C.E.P. Working Paper No. 396

-- D R A F T --
NOT FOR CITATION

EXPORT PROMOTION IN EL SALVADOR: IS 'GETTING PRICES RIGHT' ENOUGH?

John T. Schmitt*

October 1993

*Instituto de Investigaciones Económicas y Sociales,
Universidad Centroamericana, San Salvador and
Centre for Economic Performance,
London School of Economics

I. Introduction

Between the end of World War II and the late 1970s, El Salvador enjoyed remarkable macroeconomic stability. Single digit inflation rates accompanied steady economic growth. Trade surpluses were the norm, allowing the nominal value of the colon to remain unchanged for nearly fifty years. El Salvador's performance owed much to the success of the agricultural exports, particularly coffee, which formed the backbone of the nation's economy. By the end of the 1970s, however, the international climate which favored El Salvador's exports, as well as internal difficulties fueled by the nation's highly unequal distribution of wealth and income, brought about a rapid deterioration in the country's macroeconomic circumstances.[i] A sharp decline in El Salvador's terms-of-trade and the outbreak of civil war reduced national output, boosted inflation, produced large trade deficits, and put irresistible pressure on the colon. More than in most of the rest of Latin America, the 1980s were truly a 'lost decade' in El Salvador.

With world coffee prices on the decline through most of the 1980s, the government of El Salvador, with assistance from the United States Agency for International Development (USAID) and other international aid and lending agencies, undertook a series of economic reforms designed in part to encourage "non-traditional" exports.[ii] The architects of the new approach hoped that non-traditional exports would reduce El Salvador's dependence on coffee and form the basis of a new export-oriented growth strategy.

Most of the measures taken to promote non-traditional exports since the mid-1980s have emphasized "getting prices right". Successive governments have worked to unify and then free the exchange rate, reduce import tariffs and export taxes, reform the tax system, and relax controls on capital and foreign investment.[iii] The ability of such policies to resolve El Salvador's trade difficulties depends on two premises: (1) that Salvadoran export volumes will respond well to price incentives and (2) that new exports will not suffer the same tendency toward price declines as coffee.

This paper uses published data on Salvadoran export industries for the years 1975-92 to test the validity of these two assumptions. The paper reaches several conclusions. First, neither traditional nor non-traditional exports are especially responsive to changes in the real colon price received by Salvadoran exporters. The data indicate that the long-run volume-to-price elasticities for traditional exports are about 0.6 to 1.5, with the best estimate close to 0.6. Long-run elasticities for non-traditional exports appear to be slightly higher, with the best estimate approximately 1.0. Second, the historical price performance of non-traditional exports is not markedly better than that of traditional exports. The average annual US dollar price increase for non-traditional exports over the period 1975-92 was 2.6 percent, versus -1.0 percent for traditional exports.

However, most of this result depends on the last three years of the sample: the price index for traditional exports outperformed non-traditionals for the entire period 1976-89. Moreover, the volatility of non-traditional prices is very close to that of traditional exports (the coefficient of variation is 23.9 for non-traditionals and 26.5 for traditionals). Third, the historical mix of non-traditional export industries does not make for a natural coffee price hedge. The correlation between non-traditional export prices and coffee prices is erratic and not statistically different from zero over the sample period.

II. The Data

The principal source of data are various issues of the Banco Central de Reserva's Revista Trimestral, which regularly publishes the volume and value of Salvadoran exports by industry. For 1975-85, the BCR groups exports into 25 industry categories (see Table A1) following the NAUCA I conventions; for 1986-92, the BCR lists 41 export industries (see Table A2) using NAUCA II conventions. This information allows the creation of two separate panel data-sets with Salvadoran export industries as the unit of observation. The first panel, covering the years 1975-85, contains a total of 220 observations (11 years of observations on 20 export industries); the second, for the years 1986-92, has 266 observations (7 years times 38 industries). The panel for 1975-85 excludes 5 industries (refined sugar, cotton seed, cotton oil, margarine and vegetable oil) due to a lack of price information for these industries in some or all years of the sample. Together the excluded industries accounted for 0.2 percent of total exports over the period. For the same reason, the panel for 1986-92 excludes 3 industries (beef, fuel oil and synthetic textiles), which produced 0.7 percent of total exports. The two panels contain data on export volumes (in kilograms), export values (in current dollars and current colons), export prices (in current dollars and in real, GDP-deflated colons), and basic characteristics about the export industry (broad NAUCA

classification, whether traditional or non-traditional, agricultural or manufacturing).

The Revista Trimestral reports export values in colons at the official exchange rate. The paper converts these figures to produce the export value in dollars and to calculate real colon price received by exporters. The paper converts the BCR colon figures to dollars at the official exchange rate. Since the BCR generally calculated export values by first summing sales in US dollars and then converting this value to colons at the official rate, this procedure should give an accurate accounting of Salvadoran exports in dollar terms.

Calculating the real colon price received by exporters is more complicated. The multiple-exchange rate regime in operation from 1982 until 1989 makes it difficult to determine the colon exchange rate which applied to each foreign transaction. In broad terms, non-traditional exporters received a preferential exchange rate.[iv] Table A4 displays the nominal exchange rate used in this paper to convert the dollar value of each industry's exports into the number of colons received by exporters.[v] These colon values were then divided by the corresponding export volume in kilograms to produce a nominal colon price for each industry in each year. Finally, the nominal prices were converted to real colon prices using the GDP deflator.[vi]

For the sake of comparison, the paper also reports the price performance of Salvadoran imports and the US GDP deflator. Import values and prices (in dollars) were calculated using a procedure similar to the one for exports.[vii] The import categories (analogs of the export industries above) used appear in Table A3. Figures for the US GDP deflator were taken from various issues of the International Monetary Fund, International Financial Statistics.

