THE IMPACT OF INTEGRATION ON THE
INDUSTRIALIZATION OF CENTRAL AMERICA

by

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A thesis submitted to Carleton
University in partial fulfilment
of the requirements for the
degree of Doctor of Philosophy
in Economics

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Ottawa, Ontario, Canada
March 1977

Chapter 4

TRADE CREATION AND TRADE DIVERSION: AN AGGREGATE ANALYSIS

The CACM was formed more than fifteen years ago and
has experienced a lengthy period of free trade in most
industrial products. Surprisingly, however, no consensus has
yet emerged with respect to the effect of Central American
integration on trade flows. The purpose of the present
chapter is first to provide a critical survey of previous
studies of trade creation and trade diversion in Central
America and secondly to present the results of a new study.
Attention is focused on aggregate imports, for disaggregation
of the trade data is left for another chapter.

A. Analytical Framework

In the standard customs union theory presented in the
previous chapter, it was assumed that either a prohibitive or
a common external tariff exists prior to economic integration.
If all imports are valued at constant world prices, this
simplifying assumption implies that the sum of trade created
(shifted from high-cost domestic production to lower cost
production in a partner country) plus trade diverted (shifted
from low-cost production outside the region to higher cost
production in a partner country) is equal to the expansion of

intra-union imports induced by economic integration.
Attention is thus focused entirely on the effects of freeing
intra-regional trade.

In empirical studies it is neither possible nor
desirable to ignore the effects of the establishment of a
common external tariff. The expansion of intra-regional
imports induced by the common external tariff and economic
integration may be less than, rather than equal to, the sum
of trade created plus trade diverted. Changes in tariff
rates and duty exemptions for imports from non-member
countries give rise to trade suppression (high-cost domestic
production replacing low-cost non-member production) and
external trade creation (low-cost non-member production
replacing high-cost domestic production). But trade
suppression is a form of trade diversion, for it represents
a shift from low to higher cost sources of supply.[1] Similarly,
external trade creation is a form of trade creation to the
extent that production is shifted to a lower cost source of
supply.

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1. This point is made by M. B. Krauss in "Recent
Developments in Customs Union Theory: An Interpretive Survey,"
Journal of Economic Literature 10 (June 1972), p. 421.
Decreasing costs can also result in trade suppression, as is
demonstrated by W. M. Corden, "Economies of Scale and Customs
Union Theory," Journal of Political Economy 80 (May 1972),
pp. 465-75.

Allowing for the effects of a common external tariff, gross trade creation (trade creation broadly defined) is thus equal to the sum of integration-induced imports from partners that replace domestic production plus the external trade creation that results in the replacement of domestic production by imports from non-member countries. Similarly, gross trade diversion is the sum of intra-regional imports that replace extra-regional imports plus the domestic production that replaces imports. The net effect on resource allocation depends on whether trade-creating or trade-diverting effects dominate.

B. Survey of Previous Studies

The measurement of trade creation and trade diversion is difficult not because the conceptual framework is complicated, but rather because supply conditions, income and a host of other factors are changing over time. Any empirical measure requires heroic assumptions, and available studies of the CACM are grouped below according to the basic assumptions that are made.

1. Political Behaviour of Participants

One approach is to ignore trade flows and concentrate instead on observed political behaviour as an indication of net gains from trade creation or net losses from trade diversion. If we assume that governments, like normative economists,

are concerned primarily with economic efficiency and consumer welfare, then reluctance to participate in a customs union would indicate expected trade diversion while eager participation would be evidence of trade creation.[2] In Central America, Honduras' discontent is for this reason often cited as evidence of a substantial net loss resulting from trade diversion. The authors of one study conclude, for example, that "some internal-trade creation resulted for all countries, with the possible exception of Honduras, where trade diversion led to the consideration of compensation agreements and special concessions."[3]

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2. "While it is possible that the welfare gains due to trade creation are larger than the welfare losses due to trade diversion, it is also possible that the reverse holds true. Thus the formation of a customs union will not always lead unambiguously to an improvement in economic welfare. This fact is clearly attested by the observable behaviour of countries. Some countries try to form customs unions because the expected gains are larger than the expected losses, while others refrain from doing so for the opposite reasons." H. R. Heller, International Trade: Theory and Empirical Evidence (Prentice Hall, Englewood Cliffs, N. J., 1968), p. 163. Emphasis added.

