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Trade Liberalisation, Market Deregulation and Agricultural Performance in Central America

JOHN WEEKS

One frequently encounters the argument that trade liberalisation and deregulation of domestic markets in developing countries result in increased incentives for agriculture. This proposition is considered for the Central American countries, all of which passed through fundamental policy change either in the 1980s or 1990s. After characterising the policy regimes in each country over various periods, the analysis moves to an inspection of agricultural trade performance. The evidence indicates that liberalisation of foreign trade and deregulation of domestic markets has not been associated with improved agricultural performance. It is suggested that the failure of agriculture to respond positively to policy changes can be in part explained by an unfavourable trend in world prices of the region's major tradable commodities.

INTRODUCTION

The debate over whether government interventions in markets have a positive or detrimental effect on the agricultural sector is an old one, going back to the eighteenth century. While economic theory (and international trade theory in particular) has changed fundamentally in the subsequent 250 years, the debate remains current. This study considers the impact of trade liberalisation and domestic market deregulation on the agricultural sectors of the five Central American countries. During the 1960s and 1970s these countries pursued a regional import substitution strategy; then, in the second half of the 1980s and early 1990s they shifted to less interventionist policy regimes. The purpose is neither to critique nor to endorse a particular policy regime; rather, it is to investigate, in the concrete, the response of the

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agricultural sector to a fundamental change in policy regime.

In the context of this study, 'liberalising' refers to three categories of policy: the macroeconomic regime, the trade regime and internal markets. A country is designated as 'liberalised' if: (1) in macro policy the exchange rate is determined through a relatively non-interventionist 'float', and interest rates are deregulated; (2) in the trade regime, non-tariff barriers are converted to tariffs, and the tariff structure reformed towards non-discrimination across products and sectors, with lower nominal rates; and (3) in internal markets, the role of state trading is reduced towards a minimum and direct price controls eliminated. To avoid confusion, 'deregulation' will be used to refer to policy reforms affecting internal markets, and 'trade liberalisation' will be used to describe trade policy reform. The words 'liberalised' and 'not liberalised' will be used to summarise the overall policy regime.¹

The general theoretical analysis of the effect of trade liberalisation and domestic market deregulation on resource allocation is well known and can be found in the standard textbooks. If one makes the simplifying assumptions that an economy has only two products, both of which are tradable, then under autarky with perfect competition resources will be allocated to yield a composition of production consistent with domestic demand. If all trade barriers are eliminated ('free trade'), domestic prices will become equal to world prices.² Because domestic markets are perfectly competitive (implying full employment), resources are reallocated consistent with the familiar marginal efficiency conditions. This results in an increase in the output of the product whose price has risen, and a decline in the output of the product whose price has fallen ('specialisation'). Domestic demand for each product no longer equals the production of each. Supply-demand equilibrium is achieved through international trade, which results in welfare gains. If one makes further assumptions, such as no 'factor reversals' in production, the product whose price and output have risen will be the one which in production uses intensively the factor that is relatively abundant in the country. It is this line of argument that yields the generalisation that a policy shift towards freer trade will result in a country realising its comparative advantage. The analysis becomes more complicated with more than two products,³ but, given the assumptions, the basic conclusion holds.

If one assumes that per capita income is inversely correlated with labour abundance, and that the agricultural sector is labour intensive relatively to other sectors, then it follows that a shift towards free trade will stimulate agriculture relatively to other sectors in low income countries. To put the matter simply, trade barriers prevent the transmission of the price signals that indicate agriculture's comparative advantage; interventions in domestic

markets prevent resource re-allocation in response to those signals. To make the implications more concrete, this analysis implies that import substitution regimes will, in general, have a relatively detrimental impact on the agricultural sector. This argument was made succinctly in an influential study sponsored by the World Bank of agricultural pricing in eighteen developing countries. Generalising from their comparative study and referring to import substitution regimes in developing countries, Schiff and Valdés write:

The bulk of discrimination against agriculture ... comes from indirect price interventions, which are rooted in the national development strategies of industrialization based on import substitution ... Macroeconomic policies [in such strategies] caused the appreciation of the real exchange rate, raised the relative cost of nontraded inputs, and reduced the real purchasing power of income received from the sales of export and import-competing commodities. And protection of domestic industry hurt agriculture by raising the domestic price of importable agricultural inputs above world prices, reducing the purchasing power of farm households as consumers of manufactured goods, and by causing further appreciation of the real exchange rate. Such intervention usually reduced agriculture's share of gross national product and was often related to slower growth in agricultural production and agricultural exports and to slower economic growth overall [*Schiff and Valdés, 1992: 199, 201*].

In this approach, derivative from the theory summarised above, the depressing effect on agriculture is not only, or even primarily, the result of policies specific to that sector.⁴ This general argument has been applied specifically to Central America. For example, in its 1989 report on Central American economic integration, the World Bank recommended that '... comprehensive trade liberalizing policy reforms are needed to encourage structural readjustments that would enable the region's economies to perform more successfully in the current international environment' [*World Bank, 1989: 2*].⁵ In a more recent report on Honduras, it reviewed favourably the government's moves towards freer trade and less regulated domestic markets:

The [import substitution] trade and policy regime implemented by the Honduran government since the 1970s was one of increasing state intervention and control in agricultural markets of tradable goods. This regime has reflected an anti-agricultural bias ... The economic reforms implemented since 1990 were inspired by a new reliance on markets and trade to promote efficiency and growth in the economy.

Consistent with this spirit, the government adopted policies to allow agricultural markets to operate with fewer controls ... [P]olicies of price supports and trade monopoly were eliminated, as were most price controls and restrictions on the free flow of goods across borders [*World Bank, 1995a: 13, 20*].

The World Bank gave the same advice to Costa Rica in a 1988 report, with equal clarity:

The key issue in trade policy is the need to reduce protection, which prevents the allocation of resources according to comparative advantage and hurts the export sector ... Price, tax and subsidy policies have been areas of major reform since 1985. The aim has been to reduce intersectoral and intercrop price distortions in order to fully exploit the country's comparative advantages [*World Bank, 1988: 11, 21*].

The general argument, recommended to the Central American governments (and implemented, see below), might be called the 'liberalisation/deregulation' hypothesis: that a shift away from an import substitution regime towards a substantially less interventionist strategy, favours the development of agriculture. In what follows, that hypothesis is tested for the Central American countries.

AGRICULTURAL PERFORMANCE IN CENTRAL AMERICA

As a first step to investigate empirically this hypothesis for Central America, Table 1 summarises the evolution of policy regimes in the region.⁶ In the early 1960s, the governments of the region agreed on a series of measures, including a common external tariff, to create the Central American Common Market, which officially came into operation in 1963. The 1970s brought the fullest development of the CACM, notwithstanding that Honduras abandoned the enterprise at the start of the decade. To the extent that the four remaining Central American countries engaged in a purposeful policy of import substitution, it occurred in the 1970s. For all of the countries except Honduras, the period 1970–79 was characterised by a policy framework designed to shift the structure of aggregate production and exports towards industry. This desired outcome was achieved, though perhaps not as dramatically as policy-makers had hoped. In 1960, manufacturing value added was 14 per cent of regional GDP, and rose to 18 per cent in 1975. Over the same period within manufacturing, food and textiles declined from 80 per cent of total output to 61 per cent [*Weeks, 1985: 135–6*], with most relative increases occurring in intermediate

products (for example, industrial chemicals) and consumer durables. In trade, the five major agricultural products accounted for 77 per cent of exports during 1960–64, and 61 per cent during 1975–9.⁷ With the exception of Honduras, import substitution regimes ruled in Central America during the 1970s.