III. A Quick Look at El Salvador's Exports 1975-92

The two data sets provide a comprehensive overview of the Salvadoran export experience during the period 1975-92. Figure 1 graphs the US dollar value of total exports and imports for each of the sample years. Through the late 1970s the trade account was very nearly in balance and frequently in surplus. After 1980, exports fell and imports grew rapidly. The decline in the value of coffee exports -- due primarily to declines in the world price -- played an important role in the resulting trade deficits. Figure 2 graphs the actual trade deficit against a hypothetical deficit where coffee exports were at their average level during the 1970s and increased in value thereafter at the same rate as the US GDP deflator. While the deficits persist, they are much smaller and do not grow substantially until the end of the decade when restored economic growth boosted demand for imports.

Traditional and non-traditional exports behaved differently over the period. As Figures 3 and 4 make clear, the value of both kinds of exports grew rapidly during the last half of the 1970s and then fell dramatically through 1986. Thereafter, traditional exports continued their decline, while the value of non-traditional exports more than doubled. The strong performance of non-traditionals owed much to a surge in manufacturing exports (see Figure 6), which responded to a rejuvenation of trade within the five members of the Central America Common Market.

Nevertheless, the average annual value of non-traditional agricultural exports, as Table 1 illustrates, was lower during the period 1986-92 ($23.4 million) than it had been during the 1970s boom ($35.4 million) and the early-80s bust ($30.7 million).

IV. Supply Responsiveness

The success of current Salvadoran export policy will depend in large measure on the responsiveness of exports, particularly non-traditional exports, to price incentives. This section of the paper uses the panel data sets described above to estimate the price elasticity of Salvadoran export volumes.

The analysis which follows makes two key assumptions about the nature of Salvadoran exports and exporters. First, El Salvador, which has a small share of world trade even in coffee, is assumed to be a price-taker in world markets. Second, Salvadoran exporters are assumed to be interested only in the real colon price of their exports. Exporters adjust quantities in response to the real price in national currency, not US dollars. This amounts to assuming that Salvadoran exporters do not face entirely "dollarized" input markets.

Given these assumptions, estimation of a "classic" competitive supply curve for exports is fairly straightforward. The equations reported below regress export volumes in kilograms against export prices in real colons (plus some controls). The assumption that El Salvador is a price-taker ensures that the regression is "identified", that is, that the coefficient of the price term in the supply equations reflects the slope of the supply curve and not the slope of the demand curve or shifts in both curves. To illustrate this, imagine that El Salvador has an

upward-sloping export supply curve and faces a flat world demand curve which shifts up-and-down over time. Connecting the points reached at the end of each discrete shift in world demand would trace out the national export supply curve (not the world demand curve). The basic validity of this approach holds true even if the national short-run supply curve shifts. In this case, the price-output combinations traced by changes in world demand would reveal the long-run supply curve.

The use of industry-level panel data to estimate the national export supply curve offers a significant advantage over a simple time-series approach: the industry-level data capture variations in prices across industries and therefore greatly increase the statistical degrees of freedom. The industry data-set for 1975-85 contains 220 observations; the data-set for 1986-92, has 266 observations. An aggregate time-series regression for the same two periods would include only 18 observations.

At the same time, panel data estimation can create problems not present with time-series. The most important difficulty in the present context concerns dynamic specifications. The inclusion of a lagged dependent variable in a regression which uses a conventional within-group estimator induces biased coefficient estimates.[viii] To correct for these biases the regressions, when appropriate, use instrumental variables techniques.[ix]

In general the panel data indicate that the supply of Salvadoran exports is approximately unit elastic -- a one percent rise in the real colon price leads to about a one percent rise in export volumes. The long-run elasticity of non-traditional exports (between 1.0 and 1.5) appears to be slightly higher than the elasticity of traditional exports (between 0.6 and 1.4). The estimates are very similar for the time periods covered by the two data sets, though estimated elasticities were slightly smaller in 1986-92 than 1975-85.

Table 2 reports regression results for the sample of 20 export industries for the years 1975-85. The dependent variable in the first column is the volume of exports [v]. The explanatory variables are the lagged volume of exports [v(-1)], the world price [p], and the lagged world price [p(-1)]. All variables are in natural logarithms. The inclusion of lagged dependent and independent variables permits the modeling of fairly complicated dynamics in a parsimonious fashion. The price variables have been interacted with a dummy variable (nte) which takes the value 1 if the industry is non-traditional and 0 otherwise. This interaction allows the price elasticity to differ between traditional and non-traditional exports. The regression also includes time dummies to capture supply shifts common to all industries. The regression was estimated using ordinary least squares, under the assumptions that (i) unobservable industry fixed effects are not correlated

with the included regressors and (ii) the disturbance term is not serially correlated.[x] The "impact" elasticity of price changes is 0.877, with the long-run elasticity approximately 1.45 [(0.877-0.822)/(1-0.962)]. Non-traditional export industries do not appear to behave differently from the traditional ones: the non-traditional price terms are not statistically different from zero at conventional levels. Dropping these non-traditional price variables (see column two) raises the absolute values of the coefficients on current and lagged prices to above one. It also dramatically reduces the standard errors of these coefficients. The estimated long-run elasticity rises slightly to 1.53.

Unmodeled industry fixed-effects, however, may bias the coefficient estimates in columns one and two. The regression in column three, therefore, fits the data using a within-groups estimator (ordinary least squares with data in first-differences) in order to control for unobserved industry-effects.[xi] The current basic price coefficient, at 0.874, is statistically significant and very close to the OLS levels estimate. The lagged basic price term, at -0.125, however is much smaller than under OLS and not statistically significant. The non-traditional price terms now both enter strongly and positively. For non-traditionals the lagged price response (0.324) is greater than the current price (0.216). The lagged dependent variable in the within-groups

estimator, however, is negative and not significantly different from zero, raising concerns about the specification.