3. K. Holbik and P. L. Swan, Trade and Industrialization in the Central American Common Market: The First Decade (University of Texas, Austin, 1972), p. 36. Similar conclusions are reached in Vincent Cable, "The Football War and the Central American Common Market," International Affairs (London), October 1969, pp. 669-70; D. E. Ramsett, Regional Industrial Development in Central America (Praeger Publishers, New York, 1969), pp. 65-69; and Stuart I. Fagan, Central American Economic Integration: The Politics of Unequal Benefits (University of California, Berkeley, 1970), pp.16-22.

This approach is appealing in its simplicity, but its fundamental assumption is nonetheless suspect. In the previous chapter it was shown that efficiency gains obtained through trade creation can, in the absence of economies of scale, be achieved through a unilateral reduction in tariffs with no need to concede preferential treatment to imports from partner countries. Moreover, if government policy exhibits a preference for protected manufacturing activity, then both trade creation and trade diversion can conceivably result in a welfare loss. A country may even prefer the expansion of intra-union imports to take the form of trade diversion, for trade creation means that domestic producers must compete with lower cost imports, while trade diversion means that it is foreign rather than domestic production that is displaced.[4]

2. Import Shares

An alternative and equally simple approach is to assume that the share of intra-regional in total imports would have remained constant over time in the absence of economic integration. As shown in table 17, partner countries did supply an increasing proportion of total imports in each of the five countries during the CACM years.

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4. On this point, see A. O. Hirschman, A Bias for Hope (Yale University Press, New Haven, 1971), pp. 9-10.

Table 17. Intra-Regional Imports as a Percentage of Total
          Imports, 1953-70

	1953	1958	1962	1964	1966	1968	1970
Central America	3.5	4.1	9.2	13.8	18.7	24.1	24.2
Guatemala	1.2	1.5	8.5	13.0	16.3	17.3	22.9
El Salvador	9.2	9.7	17.7	20.5	23.7	30.5	28.4
Honduras	4.1	6.1	11.2	17.7	22.8	26.3	24.9
Nicaragua	2.7	3.5	5.4	10.4	17.4	25.0	25.2
Costa Rica	0.6	1.0	2.9	6.0	13.0	22.8	21.7

A serious difficulty with the approach is that it is not at
all clear what is being measured. Schiavo-Campo[5] cites the
rise in the intra-regional import share as prima facie
evidence of trade creation in Central America, while Brewster[6]
employs the same statistic as measure of trade diversion.
Since both trade creation and trade diversion will in fact
cause an increase in the ratio of intra-regional to total
imports, the statistic provides no information with respect
to efficiency gains. It is at best a crude indicator of the
total effects of integration on trade flows.

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5. Salvatore Schiavo-Campo, "Import Structure and
Import Substitution in the Central American Common Market,"
SIECA/ROCAP, Guatemala, June 1971, p. 59.

6. Havelock Brewster, "The Choice between Efficiency
and Industrial Balance: Protection and Employment in the
Central American Common Market," SIECA/UNIDO, Guatemala, April
1972, section 1.

3. Share of Imports in Total Apparent Consumption

A third approach to the measurement of trade creation and trade diversion has been applied by a World Bank mission to CACM data.[7] Following Truman,[8] the basic assumption of the study is that the share of both extra-regional and intra-regional imports in total apparent consumption would have remained unchanged in the absence of economic integration. The calculations were performed for individual Central American countries as well as for the CACM as a whole using aggregate manufacturing data and taking 1958 as a base year with which to compare the "integration" years 1964 and 1968.[9] Agricultural commodities, which are excluded from the analysis, accounted for 44 per cent of intra-regional trade in 1958, but only 18 per cent in 1964 and 14 per cent in 1968.

Under this method, changes in the share of total imports in apparent consumption are assumed to be the net result of trade creation, which causes the total import share to rise, and trade suppression, which causes the total import share to fall (domestic production share to rise). Trade

7. International Bank for Reconstruction and Development, Report of the Industrial Finance Mission to Central America: The Common Market and Its Future (Washington, D.C., 1971), pp. 21-22.

