Can Trade Liberalization Lead to
an Increase in Poverty in Central America?*

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A stylized Central American trade model is used to demonstrate that trade liberalization can cause an increase in poverty. The paper uses a straight-forward 3x3 small-country trade model. In the general case the 3x3 model will not yield signable results. In this paper constraints that are consistent with stylizations for Central America provide enough structure to give signable results for the effects of trade policy changes on factor prices. The stylized economy is modeled to have a manufacturing sector, an agricultural export sector, and a traditional subsistence agricultural sector. This 3x3 model is much more appropriate for analysis of trade policy in Central America than the standard 2x2 model.

I. Introduction

Common recommendations for improving economic performance in developing countries include liberalizing trade policy.[1] In fact, multilateral aid agencies frequently tie aid to trade policy changes. The typical International Monetary Fund stabilization package includes requirements for a general opening up of the economy to international commerce.[2] The World Bank is also more frequently attaching conditionality requirements, including trade liberalization, to its loans.[3]

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[1] For example, see Krueger (1984). For an opposing view see Vanek (1986).

[2] See Cline and Weintraub (1981).

[3] For a good summary of World Bank policies and positions, see "The World Bank," *The Economist*, September 27, 1986.

to illustrate problems that can arise with trade liberalization in Central American economies. Using a stylized model with three sectors it is demonstrated that for countries that currently have some level of domestic protection for a modern (manufacturing) sector and an export tax for the agricultural sector, trade liberalization will cause an increase in the inequality of the distribution of income, a drop of the wage in terms of the subsistence good, and a corresponding increase in the incidence of poverty.

The following section describes a particular stylization of a Central American economy and develops the resulting model. The model is then used to illustrate the results of trade liberalization in such an economy. In section III the policy results are discussed. Section IV provides concluding remarks.

II. A Stylized Trade Model of a Central American Economy

The primary exports of all the Central American countries are either agricultural goods or natural resources in raw or semi-processed form. For example, coffee and cotton comprise approximately 59% (value) of El Salvador's exports while fruits, nuts, coffee, and meat comprise approximately 59% of Costa Rica's exports.[6] Table 1 shows agricultural exports as a percentage of total exports for each country in the region. These obser-

Table 1

SELECTED CENTRAL AMERICAN COUNTRIES' AGRICULTURAL
EXPORTS AS A PERCENTAGE OF TOTAL EXPORTS

Country	Agricultural Exports
Costa Rica	62.45
El Salvador	62.96
Guatemala	57.69
Honduras	65.92
Nicaragua	85.92

Source: *Handbook of International Trade and Development Statistics,* 1987 Supplement, UNCTAD, UN Publications, New York, p. 180 and following pages.

[6] Figures calculated from the *Handbook of International Trade and Development Statistics,* 1987 Supplement, UNCTAD, UN Publications, New York, p. 180 and following pages.

entry or potential entry. The domestic price for Y (X) is the world price plus (less) the domestically levied import tariff (export tax).

The agricultural sector uses land (T) and labor (L) in both of its sub-sectors and capital (K) in its export sub-sector. The agricultural sector pro-duction functions can be expressed as follows:

(1) $S = H(T,L)$,

(2) $X = G(T,L,K)$,

where H and G are well-behaved production functions exhibiting constant returns to scale. The domestic price of X is q_d, which differs from the world price, q, by the amount of the export tax, t_x, on the agricultural export good (i.e., $q - q_d = t_x$).

The manufacturing sector uses only capital and labor. In this sector a protective tariff, t_y, causes the domestic price, p_d, to be higher than the world price, p, by the amount of the tariff (i.e., $p_d - p = t_y$). The modern sector's production function can be expressed as follows:

(3) $Y = F(L,K)$,

where F also is a well-behaved production function exhibiting constant returns to scale.