One difficulty, mentioned earlier, is that the within-group estimator is biased in models with fixed effects. Column four, therefore, reports results using instrumental variables estimation on the same specification. The level of the second lag of the dependent variable is used as an instrument for the lagged dependent variable in differences.[xii] Instrumental variables estimation does not improve the results. The lagged dependent variable is negative (though smaller in absolute value than under within-groups) and not significantly different from zero.

The final column of Table 5 drops the lagged dependent variable. The regression improves dramatically. As before, the current and lagged price terms are both statistically significant. In addition, the current and lagged non-traditional prices now enter the regression significantly. The "impact" elasticity for traditional exports is 0.897, falling to 0.642 after one year [0.897 - 0.255]. The elasticity for non-traditional exports is higher. The short-run elasticity is 1.10 [0.897 + 0.201], which remains nearly constant after one year (1.12).

Table 6 repeats the exercise for the 38 industries in the 1986-92 sample. The basic conclusions are identical to those for the 1975-85 sample. The best estimate for the price elasticities of traditional exports is probably about 0.6 and almost certainly

less than 1. The best estimate for non-traditionals is about 1.0 and certainly less than 1.5.

The regressions for 1986-92 do differ in several respects from the early period. First, the elasticity estimates appear to be slightly lower for 1986-92 than 1975-85. Second, the instrumented regression in column four is much worse in 1986-92 than 1975-85. The standard errors explode under IV in the later sample. Finally, the current non-traditional price term in the final specification is not statistically different from zero in 1986-92, though the point-estimates for the two samples are nearly identical (0.201 for 1975-85 versus 0.222 for 1986-92).

IV. Price Behavior

To a lesser, but still important, degree current Salvadoran export policy is also based on the assumption that non-traditional export prices will perform better than coffee. This section considers three aspects of export price performance: (i) price levels (in US dollars); (ii) price volatility; and (iii) correlations in price movements across classes of exports.

Figure 7 illustrates that world coffee prices rose to record highs in the mid-to-late 1970s and then fell almost continuously through the 1980s (except 1986 when prices temporarily returned to levels of the mid-1970s). Table 4 makes clear the impact that coffee price changes had on the average price of all Salvadoran exports over the sample period. During the period 1975-79 very large increases in Salvadoran coffee prices (50.7 percent per year on average) helped boost the average price of Salvadoran exports by 10.5 percent per year.[xiii] For 1980-85 coffee prices fell an average of 8.5 percent per year, dragging the price of total exports down by 4.7 percent per year. The 47.5 percent annual average decline in coffee prices in 1986-92 was the major cause of the 14.5 per cent annual drop in the price of overall exports during that period.

Figure 8 compares these export price movements with those of imports. Import prices rose with exports through the early 1980s and then held their own through 1992. Over the course of the full

sample, import prices grew at 1.4 percent per year versus 0.7 percent per year for exports. Figure 9 graphs the corresponding terms-of-trade, which show large improvements in the mid-1970s, followed by a precipitous decline through the mid-1980s, a recovery in 1986 and, finally, a strong, steady deterioration through 1992.

Have non-traditional exports fared better than coffee? Figure 10 graphs the price indices for El Salvador's traditional and non-traditional exports. Non-traditional prices demonstrated largely flat growth during 1975-85, followed by rapid increases through 1989, and then a period of moderate declines through the end of the sample. By 1992, the price index (1975=100) for non-traditional exports stood at 162.0, versus for 81.5 for traditional exports. By this criteria, non-traditionals outperformed traditional exports. However, the price index for traditional exports lay well-above non-traditionals for the entire period 1975-89. If price performance is measured as the area under the price- index line, and not simply by comparison of beginning- and end-of-period prices, then traditional exports did better than the non-traditionals.

A second criteria for measuring price performance is price variability. Other things constant, exports with low-price volatility are preferable to those with high-volatility. Measuring price volatility using the coefficient of variation (the

ratio of the standard deviation of prices to the average price, expressed as a percent), coffee prices are among the most volatile of all Salvadoran exports. The coefficient of variation in coffee prices for the period 1975-92 was 33.1 (see Table 5), compared to 24.0 for cotton, 24.2 for shrimp, 35.8 for sugar and 23.9 for non-traditional exports. In this respect, non-traditionals appear clearly to outperform coffee, though not necessarily other traditional exports. A closer look at non-traditionals reveals that manufactured exports (21.0) have only two-thirds the volatility of non-traditional agricultural exports (35.9), which are actually slightly more volatile than coffee.

A final measure of price performance concerns the correlation among components of the Salvadoran export portfolio. Exports with prices which tend, for technical reasons[xiv], to move in the opposite direction of coffee prices will help smooth swings in foreign exchange earnings. The data, however, show that no Salvadoran export category acts as a natural hedge for coffee. Over the full sample only one export category, sugar, shows a significant negative correlation with coffee (see Table 6).[xv] Breaking down the price data into the three time periods examined earlier, however, reveals that the significant negative correlation only holds for the period 1975-79. In 1980-85 and 1986-92, the correlation is negative, but smaller in absolute value, and not statistically significant. Non-traditional exports

show first a large positive, then almost zero, and finally a negative correlation with coffee prices over the same three time periods. None of these correlations is statistically different from zero. Breaking-down non-traditionals into manufacturing and agricultural components does not alter the basic conclusion that non-traditional do not function as coffee price hedges.

V. Some Conclusions

The data raise important questions about some of the assumptions underlying the export strategy being pursued in El Salvador and in many other developing countries. The reforms carried out through much of the 1980s, and especially after 1989, have undoubtedly played a crucial role in the expansion of non-traditional exports. The results reported here however suggest that these policies may have important limitations, that 'getting prices right' might not be enough.