8. E. M. Truman, "The European Economic Community: Trade Creation and Trade Diversion," Yale Economic Essays, Spring 1969. Truman found evidence of both trade creation and external trade creation, but no trade diversion of manufactures in the EEC.

9. The mission also performed calculations using

diversion in the narrow sense would have no effect on total imports, for the decrease in the extra-regional import share is offset by an increase in the intra-regional import share. External trade creation (the opposite of trade diversion) would be reflected in a rise in the share of imports from extra-regional sources.

Table 18 shows the mission's calculations, along with the results of a test for significance that was applied by the present writer. Intra-area trade is higher than predicted in the absence of integration, for the intra-regional import share in total consumption rises significantly in each of the five countries. There is, however, no evidence of trade creation, for the total import share is stagnant or declining over time. The share of national production in total consumption seems in fact to have risen in Honduras, but this change is not quite significant at the 90 per cent level of confidence. The significant decline in the extra-regional import share is interpreted as import substitution on a regional level, i.e. the diversion of trade in each member country from non CACM sources to partner and domestic producers.

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data disaggregated by broad industry groups, and the results were in all cases similar to the pattern found for aggregate manufactures.

Table 18. Share of Imports in Total Apparent Consumption of Manufactured Goods in Central America, 1958, 1964 and 1968 (in per cent)

| | Source of Supply | | |
	Total Imports	Intra-Regional Imports	Extra-Regional Imports
Central America			
1958	39	1	38
1964	39	5**	34*
1968	38	9**	29**
Guatemala			
1958	30	0	30
1964	32	4**	28
1968	31	5**	26+
El Salvador			
1958	39	2	37
1964	42	7**	35
1968	39	11**	28*
Honduras			
1958	60	4	56
1964	51	9+	42*
1968	53	14**	39**
Nicaragua			
1958	45	1	44
1964	47	5*	42
1968	43	11**	32**
Costa Rica			
1958	38	0	38
1964	38	2+	36
1968	37	8**	29*

(+) indicates that the share is significantly different from that of 1958 at the 90 per cent level of confidence,
(*) at the 95 per cent level, and
(**) at the 99 per cent level.

Source: International Bank for Reconstruction and Development, Report of the Industrial Finance Mission to Central America: The Common Market and Its Future (Washington, D.C., 1971), table 12. The chi-square test for significance in the change in shares was applied to data in ibid., annex tables 41-55.

These results suggest that the CACM represents a
movement toward greater protection rather than a movement
toward freer trade. Such a conclusion is strengthened when
one recognizes that use of 1958 as a base year tends to under-
state trade diversion, for 1958 was a recession year which
depressed imports more than production. But the validity of
this conclusion rests upon the assumption that the share of
extra-regional imports in total consumption would have shown
no tendency to change over time in the absence of economic
integration. If import substitution would have taken place
in any case, with or without the CACM, then economic integra-
tion may well have created rather than diverted trade. The
World Bank mission seems to have had this alternative
assumption in mind in concluding

> Central American import substitution was quite
> distinctive compared to patterns observed in
> other less developed countries. The share of
> imports from outside Central America in the
> overall supply of manufactured goods declined
> from 38 per cent to 29 per cent during the
> decade, but there was no corresponding increase
> in the share of national production. This would
> have been the outcome had import substitution
> occurred behind national tariff walls. Such a
> development would have implied much more in-
> efficiency and waste than actually occurred.[10]

The key phrase in the above passage is "had import substitu-
tion occurred behind national tariff walls." To indicate the
effects of the CACM on trade flows, it is essential to take
account of changes in import shares that would have occurred

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10. IBRD, Report of the Industrial Finance Mission,
p. 22.

independently of the establishment of the CACM.

4. Constant Import Elasticities

Various methods have been proposed to take into
account the existence of trends in import-consumption
relationships,[11] but the most widely accepted is one that was
first used by Balassa in his study of the European Economic
Community.[12] Balassa's basic assumption is that the income
elasticities of import demand would have remained constant
through time in the absence of economic integration. In
other words, past import-consumption trends are projected
into the future and any change in the relationship between
imports and gross domestic product or expenditure is assumed
to be due to the formation of the common market.