By the late 1970s, the CACM was on the wane, due to domestic, regional, and international factors. The overthrow of the Somoza regime brought a new government to Nicaragua that was ideologically committed to a high degree of intervention in national markets. Roughly contemporaneous with this, civil war broke out in El Salvador. The response of the Salvadorean governments was to implement policies which were in many cases as heavily interventionist as in Nicaragua (albeit from a different political perspective). During 1980–85, both countries can be characterised as ‘strongly interventionist’, especially in their trade policies.⁸ In Costa Rica and Guatemala policy evolved in the opposite direction, toward deregulation and liberalisation, and more so for the former than the latter during the first half of the 1980s. In the second half of the decade, both countries continued to reform policy, and we characterise them as ‘liberalised’, meaning that they had substantially ‘reduced the extent of anti-export bias’ [Edwards, 1993: *fn*, 1371] by meeting the three policy criteria discussed in the introduction. The second half of the decade also brought liberalising moves in El Salvador and Nicaragua, though from a considerably more interventionist starting point. Honduras was a special case. While its policies changed less than for any of the countries in the 1980s, Honduras began the decade with the least interventionist economic policy of the five countries. By the time it initiated purposeful and broad policy reform in the early 1990s [Thorpe, 1995], perhaps all four of the other countries had passed it in the race for trade liberalisation and deregulation.

After the early 1990s, the Central American countries had comprehensively reduced state regulation. Table 1 summarises the discussion of policy regimes,⁹ with the shaded cells indicating a high degree of liberalisation. No country in practice can eliminate all government interventions in economic life, but during the shaded periods the Central American countries were as close to this as any in Latin America. We shall use the binary classification of countries ‘not liberalised’ and ‘liberalised’, in the statistical work below. This approach is common in the literature (see Edwards 1993, *passim*), though it involves a degree of arbitrariness.¹⁰ The alternative, composite indices of liberalisation, are by their nature ordinal and not without their own difficulties and arbitrariness of weightings.¹¹ For all its difficulties, the binary classification seems most appropriate for this study.

As noted at the outset, the hypothesis is that a liberalised trade regime and a deregulated domestic economy would favour the agricultural sector in

Central America: first, because interventions associated with import substitution are assumed to turn the terms of trade against agriculture; second, because the sector's output is overwhelmingly tradable; and third, because agriculture is presumed to be labour intensive, and the countries abundant in labour. Certainly, the tradability criterion applies to Central American agriculture, where output is almost entirely either export products¹² or internationally traded staples.¹³

TABLE 1
CHARACTERISATION OF POLICY REGIMES BY PERIOD, 1960-95

Country Period	1960-1969	1970-1979	1980-1984	1985-1989	1990-1995
Costa Rica	Shift towards import substitution	Import Substitution interventions	Moderate Liberalisation & deregulation	Liberalised (from 1983)	Liberalised
El Salvador	Shift towards import substitution	Import Substitution interventions	Strong intervention & deregulation	Moderate Liberalisation & deregulation	Liberalised
Guatemala	Shift towards import substitution	Import Substitution interventions	Moderate Liberalisation & deregulation	Continued Liberalisation & deregulation	Liberalised
Honduras	Minor import substitutions policies	Mild Interventions (not part of regional import substitution)	No change	Little change	Major Liberalisation & deregulation
Nicaragua	Shift towards import substitution	Import Substitution interventions	Strong intervention	Moderate Liberalisation & deregulation	Major Liberalisation & deregulation
Comments	CACM officially begun in 1963	CACM at its peak in first half of decade (without Honduras); insurrection in Nicaragua 1977-79	Collapse of the CACM; war in El Salvador & Nicaragua	Ware continues in El Salvador & Nicaragua, ceases in both countries by end of decade	Government changes in Nicaragua (1990)

Source: See Annex 1.

Prior to considering the impact of trade liberalisation and domestic deregulation on agriculture, it is relevant to review the performance of agriculture in the Central American countries. Table 2 shows annual average rates of growth of agricultural value added at constant prices, with the liberalised periods shaded (as in subsequent tables), and the five year periods of most rapid growth highlighted in bold. For all five countries, the most rapid rate of growth was during the years of most intense implementation of the import substitution strategy, 1970–74, or in the previous decade when such policies were being put into place. Why this might be the case is considered below.

We look next at overall export performance, relevant because the vast majority of each country's exports were agricultural. One explicitly anticipated outcome of the shift towards a policy regime with less government intervention in Central America was reduction of anti-export bias. Table 3 provides a crude test of the impact of trade liberalisation, by calculating the trend in constant price exports, with a dummy variable corresponding to the liberalisation years (see Annex 1 and Annex 2 for details).¹⁴ The table supports the null hypothesis that the shift in policy had no impact on real export growth, with the exception of Guatemala, for which the coefficient on the shift variable is negative (significant at the .05 level). Only for El Salvador and Nicaragua is the shift variable of the predicted sign. These two positive (but non-significant) coefficients give no evidence for or against the trade liberalisation hypothesis, since any export improvement for these countries might be explained by the end of armed conflict. While Tables 2 and 3 should be taken as indicative rather than definitive, they suggest a need to re-assess the degree of export bias during the period of import substitution policies in Central America.

TABLE 2
GROWTH RATES OF CONSTANT PRICE AGRICULTURAL VALUE ADDED,
CENTRAL AMERICA, 1960–94

	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
1960–64	3.5	6.4	5.0	5.3	12.5
1965–6	7.7	1.8	3.8	6.2	6.1
1970–74	3.6	4.8	6.8	.7	6.6
1975–79	2.6	3.9	3.4	3.9	0.1
1980–84	2.8	-3.2	-1	1.9	-1.3
1985–89	3.1	-5	2.2	3.9	-3.6
1990–94	3.6	4.0	3.1	3.9	0.0

Source: World Bank 1995, except for Guatemala (CEPAL 1996b, for 1960–86).

TABLE 3
TREND RATE OF GROWTH OF CONSTANT PRICE EXPORTS & 'LIBERALISATION
SHIFT', CENTRAL AMERICA, 1980-95

	Trend	Shift Dummy	R2 & F-stat
Costa Rica	6.6 @ .01	neg non sig	0.739 17.0
El Salvador	neg non sign	pos non sig	0.035 0.2
Guatemala	3.5 @ .10	neg @ .05	0.267 2.2
Honduras	1.9 @ .10	neg non sig	0.196 1.4
Nicaragua	-7.1 @ .01	pos non sig	0.681 12.8

Note: The trend coefficient is multiplied by 100 to yield a per cent rate of growth.

Source: World Bank 1995.