Export promotion through gradual devaluations and market-led price incentives will certainly increase the volume of exports, but the elasticity estimates presented in this paper suggest that the pace will be slow. Reliance on non-traditional agricultural exports and low value-added manufacturing exports -- both with poor prospects for price growth -- may leave El Salvador facing balance-of-trade difficulties even if volumes of these products expand significantly.

What kind of policies, then, can complement the reforms undertaken so far? First, continued progress on Central American economic integration appears to be essential. The revival of trade within the Central American Common Market has been the most important factor behind the growth in El Salvador's non-traditional exports. Second, large-scale investment in physical infrastructure such as telecommunications, roads, railroads,

ports, and financial and commodities markets, as well as human infrastructure such as education and health can help to raise the productivity of Salvadoran workers. This would facilitate El Salvador's capacity to compete in world markets based on the quality of its exports and not simply the level of its wages. Third, given the successful experiences of nations such as Korea, Singapore and Japan, it seems that it is not unreasonable to believe that government and the private sector can, in broad terms, select, protect and actively promote a small number of medium- and high-technology exports for which El Salvador might gain some comparative advantage over time.

Notes

*This research was conducted while I was visiting the Instituto de Investigaciones Económicas y Sociales of the Universidad Centroamericana in San Salvador with financial assistance from a 10-month Fulbright Fixed Sum Grant. I am grateful to Lisandro Abrego, Nelly Carolina Alas Rodríguez, Carlos Briones, Sarah Gammage, John Van Reenen, Claudio Tona and Jonathan Wadsworth for many helpful comments and discussions. I would also like to thank representatives of USAID, FUSADES, CENITEC, the Banco Central de Reserva and the Ministerio de Agricultura y Ganadería who shared their data and perspectives with me.

Table A1: Export values and price changes by detailed category, El Salvador 1975-85

Export Category	Non-trad	Manuf	NAUCAI	Value (US$) Average Annual 1975-79	Value (US$) Average Annual 1980-85	Price Change (%) Average Annual 1975-79	Price Change (%) Average Annual 1980-85
1. Shrimp	0	0	1	11.2	17.9	15.2	-0.1
2. Fruit	1	0	1	1.0	1.4	99.5	45.9
3. Sugar	0	0	1	39.0	22.2	-23.5	-7.1
4. Refined sugar	1	0	1	0.0	0.0	--	--
5. Candy	1	0	1	2.4	1.6	6.9	0.6
6. Coffee	0	0	1	457.6	475.4	40.6	-1.8
7. Cotton seed	1	0	1	0.9	0.0	7.6	--
8. Margarine	1	0	1	1.1	0.2	0.2	--
9. Vegetable oils	1	0	1	0.0	0.1	-2.7	--
10. Other food	1	0	1	24.1	18.6	26.6	15.6
11. Sesame seed	1	0	2	2.0	3.6	12.6	4.4
12. Cotton	0	0	2	81.8	47.7	12.0	-4.1
13. Balsam	1	0	2	1.6	1.7	16.0	-10.4
14. Other raw materials	1	0	2	1.6	2.7	18.3	2.5
15. Cotton oil	1	0	3	0.0	0.5	--	--
16. Other oils	1	0	3	0.6	0.4	18.3	30.4
17. Cosmetics	1	1	4	10.2	10.1	12.2	-3.0
18. Insecticides	1	1	4	5.1	4.2	2.3	14.8
19. Other chemicals	1	1	4	24.2	22.0	-3.1	2.8
20. Cotton thread	1	1	5	8.3	10.5	10.4	-5.3
21. Cotton textiles	1	1	5	6.1	2.2	5.5	7.0
22. Clothing	1	1	5	19.0	15.5	10.5	7.9
23. Other manufacturing	1	1	5	114.8	104.2	-12.1	12.6
24. Petroleum	1	1	6	6.3	15.8	-0.9	-3.9
25. Other	1	--	6	17.0	13.3	15.0	0.6
26. Total				**835.9**	**791.8**	**14.0**	**-2.7**

Table A2:Export values and price changes by detailed category, 1986-92

Export Category	Nontrad	Manuf	NAUCAII	Value U.S.$ (mns)	Price Change (%)
1. Beef	1	0	1	1.5	16.8
2. Shrimp	0	0	1	17.0	10.5
3. Honey	1	0	1	1.7	8.6
4. Other animal prod	1	0	1	3.4	21.5
5. Fruit	1	0	2	1.9	2.9
6. Coffee	0	0	2	305.3	-15.3
7. Sesame seed	1	0	2	5.9	- 5.5
8. Balsam	1	0	2	1.5	7.8
9. Other vegetable prod	1	0	2	7.5	- 0.9
10. Sugar	0	0	3	24.0	7.6
11. Baked goods	1	1	3	1.4	9.9
12. Other food	1	1	3	18.4	- 0.6
13. Fuel oil	1	1	4	0.9	0.0
14. Lubricants	1	1	4	1.8	69.2
15. Asphalt	1	1	4	0.7	32.7
16. Other mineral	1	1	4	4.2	4.8
17. Medicine	1	1	5	20.2	17.1
18. Cosmetics	1	1	5	3.5	3.1
19. Soap	1	1	5	3.5	2.4
20. Detergent	1	1	5	4.5	5.2
21. Insecticide	1	1	5	4.9	6.7
22. Other chemical	1	1	5	7.9	10.7
23. Toilet paper	1	1	6	4.0	- 1.7
24. Cardboard cartons	1	1	6	14.4	7.4
25. Other paper	1	1	6	11.3	1.5
26. Cotton	0	0	7	4.9	24.4
27. Cotton thread	1	1	7	12.8	8.0
28. Cotton textiles	1	1	7	2.5	1.0
29. Synthentic textiles	1	1	7	1.8	17.3
30. Clothing	1	1	7	11.6	95.1
31. Towels, etc.	1	1	7	10.0	7.6
32. Other textiles	1	1	7	18.8	16.9
33. Leather shoes	1	1	8	10.0	12.3
34. Other shoes	1	1	8	2.6	1.3
35. Aluminum prod	1	1	9	11.2	6.4
36. Hand tools	1	1	9	3.3	6.1
37. Other metal prod	1	1	9	9.4	- 1.0
38. Refrigerators	1	1	10	4.0	6.1
39. Pumps	1	1	10	1.8	- 0.7
40. Other manufactures	1	1	10	5.5	7.5
41. Other	1	--	11	20.2	9.4
42. Total				**601.5**	**- 9.7**