With this method, a rise in the income elasticity of
demand for total (intra-regional plus extra-regional) imports
is evidence of gross trade creation,[13] i.e. the replacement
of domestic production by imports from partner or non-member
countries. If a rise in the total import elasticity is

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11. For a survey, see J. Williamson and A. Bottrill,
"The Impact of Customs Unions on Trade in Manufactures,"
Oxford Economic Papers 23 (November 1971), pp. 330-42 and
Bela Balassa, "Trade Creation and Trade Diversion in the
European Common Market: An Appraisal of the Evidence,"
Manchester School, (June 1974), pp. 109-14.

12. Bela Balassa, "Trade Creation and Trade Diversion
in the European Common Market," Economic Journal 77 (March
1967), pp. 1-21.

13. Balassa (ibid., p. 5, n. 3) has unfortunately used

accompanied by a rise in the income elasticity of demand for intra-regional imports, there is evidence of orthodox trade creation, i.e. the replacement of domestic production by imports from partner countries. External trade creation will be reflected in a rise in the income elasticity of demand for extra-regional imports. Similarly, a fall in the income elasticity of demand for extra-regional imports is evidence of gross trade diversion. If the fall in the extra-regional elasticity is accompanied by a rise in the intra-regional elasticity, there is evidence of trade diversion narrowly defined, i.e. the replacement of imports from non-members by imports from partner countries.[14]

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the term "gross trade creation" with reference to increases in intra-regional trade. Others, perhaps influenced by Balassa's choice of terms, have interpreted any rise in the income elasticity of demand for total imports as evidence of net trade creation. See, for example, W. T. Wilford, "Trade Creation in the Central American Common Market," Western Economic Journal 8 (March 1970), p. 63 and C. E. Staley, International Economics: Analysis and Issues (Prentice-Hall, Englewood Cliffs, N. J., 1970), p. 147. One must ask, net of what? The measure is certainly not net of trade diversion.

14. While it is possible for trade creation or diversion to be reflected unambiguously in an upward or downward shift of the import function with no change in elasticity, in empirical studies (including the present one) this has not been found to be significant. Occasionally, however, a downward (upward) shift of the function is combined with a rise (fall) in elasticity. In such cases, inferences of trade creation or trade diversion may be ambiguous in the short run, but elasticity dominates in the long run. For the aggregate import functions reported in this chapter, there is no such ambiguity in inferences of trade creation or trade diversion. In chapter 5, ambiguity exists with respect to intermediate goods in Guatemala and Central America: significant changes in elasticity suggest external trade creation while a comparison of actual with projected imports (pre-integration equation) is indicative of trade creation proper in many of the post-integration years.

Methods similar to that of Balassa have been applied by two different investigators to Central American data. Wilford[15] calculated the income elasticities of demand for total, extra-regional and intra-regional imports in each year from 1953 through 1967. In comparing the arithmetic average of these elasticities in the period 1953-61 with that in the period 1961-67, he found evidence of trade creation and no evidence of trade diversion of aggregate imports in the CACM. Nugent[16] suggests that inclusion of the years 1957-61 in the pre-integration period biases Wilford's results in favour of trade creation. The income elasticity of demand for imports is very low for these years, and this may be the result of a slow rate of growth in GDP. Nugent hypothesizes that domestic producers can easily satisfy demand in a period of recession, while supply rigidities cause a spill-over into imports during years in which aggregate demand is rising rapidly. For this reason, he chose to calculate average income elasticities for total imports in 1951-56 and 1962-68, two periods that are comparable with respect to average annual rates of growth in GDP. Nugent's results, however, do not differ qualitatively from thos of Wilford.

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15. W. T. Wilford, "Trade Creation in the Central American Common Market," op. cit.

16. Jeffrey B. Nugent, "A Study of the Effects of the Central American Common Market and of the Potential Benefits of Further Integration," SIECA/ROCAP, Guatemala, 1971, section IIB and Economic Integration in Central America (Johns Hopkins University Press, Baltimore, 1974), pp. 44-50.