Turning to a detailed consideration of the performance of the agricultural component of trade, we can summarise the hypothesis to test for Central America: if interventions discouraged agriculture, if the sector's output consisted of tradables, if the sectors were labour-intensive, and if the countries were abundant in labour, trade liberalisation and domestic deregulation would reveal a strong comparative advantage in agriculture. This comparative advantage would manifest itself in an increase of net exports for the sector. Part A of the Table 4 shows that in absolute terms (millions of US dollars) the net exports of the agricultural sector declined in four countries: El Salvador (from the early 1980s), Guatemala (also from the early 1980s), Honduras (from the second half of the 1980s), and Nicaragua (from the 1970s onwards). Only in Costa Rica does one observe an increase (in each period).

A more relevant measure is presented in the second part of the table. The ideal relative calculation would be net exports as a proportion of the gross output of agriculture, but time series data on sectoral gross output is notoriously difficult to obtain. The standard proxy is to use the value added of sectors as the denominator [Wood, 1994], which imparts no bias if the proportion of intermediate cost in total cost is constant over time. For all five countries there is a common pattern for the period 1965-79 (import substitution period), high and rising relative net exports. Then, El Salvador, Guatemala, and Nicaragua entered into sharp decline. Decline also occurred in Honduras, but by considerably less. Only in Costa Rica is post-ISI associated with a rise in net agricultural exports.

One might explain the decline in net exports for El Salvador during the

TABLE 4
NET AGRICULTURAL EXPORTS BY PERIOD, 1965-95

A. Millions of current US dollars (annual averages)

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Central America	Excluding Costa Rica
<i>Periods:</i>							
1965-69	98	103	143	101	103	548	450
1970-74	179	172	232	117	158	858	679
1975-79	464	493	658	285	401	2300	1837
1980-84	519	401	708	441	225	2293	1774
1985-89	641	288	648	535	108	2220	1580
1990-95	853	67	563	408	45	1936	1083

B. As Percentage of Sectoral Value Added (annual averages)

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Central America	Excluding Costa Rica
<i>Periods: Annual Averages:</i>							
1965-69	59.0	43.5	na	48.4	65.4	na	na
1970-74	68.6	51.9	34.7	50.3	62.2	49.4	45.9
1975-79	75.9	64.8	46.2	66.7	88.4	63.2	60.5
1980-84	73.9	47.1	32.2	76.8	39.3	46.5	42.0
1985-89	76.2	40.8	32.3	75.0	18.1	46.2	39.9
1990-95	77.5	10.8	22.1	70.0	9.1	39.7	28.6

Notes and Sources: Maximum values in bold. FAO 1996 (exports and imports) and World Bank 1995 (GDP). See Annex 2.

1980s by the effect of war, largely fought in the countryside. In the 1990s the war was over, yet net exports declined dramatically, from an average of over 40 per cent of agricultural value added during 1985-89, to 11 per cent during 1990-94. Similarly, armed conflict might be summoned to account for the sharp decrease in Nicaragua. Net exports represented over 70 per cent of agricultural value added in the 1970s, then fell to 38 per cent during 1980-84, and to 18 per cent during 1985-89. From an orthodox perspective, these declines would also be attributed to the strong price and non-price interventions by the Sandinista government (for example, an overvalued exchange rate and low producer prices through state-controlled marketing, see Annex 1). However, with the policy reforms of the 1990s, net agricultural exports continued to drop, to below ten per cent. Net agricultural exports in Guatemala remained the same from the first half of the 1980s to the second half, then dropped by a full ten percentage points in the period we describe as 'liberalised'.

A MODEL OF THE TRADE BALANCE

While the evidence presented so far suggests that liberalisation was not associated with a revealed comparative advantage in agriculture in the Central American countries, this has not been analysed in a rigorous framework. To do this, we develop a model of the determination of net exports from the sector. The model is constructed with the following variables:

- X_t = total agricultural exports,
 M_t = total agricultural imports
 $SHGDP_t = GDP_{agric_t} / GDP_t$ = share of agricultural value added (GDP_{agric_t}, agricultural GDP) in total value added (GDP_t),
 RER_t , = real exchange rate, and
 $RPAM_t$ = ratio of the agricultural price index to the manufacturing price index.

Relative net exports of agricultural products are defined as the following ratio:

$$Xn_t = X_t / M_t \quad (1)$$

The agricultural trade balance of a country will depend on its natural endowments and level of development. Abstracting from the former, one would expect the agricultural trade balance of country to be related to the share of agriculture in gross domestic product. A high ratio of agricultural value added to national income implies that a large portion of the population is in agriculture, and a correspondingly low degree of urbanisation. As a result, the internal demand for *marketed* agricultural output is low. On-farm consumption and exports tend to be high proportions of the sector's production, and imports of agricultural commodities, largely for the urban population, are correspondingly low. This is, of course, one of the structural reasons that the more underdeveloped countries are net agricultural exporters. Defining the share of agricultural value added in GDP as $[GDP_{agric_t} / GDP_t] = SHGDP_t$, we can write:

$$\begin{aligned}
 X_t &= \varphi_x [SHGDP_t]^{\alpha_x} \text{ for agricultural exports,} \\
 M_t &= \varphi_m [SHGDP_t]^{\alpha_m} \text{ for agricultural imports,} \\
 &\text{and } \varphi_x \text{ and } \varphi_m \text{ are to be determined, and} \\
 &\text{predicted to be greater than zero.}
 \end{aligned} \quad (2a)$$

Substituting (2a) and (2b) into (1),

$$Xn_t = X_t / M_t = \{ \varphi_x [SHGDP_t]^{\alpha_x} \} / \{ \varphi_m [SHGDP_t]^{\alpha_m} \} \quad (3)$$

The agricultural trade balance is assumed to have an equilibrium value

determined by two relative prices: (1) the real exchange rate (RER), indicating the relative return between tradables and non-tradables for the economy as a whole; and (2) the relative price of agricultural products to other tradables (RPAM), signalling the relative return between the tradable sectors. The latter is approximated by the ratio of agricultural prices to manufacturing prices. Relative prices enter the model through their effect on the export and import coefficients (terms φ_x and φ_m). Converting these parameters to functions of relative prices, in general form, one has:

$$\varphi_x = \varphi_x(\text{RER}_t, \text{RPAM}_t), \quad (4a)$$

$$\varphi_m = \varphi_m(\text{RER}_t) \quad (4b)$$

Exports of agricultural commodities should rise with a real depreciation of the exchange rate (defined as $+\Delta\text{RER}$), as a result of the general incentive imparted to tradables. A rise in agricultural prices relatively to manufacturing prices shifts resources to agriculture within the tradable sector ($+\Delta\text{RPAM}$). For imports it is assumed that only the real exchange rate is relevant; that is, that a relative price shift between agriculture and manufacturing has no impact on agricultural imports. Using log-linear form for RER and RPAM, the equilibrium agricultural trade ratio is:

$$Xn_{t*} = \frac{\{[\text{RER}_t]^{\alpha_1}[\text{RPAM}_t]^{\beta}[\text{SHGDP}_t]^{\alpha_x}\}}{\{[\text{RER}_t]^{\alpha_2}[\text{SHGDP}_t]^{\alpha_m}\}} \quad (5)$$