Table A3:Import categories, El Salvador 1975-92

(a) NAUCA I, 1975-85

0Food products
1Beverages and tobacco
2Non-food raw materials (except fuel)
3Fuel, lubricants and related mineral products
4Animal and vegetable fats and oils
5Chemical products
6Manufactured products classified by material
7 Machinery and transportation products
8Other manufactured products
9Live animals, special transactions, gold and other

(b) NAUCA II, 1986-91

I.Live animals, animal and vegetable products
II.Animal and vegetable fats and oils
III.Food, beverages, and tobacco products
IV.Mineral Products
V.Chemical and related products
VI.Plastics, artificial resins, natural or synthetic rubber and related products
VII.Hides, leathers, furs and related products
VIII.Wood and related products
IX.Paper and related products
X.Textiles and related products
XI.Shoes and related products
XII.Ceramics, glass and related products
XIII.Metals and related manufactured products
XIV.Machines, mechanical and electrical products
XV.Transportation products
XVI.Medical instruments
XVII.Toys, games and sporting goods

Table A4: Nominal exchange rates by export category, El Salvador 1975-92
(Colones per U.S. dollar)

(a) 1975-85

	1975-81	1982	1983	1984	1985
Coffee	2.50	2.50	2.58	2.56	2.95
Cotton	2.50	2.50	2.50	3.52	4.53
Sugar	2.50	2.50	2.50	2.50	3.52
Shrimp	2.50	2.50	2.50	3.00	4.32
Beef	2.50	2.61	2.95	2.79	4.22
Non-Trad	2.50	2.61	2.95	2.79	4.22

(b) 1986-92

	1986	1987	1988	1989	1990	1991	1992
Coffee	5.00	5.00	5.00	5.00	7.60	8.02	8.37
Cotton	5.00	5.00	5.00	5.86	7.60	8.02	8.37
Sugar	5.00	5.00	5.00	5.86	7.60	8.02	8.37
Shrimp	5.00	5.00	5.00	5.86	7.60	8.02	8.37
Beef	5.00	5.25	5.42	5.86	7.60	8.02	8.37
Non-Trad	5.00	5.25	5.42	6.25	7.60	8.02	8.37

Notes:
(1) 1975-81: Official exchange rate.
(2)1982, non-traditionals: Beginning in August 1982, non-traditional exports outside of the Central American Common Market (CACM) were exempt from the requirement that export earnings be exchanged at the official rate. The estimated average rate here is calculated as:
(7/12)*2.50+(5/12)*[(0.200)*3.86+(0.800)*2.50]
where (7/12) is the weight for months of the year the official rate (2.50) applied to all non-traditional exports; (5/12)

is the weight for months when non-traditional exports outside of the CACM could exchange earnings at the parallel rate, which averaged 3.86 during the last five months of 1982; and 0.200 and 0.800 are the shares of total non-traditional exports outside and inside the CACM, respectively.

(3)1983-85, coffee, cotton, sugar, shrimp: Taken from Saca and Rivera (1990), Table 9, p. 221, citing the Banco Central de Reserva (BCR).

(4)1983-85, non-traditionals: Adapted from Saca and Rivera (1990), Table 9, p. 221, citing the BCR. Saca and Rivera give separate rates for non-traditional exports within and outside of the CACM. The rates here are weighted averages of the Saca and Rivera rates, using the share within and outside the CACM in the total value of non-traditional exports within and outside the CACM. The shares outside the CACM were, according to BCR data cited in Segovia and Pleitez (1990), Table III.1, p. 44: 0.224 in 1983, 0.288 in 1984, and 0.435 in 1985.

(5)1986: In January of 1986, the government returned to a single official exchange rate applicable to all exports.

(6)1987, non-traditionals: In June, 1987 the government authorized non-traditional exporting firms to open foreign currency bank accounts (in U.S. dollars, Guatemalan quetzales, and Honduran lempiras). The government also permitted holders of foreign currency accounts to buy and sell foreign exchange with other holders of such accounts. These rates are based on the official rate of 5.00 from January through June and the average of the parallel rate from July through December.

(7)1989, coffee, cotton, sugar, shrimp, beef: In July, 1989 the government allowed all export earnings to be exchanged in the 'bank market', except coffee from the 1988-89 harvest, and cotton, coffee, sugar, shrimp and beef sold before July 25, 1989.

Table 1:Exports by category, El Salvador 1975-92

	Percent of Total			Annual Average (US$ millions)		
	75-79	80-85	86-92	75-79	80-85	86-92
1. Total	100.0	100.0	100.0	835.9	791.8	601.5
2. Traditional	70.5	71.1	58.4	589.5	563.2	351.1
3. Coffee	54.7	60.0	50.8	457.6	475.4	305.3
4. Cotton	9.8	6.0	0.8	81.8	47.7	4.9
5. Sugar	4.8	2.8	4.0	40.0	22.2	24.0
6. Shrimp	1.3	2.3	2.8	11.2	17.9	17.0
7. Nontraditional	29.5	28.9	41.6	246.3	228.5	250.4
8. Manufacturing	23.2	23.3	34.4	194.0	184.5	206.8
9. Agriculture	4.2	3.9	3.9	35.4	30.7	23.4
NAUCA I						
10. Food	64.3	67.9	--	537.3	537.5	--
11. Agric, non-food	10.4	7.0	--	87.0	55.7	--
12. Oils, fats	0.1	0.1	--	0.6	0.9	--
13. Chemicals	4.7	4.6	--	39.6	36.3	--
14. Manufacturing	17.7	16.7	--	148.1	132.5	--
15. Other	2.8	3.7	--	23.2	29.1	--
NAUCA II						
17. Animal prods	--	--	3.9	--	--	23.5
18. Vegetable prods	--	--	53.6	--	--	322.2
19. Food, drink	--	--	7.3	--	--	43.7
20. Minerals	--	--	1.3	--	--	7.6
21. Chemicals	--	--	7.4	--	--	44.5
22. Paper	--	--	4.9	--	--	29.7
23. Textiles	--	--	10.4	--	--	62.3
24. Footware	--	--	2.1	--	--	12.6
25. Metal manufact	--	--	4.0	--	--	23.8
26. Machinery	--	--	1.9	--	--	11.3
27. Other	--	--	3.4	--	--	20.2

