y_1 = \begin{bmatrix} 0.92 \\ 0.33 \\ 0.06 \\ 0.02 \\ 0.55 \\ 47.30 \end{bmatrix}$$

Assuming that Panama's imports from Costa Rica increased by the same amount, the change in income would be given by:

$$\Delta Y_2 = \begin{bmatrix} 1.83 \\ 1.22 \\ -0.02 \\ 0.26 \\ 42.80 \\ -46.98 \end{bmatrix}$$

Thus, the net effect would be:

$$\Delta Y_1 + \Delta Y_2 = \begin{bmatrix} 2.75 \\ 1.55 \\ 0.04 \\ 0.28 \\ 43.35 \\ 0.32 \end{bmatrix}$$

It can be seen that if Central American imports took the place of Panama's extraregional imports, this would have a positive impact on Panama and positive spillover effects to the other Central American countries as well.

IV. Conclusions

The model presented in this paper has shown that there exists potential benefits to Panama if it joined the CACM. These would be originated primarily in GDP growth that would accrue to Panama and, through economic growth spillovers, to the Central American countries. Benefits to Panama would not reside exclusively in higher economic growth. First, economic integration with Central America would be, in effect, a "swap" of markets underlined by the reciprocity in the lowering of tariffs. This would not occur if Panama opted for unilateral trade reform. Moreover, exporting to Central America would constitute a training exercise that, in a learning by doing fashion, would permit the acquisition of exporting skills.[4] In fact, the similarity between Panama's and Central American countries' levels of development and sizes of GDP would lead to expect high levels of intraindustrial trade, the type of trade that prevails in integration schemes.[5] Moreover, the integration framework offers Panama the opportunity to conduct its structural reform programs in a multilateral, Central American-wide context, which would redound in more credibility.

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4. Evidence of this effect for the case of Costa Rica is presented by Webb and Feckler [1993].

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