The actual change in relative net exports in any time period is assumed to follow a partial adjustment to equilibrium, in response to the difference between the equilibrium value for the current period and the actual value in the previous period:

$$Xn_t/Xn_{t-1} = (Xn_{t*}/Xn_{t-1})^\gamma \text{ where, } 0 < \gamma < 1. \quad (6)$$

Substituting expression (5) into (6), and expressing in logarithmic form, with the variables now ratios of their values in period t and $t-1$ (distinguished by small letters):¹⁵

$$\ln[xn_t] = [\ln Xn_t - \ln Xn_{t-1}] = \gamma[\alpha_1 - \alpha_2]\ln[\text{rer}_t] + \gamma\beta\ln[\text{rpam}_t] \quad (7) \\ + \gamma[\alpha_x - \alpha_m]\ln[\text{shgdp}_t] - \gamma[Xn_{t-2}]$$

The estimation is across all five countries. This is justified by the relatively high degree of integration among the five, which includes not only trade and capital flows, but also labour mobility.¹⁶ To test for the impact of the change in policy regime, we introduce a dummy variable for 'policy' that takes the value of unity for the years in each country defined as 'liberalised' (see Annex 1 for policies, Annex 2 for dummy variables). As discussed above, in two of the countries, El Salvador and Nicaragua, armed

conflicts disrupted economic activity, especially in the agricultural sector. To accommodate this, a 'conflict' variable is introduced, with the value of unity for conflict-affected years (see Annex 2). The equation for estimation is:

$$\ln[xn_t] = a_0 + a_1 \ln[rer_t] + a_2 \ln[rpam_t] + a_3 \ln[shgdp_t] + a_4 [xn_{t-2}] \quad (8)$$

$$a_5 [cnflt_t] + a_6 [Pol_t] + a_7 [Es] + \dots + a_{10} [Nic] + \varepsilon$$

It is predicted that $a_1 > 0$, $a_2 > 0$, $a_3 > 0$, and $a_4 < 0$, and statistically significant. For the hypothesis testing variables, the expected signs are $a_5 < 0$, and the sign of the 'policy' coefficient (a_6) to be revealed. Use of the first relative difference for the dependent variable (xn_t) would result in extremely large changes for some years, especially in the few cases in which the relative trade balance changes from positive to negative.¹⁷ Therefore, the absolute percentage point change is used, $[Xn_t] - [Xn_{t-1}]$.

The results of modelling exercise are presented in Table 5. The model accounts for over one-third of the total variation in net exports (the adjusted R-square is .371), and the overall relationship is significant at a probability of less than one-thousandth (significance of the F-statistic). The explanatory variables conform to their predicted signs and are significant at less than five per cent probability, except for the lagged trade balance, which is marginally non-significant using the ten per cent or less rule. The statistical results suggest that the agricultural trade balance is responsive to relative price changes. A ten per cent real devaluation (rer_t) prompts an increase (decrease) in the agricultural trade surplus (deficit) of 2.7 percentage points. This implies a relatively low elasticity for both exports and imports with respect to the real exchange rate. By definition, the net trade balance elasticity is equal to the export elasticity minus the import elasticity. Since the latter is negative, the coefficient implies that neither can be greater in absolute value than .27 (the maximum value for one if the other is zero). Thus, devaluation improves net export performance, but the elasticities are low.

A ten per cent shift in relative prices in favour of agriculture relatively to manufacturing has a slightly greater effect, of 3.4 percentage points. This can be interpreted as evidence of mobility of resources between sectors, with labour and capital shifting to agriculture when its price rises relatively to other tradables. The 'structural' variable, the share of agriculture in national income, proves to be quite significant, with a high elasticity: if the share of agriculture in GDP were to fall by one per cent, the net agricultural export surplus decreases by almost two percentage points. This is a long-term effect, which implies that over time, with constant relative prices, the Central American countries would decline as net agricultural exporters. The marginally non-significant lagged net export share indicates that the adjustment to equilibrium is relatively rapid.¹⁸

TABLE 5
OLS RESULTS OF ANNUAL PERCENTAGE POINT CHANGE IN NET
AGRICULTURAL EXPORTS, AS PROPORTION OF AGRICULTURAL
VALUE ADDED, 1970-94

[Dependent variable measured in percentage point changes]

	Coefficient	Std Error	T-stat	Significance
Constant	.0616	.0319	1.933	.0559
<i>Explanatory variables</i>				
1. Change in Relative prices agric/manuf ($rpam_t$):	.3425	.0962	3.561	.0006
2. Change in Real exchange rate (rer_t)	.2710	.1188	2.281	.0245
3. Change in Share of agriculture in GDP ($shgdp_t$)	1.7867	.3206	5.572	.0000
4. Net agric exports (xn_{t-2})	-.1259	.03190	-1.644	.1032
<i>Dummy Variables</i>				
5. Policy	-.0592	.0304	-1.943	.0546
6. Conflict	-.1315	.0451	-2.917	.0043
7. El Salvador	.0302	.0443	.684	.4954 (nsgn)
8. Guatemala	-.0072	.0412	-.174	.8622 (nsgn)
9. Honduras	-.0320	.0411	-.778	.4384 (nsgn)
10. Nicaragua	-.0405	.0454	-.890	.3752 (nsgn)
Adjusted R-squared & F-stat	.3707 7.9501	df=108 sgn of F: .000		

Note: For sources and explanation of variables, see Annex 2.

The 'policy' variable, the investigation of whose effect is the purpose of the exercise, shows a negative sign and is statistically significant at five per cent probability. The coefficient indicates that liberalised years were associated with a six percentage point negative shift in relative net exports, slightly less than half the negative shift associated with the conflict variable. It should be stressed that this effect holds relative prices constant. Thus, while agricultural exports prove to be sensitive to relative prices, as theory would predict, the liberalised years were associated with lower net

agricultural exports. The constant term is significant, suggesting an omitted trend influence. This is discussed below.

None of the country dummy variables is statistically significant. This result is quite important and contrary to conventional wisdom. The standard approach portrays Costa Rica as a particular success of trade liberalisation and domestic deregulation among the Central American countries, because it initiated its reforms prior to the other countries and with more vigour. Whether or not it is the case that Costa Rica pursued reform with greater commitment, the statistical results reveal no significant difference in the behaviour of net agricultural exports when one accounts for the effects of relative prices and agriculture's share in national income, *in a context in which the policy dummy is negative and significant.*

WORLD PRICE EFFECTS

As interesting, and unexpected, as the results are, they raise the question, why did the policy shift toward trade liberalisation and domestic deregulation not have its predicted outcome on the agricultural sector in Central America? The orthodox approach would turn to the movements in relative prices for the answer to this question. In a competitive economy, comparative advantage is revealed through movements in relative prices. The relative price argument develops through four parts: first, with liberalisation of the external account, the exchange rate should find its equilibrium level; second, the exchange rate adjustment should increase the prices of tradables relatively to non-tradables if domestic markets are deregulated.¹⁹ Third, if agriculture were labour intensive and the countries labour abundant, then within tradables agricultural prices should rise relatively to other tradables²⁰ and relatively to the general price level. And, fourth, relative exports of agricultural products should rise in response to the relative price changes. Therefore, if relative exports did not rise, one would expect that relative prices did not move in favour of agriculture.