Table 2: Export supply (20 industries), El Salvador 1975-85

	(1) v OLS	(2) v OLS	(3) Dv OLS	(4) Dv IV	(5) Dv OLS
v(-1)	0.962	0.964	--	--	--
	(0.017)	(0.018)			
p	0.877	1.074	--	--	--
	(0.160)	(0.026)			
p*nte	0.213	--	--	--	--
	(0.159)				
p(-1)	-0.822	1.019	--	--	--
	(0.159)	(0.027)			
p(-1)*nte	-0.212	--	--	--	--
	(0.159)				
Dv(-1)	--	--	-0.172	-0.012	--
			(0.121)	(1.810)	
Dp	--	--	0.874	0.895	0.897
			(0.102)	(0.227)	(0.100)
Dp*nte	--	--	0.216	0.202	0.201
			(0.103)	(0.167)	(0.101)
Dp(-1)	--	--	-0.125	-0.246	-0.255
			(0.124)	(1.380)	(0.055)
Dp(-1)*nte	--	--	0.324	0.275	0.272
			(0.083)	(0.055)	(0.057)
Constant	-0.212	-0.218	0.125	0.116	0.116
	(0.171)	(0.150)	(0.051)	(0.106)	(0.054)
Time Dummies	9	9	8	8	8
Sample	76-85	76-85	77-85	77-85	77-85
NOBS	200	200	180	180	180
Wald Test	22700.3	11637.2	15002.9	14041.9	12749.6
(d.f.)	5	3	5	5	4
AR(1)	-0.99	-0.82	0.06	-0.07	-0.89
AR(2)	-1.28	-1.27	-1.90	-0.95	-1.82
Elasticity:					
Traditional	1.45	1.53	0.64	0.64	0.64
Non-trad	1.47		1.10	1.11	1.12

Table 3: Export supply (38 industries), El Salvador 1986-92

	(1) v OLS	(2) v OLS	(3) Dv OLS	(4) Dv IV	(5) Dv OLS
v(-1)	0.960	0.959	--	--	--
	(0.021)	(0.021)			
p	0.715	0.951	--	--	--
	(0.157)	(0.104)			
p*nte	0.259	--	--	--	--
	(0.187)				
p(-1)	-0.664	-0.895	--	--	--
	(0.155)	(0.100)			
p(-1)*nte	-0.258	--	--	--	--
	(0.184)				
Dv(-1)	--	--	-0.283	-1.760	--
			(0.080)	(15.800)	
Dp	--	--	0.753	0.970	0.712
			(0.094)	(2.320)	(0.117)
Dp*nte	--	--	0.209	0.135	0.222
			(0.155)	(0.717)	(0.162)
Dp(-1)	--	--	0.076	1.090	-0.118
			(0.057)	(10.900)	(0.058)
Dp(-1)*nte	--	--	0.272	0.860	0.159
			(0.092)	(6.360)	(0.088)
Constant	-0.246	-0.273	0.062	-0.012	0.077
	(0.183)	(0.171)	(0.053)	(0.790)	(0.068)
Time Dummies	5	5	4	4	4
Sample	87-92	87-92	88-92	88-92	88-92
NOBS	228	228	190	190	192
Wald Test	6139.9	5133.1	172.5	136.3	171.4
(d.f.)	5	3	5	5	4
AR(1)	-1.75	-1.73	1.03	-0.06	-0.70
AR(2)	-0.78	-0.99	-1.69	-0.25	-0.88
Elasticity:					
Traditional	1.28	1.37	0.65	0.75	0.59
Non-trad	1.30		1.02	1.11	0.98

Table 4: Change in export prices by category, El Salvador 1975-92
(Average annual percentage change)

	1975-79	1980-85	1986-92	1975-92
1. Total	10.5	-4.6	-14.5	0.7
2. Traditional	23.7	-16.2	-8.5	-1.0
3. Coffee	50.7	-8.5	-47.1	0.1
4. Cotton	11.2	-6.1	10.4	3.9
5. Sugar	-10.6	-3.6	0.2	-2.0
6. Shrimp	38.7	-6.8	39.1	21.9
7. Nontraditional	-0.4	-1.3	3.7	2.6
8. Manufacturing	-6.7	-0.6	3.6	1.3
9. Agriculture	5.7	0.5	0.0	1.9
NAUCA I				
10. Food	38.2	-2.7	--	--
11. Agric, non-food	13.1	-4.1	--	--
12. Oils, fats	23.6	35.1	--	--
13. Chemicals	0.4	-1.3	--	--
14. Manufacturing	-6.8	8.8	--	--
15. Other	8.8	-1.4	--	--
NAUCA II				
17. Animal prods	--	--	6.2	--
18. Vegetable prods	--	--	-11.7	--
19. Food, drink	--	--	1.0	--
20. Minerals	--	--	0.2	--
21. Chemicals	--	--	-1.4	--
22. Paper	--	--	3.3	--
23. Textiles	--	--	26.1	--
24. Footware	--	--	10.6	--
25. Metal manufact	--	--	-2.0	--
26. Machinery	--	--	1.3	--
27. Other	--	--	8.3	--
28. US GDP Deflator	7.5	5.7	3.7	5.4
29. Total Imports	3.3	1.4	0.0	1.4