C. A New Constant Elasticity Analysis

1. The Method and Its Limitations

The approach used in this study follows Balassa, Wilford and Nugent in assuming constant income elasticities of import demand in the absence of economic integration; it differs in employing regression analysis in order to test for the significance of observed changes in elasticities. The technique of ordinary least squares has been used to fit log-linear equations of the form $\log M = \log a + b \log Y + \log u$, which is equivalent to $M = aY^b u$ where M is value of imports, a is a constant term, Y is gross domestic (regional) product and u is a random disturbance term. The coefficient "b" is thus the income elasticity of import demand, which is constant for all Y.[17]

For the purposes of the present study, the pre-integration period of each Central American country begins in the year 1953 and ends the year prior to entry into the CACM, i.e. 1960 for Guatemala, El Salvador and Nicaragua, 1961 for Honduras and 1962 for Costa Rica. The post-integration period begins in 1961, 1962 and 1963 for these respective countries, and ends in 1968. Data for years after 1968 are excluded because of the disruption of intra-regional trade following the "migration war" between El Salvador and Honduras

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17. It would be preferable to include a relative price term in the equation and to deflate both Y and M, but reliable price data are not available for Central America.

in July 1969. Years prior to 1953 are excluded because
detailed trade data do not exist. For Central America as a
whole, the pre- and post-integration periods are defined as
1953-60 and 1961-68 respectively.

The inclusion of a number of recession years in the
pre-integration period means, as Nugent has noted, that our
results may be biased generally in favour of trade creation
and particularly in favour of external trade creation.
Perhaps more importantly, the trade liberalization of the
pre-integration period means that we are implicitly assuming
that the ratio of intra-regional to total imports would have
continued to rise had the CACM not come into existence. The
early process of trade liberalization might appear to offset
the trade creation bias of including recession years in the
pre-integration equations; but this depends upon whether the
pre-integration treaties were trade-creating or trade-diver-
ting. If these treaties were largely trade-diverting, then
the income elasticities of demand for extra-regional imports
will be lower than "normal" in the pre-integration years with
the result that our estimate of trade diversion will be biased
downward. If, on the other hand, the bilateral treaties were
largely trade-creating, we will overstate the amount of trade
diversion in Central America. Given the dominance of producer
interests and the expressed preference for protected manufac-
turing activity in the region, we are probably overstating
trade creation and understating trade diversion on this account.

2. Results of the Analysis

The regression equations for Central America and for each member country of the CACM are reported in appendix A. The estimated elasticities are generally several times their standard error, and the Durbin-Watson statistics are -- with a few exceptions -- surprisingly good despite the limited number of degrees of freedom.[18] These elasticities and standard errors are listed in table 19 along with a test for significance of the difference between pre-integration and post-integration elasticities.[19] The F-ratio relevant to this test is listed to the right of each pair of elasticities; its critical value is 3.18 at the 90 per cent level of confidence, 4.75 at the 95 per cent level and 9.33 at the 99 per cent level. The test is two-tailed in that direction of change in the elasticity is not hypothesized.

The salient features of table 19 can be described as follows. For Central America as a whole, the expansion of intra-regional trade does not appear to have been at the expense of extra-regional imports. Our results, like those of Wilford, do not provide any indication of trade diversion at the aggregate level in the CACM. For individual countries, the results are mixed. Only in El Salvador is there a signi-

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18. Inclusion of a relative price variable did not improve the low Durbin-Watson statistic for Guatemala's total imports in the 1953-60 period.

19. See G. C. Chow, "Tests of Equality between Subsets of Coefficients in Two Linear Regressions," _Econometrica_ 28 (1960), pp. 591-605.