The general equilibrium conditions for the economy are:

for labor:
(4) $p_d F_L = w^*$,

$q_d G_L = w^*$,

$H_L = w^*$;

for land:
(5) $q_d G_T = \pi^*$,

$H_T = \pi^*$;

for capital:
(6) $p_d F_K = r^*$,

$q_d G_K = r^*$;

where the F_i's, G_i's, and H_i's are the respective marginal products of the

(9c) $\hat{q}_d = \beta_{LX}\,\hat{w} + \beta_{TX}\,\hat{\pi} + \beta_{KX}\,\hat{r}$;

where β_{ij} is the ith factor's share of the output of j (e.g., $\beta_{LX} = a_{LX}w^*/q$) and the $\wedge$ notation refers to the percentage change of the equilibrium value of the variable (e.g., $\hat{w} = dw^*/w^*$). Note that: $\beta_{KS} = \beta_{TY} = 0$ since $a_{KS} = a_{TY} = 0$ (i.e., capital is not used in subsistence agriculture and land is not used in manufacturing).[10] Also, since the output of the subsistence sector is the numeraire good its percentage price change is zero.

Solving for $\hat{w}$, $\hat{\pi}$, and $\hat{r}$ results in equations (10a-c).

(10a) $\hat{w} = \hat{p}_d\,(\beta_{KX}\beta_{TS}/D) + \hat{q}_d(-\beta_{KY}B_{TS}/D)$,

(10b) $\pi = \hat{p}_d\,(-\beta_{KX}\beta_{LS}/d) + \hat{q}_d(\beta_{KY}\beta_{LS}/D)$,

(10c) $\hat{r} = \hat{p}_d\,((\beta_{LS}\beta_{TX}-\beta_{LX}\beta_{TS})/D) + \hat{q}_d(\beta_{LY}\beta_{TS}/D)$,

where $D = \beta_{KY}(\beta_{LS}\beta_{TX}-\beta_{LX}\beta_{TS}) + \beta_{KX}\beta_{LY}\beta_{TS}$. All of the β_{ij}'s are positive fractions, as they are factor shares. The only non-obvious sign is for the expression:

(11) $\beta_{LS}\beta_{TX}-\beta_{LX}\beta_{TS}$,

which is in the numerator in (10c) as well as being in the denominator of all the equations (10a-c). Expression (11) can be rewritten using the definition of factor shares as:

(12) $((w^*\pi^*)/q_d)\,(a_{LS}\,a_{TX}-a_{LX}\,a_{TS})$.

Referring to (7) and recalling that prices must be positive, it is obvious that expressions (12) and (11) are positive. Equations (10a-c) can now be easily interpreted.

III. The Policy Effects: Interpretation of the Results

There are three methods for liberalizing trade: lowering the import tariff, lowering the export tax, or doing both simultaneously. If the import tariff is removed or lowered, ($\hat{p}_d<0$), the wage falls, the reward to land rises, and the rental for capital falls. If the export tax is removed or

[10] It is sufficient that a_{KS} and a_{TY} be small (approaching zero) to obtain the results discussed below, but the exposition becomes needlessly complex in that case.

income from land and capital is highly concentrated. This is indicated by the large segments of the population that are without secure access to land (LNL). Secondly, land is used relatively more intensively in export agriculture than in subsistence agriculture.

In this model trade liberalization decreases the return to labor, lowering the income of the poorest segment of the society. In some Central American countries this may be almost 60% of the population. The combined return to land and capital must rise by at least enough to offset the losses to labor, but in the absence of a redistribution of these gains, the impact of the trade liberalization is to increase the inequality of the distribution of income, and increase the incidence of poverty. If the mandate to liberalize trade is attached to a development aid package, then the impact of trade liberalization will be at odds with the usual developmental goal of reducing poverty.

Clearly, one way to make trade liberalization beneficial to the poor (LNL) would entail having a land redistribution program carried out in advance of any trade liberalization policy. In fact, having a high export tax on agriculture and using the proceeds to purchase land for redistribution may be a very attractive way to finance a land reform program since the higher is the export tax, the lower is the price of the land and the higher is the wage for labor. Once land holdings are redistributed, trade liberalization could be implemented as the truly optimal trade policy.

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