Table 5:Coefficient of variation for export prices by category, El Salvador 1975-92 (Percent)

	1975-79	1980-85	1986-92	1975-92
1. Total	21.7	6.2	20.3	18.8
2. Traditional	29.2	14.9	32.6	26.5
3. Coffee	41.7	10.8	39.8	33.1
4. Cotton	16.5	11.4	32.2	24.0
5. Sugar	63.0	24.5	27.9	35.8
6. Shrimp	17.7	16.4	17.1	24.2
7. Nontraditional	7.2	5.0	13.2	23.9
8. Manufacturing	15.6	5.3	15.1	21.0
9. Agriculture	26.4	23.3	17.0	35.9
NAUCA I				
10. Food	30.0	16.0	--	--
11. Agric, non-food	13.2	18.3	--	--
12. Oils, fats	28.4	9.0	--	--
13. Chemicals	14.9	13.8	--	--
14. Manufacturing	24.9	15.6	--	--
15. Other	13.3	22.8	--	--
NAUCA II				
17. Animal prods	--	--	14.6	--
18. Vegetable prods	--	--	39.3	--
19. Food, drink	--	--	29.8	--
20. Minerals	--	--	24.8	--
21. Chemicals	--	--	12.3	--
22. Paper	--	--	10.6	--
23. Textiles	--	--	31.7	--
24. Footware	--	--	22.2	--
25. Metal manufact	--	--	14.2	--
26. Machinery	--	--	13.5	--
27. Other	--	--	23.3	--
28. US GDP Deflator	11.5	9.8	8.0	26.5
29. Total Imports	13.9	3.8	6.3	20.8

Table 6: Correlation coefficient for the price of coffee exports and the price of other exports, El Salvador 1975-92

	1975-79	1980-85	1986-92	1975-92
1. Total	0.95*	0.78*	0.89*	0.59*
2. Traditional	0.97*	0.78*	0.90*	0.79*
3. Coffee	1.00	1.00	1.00	1.00
4. Cotton	0.88*	-0.12	-0.35	-0.11
5. Sugar	-0.88*	-0.27	-0.40	-0.65*
6. Shrimp	0.42	-0.45	-0.79*	-0.38
7. Nontraditional	0.68	0.02	-0.40	-0.35
8. Manufacturing	0.14	-0.11	-0.25	-0.32
9. Agriculture	0.32	0.09	-0.29	-0.29
NAUCA I				
10. Food	0.94	0.83*	--	--
11. Agric, non-food	0.82*	-0.08	--	--
12. Oils, fats	0.50	-0.07	--	--
13. Chemicals	-0.39	-0.79*	--	--
14. Manufacturing	-0.02	-0.16	--	--
15. Other	0.78	0.45	--	--
NAUCA II				
17. Animal prods	--	--	-0.55	--
18. Vegetable prods	--	--	0.99*	--
19. Food, drink	--	--	-0.12	--
20. Minerals	--	--	-0.08	--
21. Chemicals	--	--	0.29	--
22. Paper	--	--	-0.62	--
23. Textiles	--	--	-0.83*	--
24. Footware	--	--	-0.75*	--
25. Metal manufact	--	--	0.34	--
26. Machinery	--	--	-0.21	--
27. Other	--	--	-0.67*	--
28. US GDP Deflator	0.56	-0.77*	-0.87*	-0.40*
29. Total Imports	0.17	-0.30	-0.28	-0.17

References

Alas Rodríguez, Nelly Carolina (1987). 'The experience of a dual exchange market with a simultaneous unofficial market in El Salvador,' Master's thesis. Rice University.

Arellano, Manuel and Stephen Bond (1988). 'Dynamic panel data estimation using DPD -- a guide for users,' mimeo, Institute for Fiscal Studies, London.

Arellano, Manuel and Stephen Bond (1991). 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations,' Review of Economic Studies, vol. 58, pp. 277-97.

Arellano, Manuel and Olympia Bover (1990). 'La econometria de datos de panel,' Investigaciones Económicas (segunda época), vol. 14, no. 1, pp. 3-45.

Arriagada Stuven, Pedro (1992). Marco legal e institucional para el desarrollo de las exportaciones no-tradicionales, Centro Internacional para el Desarrollo Económico (CINDE).

Banco Central de Reserva, Revista Trimestral, San Salvador, various.

Bulmer-Thomas, Victor (1987). The political economy of Central America since 1920, Cambridge University Press.

Cáceres, Luis René and Oscar A. Nuñez (1991). 'La determinación del tipo de cambio en el mercado negro de El Salvador,' El Trimestre Económico, vol. 58(2), no. 230, pp. 249-62.

Hogg, Robert V. and Allen T. Craig (1978). Introduction to mathematical statistics, Macmillan.

Levy, Santiago and Roberto Rosales (1991). 'Los tipos de cambio múltiples y el racionamiento de las divisas: la teoría y una aplicación al caso de El Salvador,' El Trimestre Económico, vol. 58(3), no. 231, pp. 521-59.

Loehr, William (1988). 'Real exchange rates in El Salvador,' report prepared for the United States Agency for International Development, El Salvador.

Ministerio de Planificación, Indicadores Económicos y Sociales, San Salvador, various.

Nickell, Steve (1981). 'Biases in dynamic models with fixed effects,' Econometrica, vol. 49, pp. 1417-26.

Ramírez Aleman, Dimas (1993). 'Evaluación de la política cambiaria, julio 1989-diciembre 1992,' mimeo, Banco Central de Reserva, San Salvador.