Table 19. Tests for Constancy of Income Elasticities of Import Demand

	Total Imports			Intra-Regional Imports			Extra-Regional Imports		
	Elasticity		F Ratio	Elasticity		F Ratio	Elasticity		F Ratio
	Pre	Post		Pre	Post		Pre	Post	
Central America	1.38 (.19)	1.69 (.11)	2.06	2.99 (.71)	4.14 (.15)	3.34+	1.30 (.23)	1.28 (.14)	.00
Guatemala	1.94 (.32)	1.81 (.26)	.11	4.66 (1.15)	4.43 (.45)	.04	1.87 (.35)	1.46 (.25)	.90
El Salvador	2.09 (.20)	1.63 (.18)	1.86	1.98 (.40)	3.06 (.17)	16.93**	2.06 (.23)	1.26 (.23)	3.70+
Honduras	.68 (.19)	1.96 (.13)	29.70**	3.22 (.89)	3.90 (.34)	.50	.53 (.23)	1.52 (.12)	14.91**
Nicaragua	1.19 (.35)	1.45 (.11)	.55	3.24 (.96)	4.22 (.19)	1.46	1.12 (.38)	1.09 (.14)	.00
Costa Rica	.80 (.58)	1.35 (.22)	9.84**	4.76 (.79)	6.32 (.78)	1.38	.73 (.07)	.75 (.26)	.01

The figures in parentheses are the standard errors of the estimated elasticities.

Pre = Pre-integration period.   Post = Post-integration period.

(+) indicates that the F-ratio is significantly different from zero at the 90 per cent level of confidence, while

(**) indicates that it is significant at the 99 per cent level.

Source: Appendix A.

ficant increase in the income elasticity of demand for intra-
regional imports. The increase in this elasticity is not sig-
nificant for the other four countries, presumably because of
trade liberalization in the pre-integration period. Moreover,
economic integration has been trade-diverting in El Salvador
with no compensating trade creation. In Honduras, there is
substantial evidence of external trade creation and in Costa
Rica there is evidence of trade creation in the absence of
trade diversion. The relevant F-ratios are small for
Guatemala and Nicaragua, indicating that the post-integration
elasticities are not significantly different from those in the
pre-integration period.

D. Conclusion

The results of two plausible aggregate analyses are
summarized in table 20. The constant share in total consump-
tion approach produces evidence of trade diversion in each
member country of the CACM, with no offsetting trade
creation. The constant elasticity analysis of the previous
section suggests, however, that there is no statistically
significant evidence of trade creation or trade diversion for
Central America as a whole. For member countries of the
CACM, with the constant elasticity assumption there is
significant evidence of trade diversion in El Salvador,
external trade creation in Honduras, and trade creation in
Costa Rica.

Table 20.   Trade Creation and Trade Diversion in Central America:
Inferences from Aggregate Data

	Constant Share in Total Consumption Hypothesis[a]	Constant Import Elasticity Hypothesis[b]
Central America	Trade Diversion	-
Guatemala	Trade Diversion	-
El Salvador	Trade Diversion	Trade Diversion
Honduras	Trade Diversion	External Trade Creation
Nicaragua	Trade Diversion	-
Costa Rica	Trade Diversion	Trade Creation

(a)   Calculations based on trade in manufactures, using 1958 as the base year and 1968 as the final year. Relevant changes in the import/consumption ratios were significant at the 90 per cent or higher level of confidence.

(b)   Calculations based on aggregate trade data for 1953-68. No inference has been drawn unless the change in the relevant income elasticity of import demand was significant at the 90 per cent or higher level of confidence.

Source: Tables 18 and 19.

It should be emphasized that the first approach is biased in favour of trade diversion and against trade creation if the import/consumption ratios would have declined rather than remain constant in the absence of economic integration.[20] Conversely, the second approach leads us to overstate trade creation and understate trade diversion because of both the relatively slow rate of growth of GNP and the intra-regional trade liberalization of the pre-integration period. Given that the two methods are biased in opposite directions, the only strong inference possibe is that there has been trade diversion in El Salvador. El Salvador has been the main proponent of Central American integration, so this conclusion lends support to Hirschman's suggestion that trade creation and trade diversion are useful concepts "in the appraisal of the political appeal and feasibility of customs unions, ... but the signs which they must be given there are opposite to the ones they carry in the economist's analysis of the welfare effects of customs unions."[21]

Even though the constant elasticity assumption biases our results against trade diversion, it is surprising that there is not more evidence of trade diversion given that industrialization in a protected market is the raison d'etre

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20. A declining import/consumption ratio for manufactures is consistent with income elasticities of demand for imports above unity provided that the share of manufactures in aggregate expenditure is rising over time.

21 . Hirschman, A Bias for Hope, p. 10.

of the CACM. In the chapter that follows, it is shown that
the constant elasticity approach does provide stronger evidence
of trade diversion when the import data are appropriately
disaggregated.