Table 6 provides the relative price data used in the regression, and these are shown graphically in Figures 1 and 2. Part A of the table gives the purchasing power parity exchange rates for the 1980s and 1990s, calculated such that an increase indicates a real depreciation. The numbers show that for Honduras and Nicaragua liberalisation of the current account had the predicted result: the exchange rates depreciated during the period of liberalisation. For Costa Rica and El Salvador the anticipated outcome was contradicted: after appreciations during the 1980s, the exchange rate showed a further appreciation during the 1990s. In the case of Guatemala, the real exchange rate depreciated during the first five years of liberalisation, then appreciated slightly in the 1990s. Overall, the hypothesis

that exchange rate liberalisation results in real devaluation is not proved in Central America, for it is sustained in only two of five cases. Further, Nicaragua must be considered a special case, for the real depreciation of the exchange rate may have had more to do with the end of hyperinflation than with liberalisation as such. It is beyond the scope of this article to explain the appreciation of exchange rates, but one can hypothesise the following mechanisms: short run financial inflows made possible by capital account liberalisation, inflow of worker remittances from the United States, and inflows of foreign direct investment.

In part B of the table is calculated the ratio of the agricultural value added deflator to the GDP price deflator. First, it is interesting to note that during the import-substituting 1970s, *relative prices moved in favour of agriculture* in four of the five countries (Costa Rica, El Salvador, Guatemala and Nicaragua). Relative prices moved against agriculture only in Honduras, which was the country that implemented import substitution least. For the liberalised periods, the result was the reverse: in Costa Rica, El Salvador, Guatemala and Nicaragua relative prices moved against agriculture, and in favour only in Honduras. Part of the explanation might be that the import-substituting policies of the Central American countries included emphasis upon processing of agricultural inputs, including 'traditional exports' such as coffee and cotton seed [Weeks, 1985; Bulmer-Thomas et al., 1992].²¹

TABLE 6
NET AGRICULTURAL EXPORTS BY PERIOD, 1965-95

A. Real Exchange Rate (average for 1970-994 = 100)

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
<i>Years:</i>					
1970-74	165	196	177	161	174
1975-79	97	118	105	111	110
1980-84	94	75	69	73	66
1985-89	78	63	77	64	70
1990-94	66	48	73	91	81

B. Ratio of Agricultural to Manufacturing Price Deflator (average for 1970-94 = 100)

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
<i>Years:</i>					
1970-74	85	111	106	100	85
1975-79	111	148	120	89	111
1980-84	113	107	94	71	113
1985-89	99	77	96	110	99
1990-94	88	46	81	136	88

Note: In Part B, for El Salvador, Honduras and Nicaragua, the last year is 1993. For Guatemala, 1970-86 is the external terms of trade. See Annex 2.

Source: World Bank 1995.

FIGURE 1
REAL EXCHANGE RATES IN CENTRAL AMERICA, 1970-94

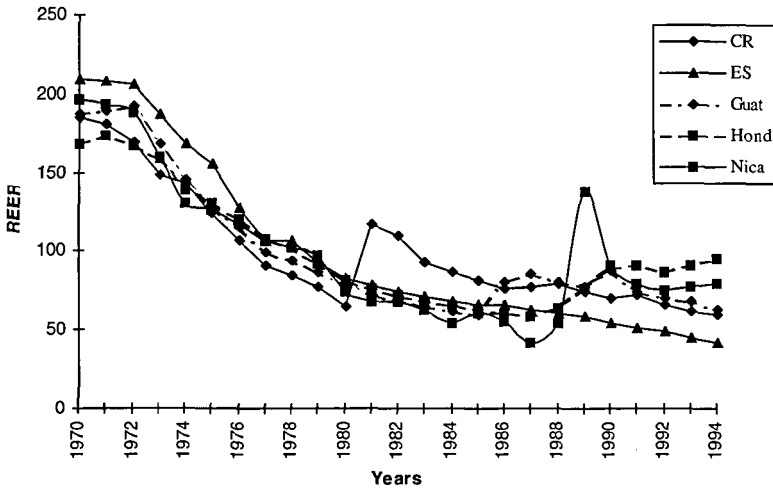
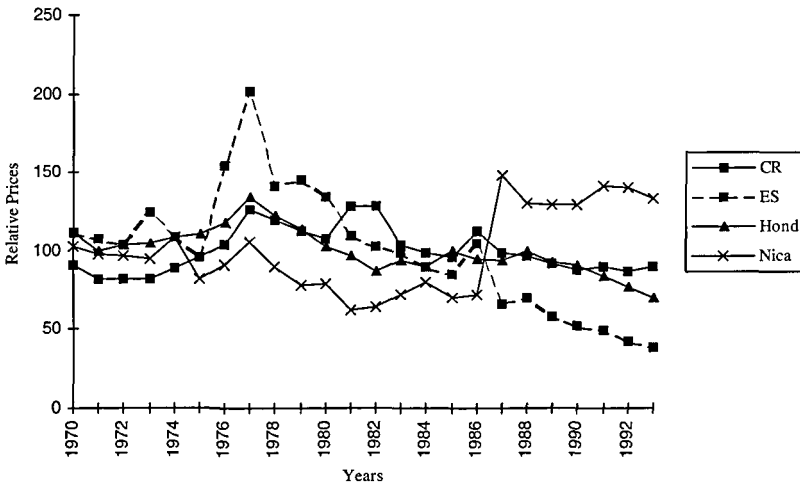


FIGURE 2
RATIO OF AGRICULTURAL TO MANUFACTURING DEFLATOR,
COSTA RICA, EL SALVADOR, HONDURAS & NICARAGUA, 1970-94



In pursuit of an explanation of the decline in the revealed comparative advantage in agriculture, we disaggregate the output of the sector between products for domestic consumption and those for export. Table 7 provides relevant price statistics. The first five products listed in the table are the major exportables: coffee, sugar, cotton, bananas, and livestock. These together accounted for over 80 per cent of agricultural exports during 1980–84, and about 75 per cent during 1990–94.²² They are followed by four products of domestic consumption, maize, beans, rice, and wheat ('importables'). For each product, the trend in the absolute price level is calculated using simple regression analysis, for the years 1980–94.²³ For comparison, the US wholesale price index is given in the last row of the table. The price trends suggest an explanation for the decline in the net exports of the agricultural sector of the region. For two of the exportables, coffee and sugar, the price trend is negative and statistically significant; for two more, the trends are non-significant; and for only one (bananas) is there a significant and positive tendency. If the trend in the US wholesale price index is taken as a measure of the 'world price level', one can conclude that relative prices moved against all the region's major exportables except bananas. As one would expect, only bananas showed a consistent increase in share in total agricultural exports.