Saca, Nolvia and Roberto Rivera (1990). 'Políticas de estabilización en El Salvador,' in José Roberto López and Eugenio Rivera (eds) Deuda externa y políticas de estabilización y ajuste estructural en Centroamérica y Panamá, Confederación Universitaria Centroamericana (CSUCA).

Segovia, Alexander and William Pleitez (1990). 'Política de promoción de exportaciones no tradicionales de El Salvador a terceros mercados en la década de los ochenta,' Centro de Investigaciones Tecnológicas y Científicas (CENITEC), Cuaderno de Investigación no. 4, año 2.

[i] See Victor Bulmer-Thomas (1987).

[ii] This paper uses the definition of "non-traditional" exports which is standard in El Salvador, namely, all exports excluding coffee, cotton, sugar and shrimp. The definition is somewhat arbitrary. Balsam and sesame seed, for example, have much longer histories as Salvadoran exports than cotton, sugar or shrimp. In this sense, "non-traditional" exports are those which are economically significant and whose place in the Salvadoran export structure is well-established. In some of the analysis which follows I will abandon the strict definition of non-traditionals and focus instead on the distinction between coffee and all other exports.

[iii] Segovia and Pleitez (1990) provide an excellent summary of efforts to promote non-traditional exports during the 1980s. Their study attempts to measure the effectiveness of some of these measures. Arriagada (1992) supplies even greater institutional detail on promotional efforts.

[iv] Segovia and Pleitez (1990) discuss some of the details of the exchange rate system as it applied to non-traditional exporters. Levy and Rosales (1991) and Cáceres and Nuñez (1991) provide more detailed discussions of El Salvador's multiple exchange rate regime.

[v] The two principal sources used for the determination of the appropriate nominal exchange rate were Saca and Rivera (1990) and Segovia and Pleitez (1990).

[vi] The GDP deflator for each year of the sample was calculated from data in the Revista Trimestral.

[vii] Some import values and volumes were taken from the Ministerio de Planificación, Indicadores Económicos y Sociales. Export volumes for NAUCA I import categories were not available from published sources for 1985.

[viii] See Nickell (1981) and Arellano and Bover (1990).

[ix] All regressions are estimated using "Dynamic Panel Data", which conveniently implements instrumental variable and generalized method of moments estimation, in addition to more conventional techniques. See Arellano and Bond (1988) for a complete description of, and practical introduction to, DPD. Arellano and Bond (1991) provides a thorough discussion of the theoretical issues.

[x] The violation of either assumption would mean that coefficient estimates would be biased. In the first case, if unobservable industry-specific effects are correlated with the included regressors, their exclusion from the regression would induce classic omitted variable bias. Regressions, discussed below, which control for industry-effects give results that are very similar to these OLS levels equations. This suggests that industry effects are either unimportant or not correlated with other regressors. In the second case, if the disturbance term is serially correlated, then the lagged dependent variable will be correlated with the disturbance term. The results include statistics AR(1) and AR(2) which test for first and second order serial correlation, respectively. The statistics are distributed N(0,1) under the assumption of no autoregression. Neither

of the OLS levels equations reported in the table show signs of serially correlated disturbances.

[xi] The "D" before the abbreviations for the variables in Tables 2 and 3 indicates that the data is in first-differences.

[xii] The within-group estimator is biased because the lagged dependent variable is correlated with transformed (differenced) disturbance term. Taking the simplest example of a dynamic panel model, assume that:

$$\text{(i)} \quad y_{it} = \alpha y_{i(t-1)} + f_i + v_{it}$$

where y_{it} is the value of the variable of interest in industry i in time period t, f_i is an industry-specific, time-invariant effect, and v_{it} is a well-behaved disturbance term.

The first-difference version of the within-group estimator of this equation, is OLS performed on:

$$\text{(ii)} \quad y_{it}-y_{i(t-1)} = \alpha[y_{i(t-1)}-y_{i(t-2)}] + [v_{it}-v_{i(t-1)}]$$

where the y-term on the right-hand side of (ii) is correlated with the disturbance term since $y_{i(t-1)}$ depends on $v_{i(t-1)}$. A valid instrument will be correlated with the regressor but not with the disturbance term. $y_{i(t-2)}$ is correlated with the y-term (which includes $y_{i(t-2)}$) but not with the disturbance (which depends on subsequent values of the untransformed disturbance).

[xiii] The annual average price change is calculated as 100 times the difference between the price in the last and the first year of the specified period, all divided by the number of price changes. For 1975-79, for example, the formula is:

$$(100 * (p_{79} - p_{75}))/4$$

Where export classifications include more than one industry, price was calculated as the volume-weighted average price of all export industries in the classification. The volume-weights were calculated for each year. Normal practice would have been to use the same weights for each year (for example, the average share in volume of each product over the whole sample). The change from NAUCA I to NAUCA II after 1985, made it impossible to implement such a weighting scheme. The price index used here gives the true mathematical average price for exports in each year. This has the advantage over fixed-weight indices that changes in the composition of exports from year-to-year can affect the change in average export prices. It has the disadvantage that compositional effects can make comparisons across export classifications trickier. For example, the price of traditional exports fell on average by 16.2 percent per year during 1980-85, even though coffee, cotton, sugar and shrimp prices, the four components of traditional exports, all declined by less than that.

Shifts in composition toward lower priced commodities helped pull the average price of traditional exports down more than the price declines of any individual product.

[xiv] Coffee prices, for example, might be pro-cyclical since rising economic activity could increase demand for coffee as an intermediate input in production. An export with counter-cyclical price pattern would then be a good hedge against coffee price swings. Or, coffee might react badly to excessive rain. A crop which requires a great deal of rain might then also be an appropriate hedge.

[xv] Correlations significant at the five percent level are marked with an * in Table 6. For the appropriate test, see Hogg and Craig (1978).