For the major importable agricultural products, three of the four show a significant and negative price trend over the period (with the trend for the fourth, beans, also negative, but non-significant). Thus, on the import side, producers of basic food commodities in Central America faced declining international prices; that is, competition with cheapening imports. Table 8 shows that falling border prices of importables was associated, as one would expect, with declining net exports of these products (increased net imports). For the region as a whole, net exports of maize went from minus six per cent of national production during 1970–79, to minus 25 per cent during 1990–95 (with a lower proportional change if Costa Rica is excluded). For rice, the deterioration was greater, from near self-sufficiency during 1970–79, to net imports of almost 40 per cent of national production in the 1990s. While the change for the region as a whole was massive for beans (minus three per cent of national production to -23, from the 1970s to the 1990s), almost all of this was in Costa Rica.²⁴ When this country is excluded, the shift is a relatively small ten percentage points, plus six per cent in the 1970s to -3.5 in the 1990s. This relatively small shift is consistent with the non-significant trend in bean prices (see Table 7, 'importables', number 2).

The information on price trends provides an explanation for the significant constant term in the regression results (Table 5): the trend term may result from the negative movement in the price terms of trade between

Central America's agricultural exportables and non-agricultural importables. On the basis of the trend term, the price information in Table 7, and the net export statistics in Table 8, a 'story' can be constructed to account for the negative coefficient on the liberalisation variable in our model. Declining world prices for the region's major exportable and importable agricultural commodities tended, *ceteris paribus*, to undermine the return to most of the region's major agricultural commodities. On the export side this resulted in disincentives, such that in real terms agricultural exports grew slowly in every country but Costa Rica. On the import side, declining international prices for the major importables also generated disincentives for producers in the region, with the result that agricultural imports grew rapidly. Trade liberalisation exacerbated these effects, by bringing internal agricultural prices more closely in line with international prices. Exchange rate management (that is, managed devaluations) might have offset the relative price shifts, but the liberalisation packages included exchange rate unification and non-intervention in foreign exchange markets. Rather than depreciating to offset international price trends, exchange rates tended to appreciate in real terms under liberalisation.

TABLE 7
REGRESSION-CALCULATED INTERNATIONAL PRICE TRENDS
FOR THE MAJOR CENTRAL AMERICAN COMMODITIES, 1980-95

Crop		Trend Statistic* (per cent p. a.)	R-square & F-statistic
<i>Exportables</i>			
1.	Coffee	- 3.8 (.02)	.327 6.8
2.	Sugar	- 2.1 (.10)	.183 3.3
3.	Cotton	0.8 (ns)	.032 0.5
4.	Bananas	2.2 (.01)	.818 62.8
5.	Livestock	.000 (ns)	.001 0.1
<i>Importables</i>			
1.	Maize	- 2.1 (.01)	.420 8.7
2.	Beans	- 1.1 (ns)	.033 0.4
3.	Rice	- 2.9 (.01)	.568 15.8
4.	Wheat	- 1.4 (.10)	.246 3.9
<i>USA WPI</i>		1.8 (.01)	.909 130.3

* T-statistic in parenthesis under trend value.

Note: Prices are the average paid for Central America as a whole.

Source: CEPAL 1996a.

TABLE 8
NET EXPORTS OF STAPLES, 1970-94
(as percentage of national production)

A. Maize

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Central America	Excluding Costa Rica
<i>Periods:</i>							
1979-79	-18.8	-2.0	-4.4	-1.3	-4.5	-5.7	-3.6
1980-84	-70.5	-10.8	-2.9	-5.2	-36.4	-10.5	-8.0
1985-99	-88.9	-8.9	-2.4	-4.3	-14.2	-8.9	-5.3
1990-95	-568.9	-20.5	-12.4	-13.4	-8.9	-24.6	-14.1

B. Rice

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Central America	Excluding Costa Rica
<i>Periods:</i>							
1979-79	7.1	1.5	-12.2	-15.3	6.9	-2.3	-4.8
1980-84	15.9	-13.9	-7.4	-3.8	-21.8	-1.0	-13.5
1985-99	-9.1	-20.3	-14.1	-4.4	-53.1	-20.4	-27.6
1990-95	-27.5	-43.7	-84.0	-35.4	-40.5	-37.8	-44.6

C. Beans

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Central America	Excluding Costa Rica
<i>Periods:</i>							
1979-79	-37.4	-7.3	-3.1	10.9	8.0	-3.2	6.1
1980-84	-97.3	-0.1	-0.9	3.4	-22.2	-9.4	-4.4
1985-99	7.6	-5.3	-1.9	-3.4	-25.4	-6.6	-8.0
1990-95	-38.3	-17.1	-3.3	-5.4	3.6	-23.2	-3.5

Sources: Weeks [1990, 1996] & CEPAL [1996a].

The statistics provide circumstantial evidence that trade liberalisation shifted incentives away from the major agricultural commodities in Central America. An advocate of free market mechanisms might argue that this result is not a bad thing: producers should shift from commodities with declining world prices to ones with rising or stable prices. None would deny that the Central American countries needed export diversification. Table 9 shows that in the early 1980s five products accounted for toward 90 per cent of agricultural exports in Costa Rica, El Salvador, Honduras, and Nicaragua, and over 70 per cent in Guatemala. Inspection of the table suggests that liberalisation was coincident with some diversification, 11

percentage points for Costa Rica and nine for Guatemala, and over ten per cent for both El Salvador and Nicaragua.²⁵ For Honduras the change was small and merely a return to the degree of concentration of the early 1980s. However, the diversification was not sufficient to prevent a deterioration of the agricultural trade balance in four of the five countries.

TABLE 9
PROPORTION OF AGRICULTURAL EXPORT EARNINGS CONTRIBUTED
BY COFFEE, COTTON, SUGAR, BANANAS & MEAT, 1980s & 1990s

Countries:	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
<i>Periods:</i>					
1980-84	89	92	75	85	88
1985-89	84	95	75	89	92
1990-94	78	81	68	85	80
Percentage pt change (lib - prelib)	-11	-14	-9	-4	-12

Source: CEPAL [1996b]

POLICY IMPLICATIONS

The statistical results suggest that the trade liberalisation and market deregulation policies were not associated with increases in net exports of agriculture in Central America. The main result would appear to have been import stimulation, with weak effects on exports. In part this could be explained by the failure of the exchange rate to depreciate in several of the countries. However, when we account for this in our model, the liberalisation variable is still negative. A purposeful trade policy, combining exchange rate management and subsidies to farm inputs, might have produced an outcome more favourable to the agricultural sector than deregulation and trade liberalisation. If fostering agriculture was a policy goal, a judicious combination of export promotion and import substitution *targeted to agriculture* might have been more successful. Whether or not this would have produced a better export performance for agriculture, the Central American evidence supports the conclusion that trade liberalisation is not sufficient to stimulate agricultural exports. A country-by-country approach is required without prior theoretical bias as to outcome.

The elements of an alternative policy would be formulated in terms of an alternative *agricultural* policy, of which trade policy would be one part. The agricultural policy would be based on two principle goals, to diversify exports and to aid smallholders in the transition to a more deregulated and liberalised incentive environment. The basic staples in Central America,

especially maize, are the mainstays of smallholder incomes.²⁶ Regional or country level tariffs would be used to protect smallholders, and combined with a programme to foster diversification into higher value added crops, such as vegetables for the North American market. Rates of protection could be linked to fluctuations in border prices during a transitional period. At the same time, directed credit and extension services would be used to encourage adoption of new crops. These production-altering policies would be combined with exchange rate management to counter the disincentive effects of declining world prices. Such a programme would be designed to facilitate, rather than prevent, trade-induced changes in the structure of agricultural output.

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NOTES

1. It is not entirely satisfactory to use the root 'liberalise' in two senses, 'trade liberalisation' and 'liberalised' (in the sense of the economy as a whole), but no better choice of words presents itself.
2. The 'small country' assumption is made: that the country in question supplies only a tiny portion of each product relatively to world production, so the country's entry into world trade has no impact on world prices.
3. Most models assume at least three products: an exportable, an importable, and a non-traded good, for example, construction (see Liang [1992] for analysis of trade policy in a three-commodity framework).
4. '[...]e found that the dominant influence on agricultural prices was through indirect, economywide policies' [Schiff and Valdés 1992: p.28]. A similar argument is presented in Edwards' review of the trade liberalisation literature [Edwards, 1993].
5. Elsewhere in the same report, one reads: 'The primary motor for growth in the past was the expansion of trade, and this remains the most promising vehicle ... To generate an expansion of trade ... it is necessary to reduce the anti-export bias created by past ISI policies ... [T]rade liberalization is required to provide a better incentive framework ... [World Bank, 1989: iii].
6. Changes in policies are presented in detail in Annex 1.
7. These were bananas, coffee, cotton, meat products and sugar.
8. In the 1987 *World Development Report*, all five Central American countries were defined as 'moderately inward oriented' by the World Bank for the period 1973–1985 [World Bank, 1987]. This assessment would be correct up to 1979, and agrees with Table 1. However, during 1980–85 Nicaragua was probably the most protectionist country in Latin America after Cuba, and Costa Rica had initiated trade reforms. The problem with the World Bank categorisation is not conceptual or factual, but rather the long time period, during which some countries changed their policy regimes.
9. A general survey of policy changes for all Latin American countries is found in Bulmer-Thomas [1992]. The table is based primarily on Paz Calferata [1993] and Buttari [1990], where chronologies of policy changes are given in tables. Other useful sources are Garay [1995], CEPAL [1995], Dean, Desai and Riedel [1994], which covers only Costa Rica among our countries, World Bank [1988] for Costa Rica only, and World Bank [1989].
10. As Edwards writes: '... [T]here was a nontrivial degree of arbitrariness in classifying countries ... [by use of] binary dummies [which] precluded the analysis of how different grades of trade liberalization affect growth and other key variables' [Edwards, 1993: 1373].

11. For a discussion of the arbitrariness of policy indices, see Weeks [1997].
12. The most important of these for the region were coffee, bananas, sugar, livestock, and cotton, though the latter declined dramatically in the 1980s. In the late 1980s and 1990s non-traditional export crops, such as fruits and market vegetables became important in Costa Rica and Guatemala.
13. The region's most important staple was maize, followed by rice and beans. A fourth internationally traded crop of domestic consumption was sorghum, used both for animal feed and human consumption.
14. Since the purpose is to test the hypothesis that policy change impacted on exports, no attempt is made for a general search for structural breaks in the data series.
15. For example, $rer_t = [RER_t]/[RER_{t-1}]$, $shgdp_t = [SHGDP_t]/[SHGDP_{t-1}]$, etc.
16. While there was not free mobility of labour among the countries over the period under study, there was considerable legal and illegal migration of agricultural workers, especially from El Salvador and Honduras to Nicaragua in the 1970s, and from Nicaragua to Costa Rica in later years. See Bulmer-Thomas *et al.* [1992].
17. That is, from greater than unity to less than unity in the fractional measure.
18. From the model, one sees that the 'reaction coefficient' (the percentage of adjustment to equilibrium that occurs in one period) is .87 (one plus the coefficient on the lagged trade balance).
19. Devaluation plays a central role in the liberalisation scenario [Krueger, 1978].
20. This relative price shift follows from the standard assumption that agriculture is labour intensive compared to other tradables, namely manufactures. Were it the case that agriculture were less labour intensive, then the effect would be the reverse.
21. This will be part of a larger study, in an extension of this article.
22. There was a dramatic change in composition, however. In the former period, bananas accounted for less than 20 of agricultural exports and near 40 per cent in the latter period.
23. For exportables the price is the average (trade-weighted) export price across the five countries. For the importables the average (trade-weighted) import (border) price across the five countries is used.
24. The Costa Rican government ended subsidies to beans during the liberalisation process [Rueda-Junquera, 1996; Weeks, 1996].
25. These percentage changes overstate the degree of diversification, since the share for bananas rose substantially. Much of the decline was the result of the collapse of cotton production throughout the region.
26. See Weeks [1995b: annex] where the production of different products by size of farm is analysed for Costa Rica, Guatemala and Honduras.

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ANNEX 1
POLICY CHANGES IN CENTRAL AMERICA

This annex gives the chronology of policy changes in the Central American countries. Table A1.1 provides a chronology by country of the major policy reforms. To put these in context, Table A1.2 provides a 'before' and 'after' summary of these changes. The sources for the tables (in order of detail provided) are : Buttari (1990), Paz Calferata (1993), Weeks (1995a and 1995b), Rueda-Junquera (1996), and CEPAL (1995).

TABLE A1.1
CHRONOLOGY OF MAJOR POLICY CHANGES IN CENTRAL AMERICA

Country	Year and policy change
Costa Rica	1984 start of privatisation
	1985 crawling peg exchange rate, export incentives, export free zone
	1986 tariff liberalisation, interest rate liberalisation, reforms of basic grains pricing and subsidies
	1987 tax reform, cut in support prices for basic grains, trade liberalisation, application to GATT
	1988 financial sector reform, trade liberalisation
	1989 revised export incentives, trade liberalisation
	1994 wheat & rice imports completely privatised
El Salvador	1989 liberalisation of exchange rate, liberalisation of interest rates, trade reform, price deregulation, bank privatisation, petroleum sector reforms, agricultural sector reforms and liberalisation (including elimination of state purchasing of grains), clearinghouse for exports, elimination of export taxes except coffee
	1990 unification of free market exchange rate, more privatisation of banking, reduction of tariffs, implication and reduction of tax rates, more liberalisation of petroleum sector, increase and unification of interest rates, coffee exports privatised, sugar refineries privatised
Guatemala	1986 liberalisation of price controls, simplification of exchange rate, increases in interest rates, reduction of exchange rate subsidies, increases in selected prices (including petroleum), restructuring of customs administration, tariff reductions on textiles
	1987 tax reform, simplification of export administration, unification of commodity trade into regulated exchange market
	1988 unification of exchange rate, reduction in price controls
	1989 freely floating exchange rate, elimination of exchange rate guarantees, tariff reform, export incentives, liberalisation of interest rates, export free zones
	1990 elimination of temporary export tax, auction system for exchange rate, tariff liberalisation, taxes on exports eliminated, elimination of import quotas on agricultural products, elimination of export ban on basic grains
Honduras	1990 market-based crawling peg for exchange rate, raised interest rate ceilings, tariff reform, partial price liberalisation, temporary export tax on non-traditional exports rescinded
Nicaragua	1990 reform of the exchange rate regime (through introduction of new currency pegged one-to-one with the US dollar), deregulation of interest rates
	1991 eliminated state monopoly on trade, privatisation, tariff reform, export incentives

TABLE A1.2
SUMMARY OF POLICY REGIMES IN CENTRAL AMERICA, CIRCA 1994

Policy Area	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
<u>Exchange Rate</u> Pre-liberalisation	Fixed to US dollar	Fixed to US dollar, market segmented by type of transaction	Fixed to US dollar	Multiple exchange rates	Fixed to US dollar, (multiple rates), large 'black market' premium
Post-liberalisation	Free, with some CB intervention	Free, with some CB intervention	Flexible, administered	Free, with some CB intervention	Flexible, administered (crawling peg)
<u>Tariffs</u> Pre-liberalisation	Rates to 100%, import surcharges, tariff exemptions	Tariff range 5-35%, with 50% for certain products	Tariff range 0-40%, surcharge on imports	Tariff range 0-120%, surcharge on imports	Tariff range 4-253%
Post-liberalisation	Large tariff reductions, harmonisation to CA Tariff System (0-20%); special tariff on rice	Large tariff reductions, harmonisation to CA Tariff System (0-20%);	Harmonisation to CA Tariff System (0-20%);	Tariff range 0-40%, harmonisation to CA Tariff System (0-20%);	harmonisation to CA Tariff System (0-20%);
<u>Import Restrictions</u> Pre-liberalisation	Deposits for imports, licenses for basic grains	Permits for basic grains	Licenses for basic grains, wheat, sugar, seeds, milk, fruits, agricultural inputs	Licenses from central bank for all imports	Licenses for all imports
Post-liberalisation	Licenses required for poultry & dairy products	Licenses for sugar & molasses	Restrictions for cattle and processed meat	Licenses for sugar & poultry	Restrictions on sugar imports
<u>Export Restrictions/Incentives</u> Pre-liberalisation	Permits to export grains, seeds, sorghum; export taxes	Permits to export grains, export taxes	Permits for most agricultural exports (not coffee)	Permits for all exports, export taxes, 'temporary' ex-port surcharge	Restrictions on foreign exchange retention by exporters, permits for most exports
Post-liberalisation	Restriction on wood exports; export taxes on coffee based on world price (not charged in 1993-94)	Restrictions on exports to CA of cotton, sugar, coffee & wheat flour; export taxes eliminated	Elimination of export licenses; Export taxes on coffee & bananas (one & 1.5% of value)	Licenses required for sugar, edible oils & poultry; export taxes on coffee (non-processed, if world price above US\$70), bananas (US\$.50 per box), sugar (if world price above US\$ 15)	No licenses, no export taxes

TABLE A1.2 (cont.)

Policy Area	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua
<u>Price Controls</u> Pre-liberalisation	Prices of products in 'basic consumption basket', guaranteed producer prices for grains (except rice, whose price set for mills)	240 products price controlled, guaranteed prices for grains	Price control on white maize, beans, milk, some meat products	Price controls on sugar, oils, coffee, poultry, wheat, milk, & several other products; Guaranteed prices for basic grains	Price controls on 'basic' consumer goods, state trading in most consumer goods
Post-liberalisation	Regulation of profit margin for: rice, beans, white maize, molasses; price setting for sugar, coffee, bread flour, poultry	No price controls or guaranteed prices;	No price controls or guaranteed prices;	No price controls or guaranteed prices, except for sugar & coffee (low quality);	No price controls or guaranteed prices;
<u>State Marketing</u> Pre-liberalisation	National Production Council (CNP) intervened in grains market (except rice) through domestic & external sales and purchases	Food Regulator Institute (IRA) intervened in grains market through domestic & external sales and purchases	Agricultural Marketing Institute (INDECA) intervened in grains market through domestic & external sales and purchases	Agricultural Marketing Institute (IHMA) intervened in grains market through domestic & external sales and purchases; State monopoly on grain imports	National Basic Food enterprise (ENABUS) intervened in grains market through domestic & external sales and purchases, owned 80% of storage facilities; state controlled 55% of all imports & 98% of all exports
Post-liberalisation	In beans & white corn (minor)	Marketing agency closed, state monopoly on trade in coffee & sugar eliminated, price band for yellow maize, rice & sorghum	No state participation in basic products trade, notional price band for yellow maize, rice & Sorghum	State supplier of basic products imports small amounts of rice, sugar, chicken, maize, price band for yellow maize, rice & Sorghum	State role reduced to a minimum, Price band for yellow maize, rice & Sorghum

Note: 'Pre-liberalisation' refers to the situation just prior to the following dates: Costa Rica 1985, El Salvador 1990, Guatemala 1985, Honduras 1990, and Nicaragua 1990.

Source: Paz Calferata 1993, annex tables.

ANNEX 2
DATA SOURCES AND VARIABLES

Date Sources:

The major sources are *FAOSTAT*, a database on 'floppy' disk from the FAO, and *World Development Indicators* of the World Bank, on CD-ROM. The latter has been replaced by a new CD-ROM, more technically advanced, but with a shorter time series. There are no relative price data for 1965–69 in the case of Guatemala. Thus, the regression is over the years 1970–94.

- (1) Agricultural exports and imports: *FAOSTAT* (1996), in current US dollars.
- (2) Agricultural value added (GDP): in current US dollars, *World Development Indicators*, World Bank. Slightly different time series are found in *SIECA* (1981, 1988, & 1990) and *CEPAL* (1996b).
- (3) Constant price agricultural GDP: in 1978 prices, *World Development Indicators*, World Bank ('Stars' on CD ROM).
- (4) Relative prices: nominal exchange rate, GDP deflator, agricultural sector deflator, manufacturing sector deflator, *World Development Indicators*, World Bank ('Stars' on CD ROM).

Regression variables:

- (1) *Change in net agricultural exports*, as proportion of sectoral value added, measured as the absolute change,

$$xn_t = (Xn_t) - (Xn_{t-1})$$

- (2) *Change in the real effective exchange rate (RER)*

Since for all the countries the US wholesale price index would serve as the measure of international prices, it is not included in the calculation. The variable is calculated as the natural logarithm of the ratio of the exchange rate deflated by the GDP price index) in years t and $t-1$:

$$rer_t = \ln[RER_t] / [RER_{t-1}]$$

- (3) *Change in the relative prices of agricultural and manufacturing prices (RPAM)*. This variable is a proxy for relative price changes within tradable goods.

$$rpam_t = \ln[RPAM_t] / [RPAM_{t-1}]$$

For Guatemala, sector price deflators begin in 1987. For 1970–1986, the external net barter terms of trade were used (*FAOSTAT*).

- (4) Change in the share of agricultural value added in total GDP (*shgdp*):

$$shgdp_t = \ln[SHGDP_t / SHGDP_{t-1}]$$

- (5) *Conflict*: This variable assumes a value of unity for El Salvador and Nicaragua in the following years:

El Salvador: 1981–89

Nicaragua: 1977–79, 1983–89.

- (6) *Policy*: This variable assumes the value of unity for the following years:

Costa Rica 1982–1994

El Salvador 1989–1994

Guatemala 1985–1994

Honduras 1990–1994

Nicaragua 1989–1994

For an explanation of the choice of these time periods, see Weeks [1995a: pp.70–73].

- (7) For the country dummies, Costa Rica is the omitted variable.