Can trade liberalization lead to an increase in poverty in Central America?

Moore, Robert E.

December 1990

Policy Research Center

College of Business Administration
Georgia State University

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

Robert E. Moore

Georgia State University

Carl V. Patton	President
Ronald J. Henry	Provost
Cleon Arrington	Vice President for Research

College of Business Administration

John D. Hogan	Dean

Policy Research Center

Roy Bahl	Director
Jorge L. Martinez	Associate Director, International Studies
David L. Sjoquist	Associate Director, Domestic Studies
David Sandt	Associate Director, Administration
Henry Huckaby	Director, Fiscal Policy Program
Ronald G. Cummings	Noah Langdale Chair
Francis W. Rushing	Bernard A. and Eugenia A. Ramsey Chair

Senior Associates

Shomu Banerjee	Julie L. Hotchkiss	Laura Osborne	George W. Sherk
Chris Bollinger	Keith R. Ihlanfeldt	Marshall Sanders	Paula E. Stephan
Paul Brewer	Jennifer McCoy	Rubin Saposnik	Mary Beth Walker
Carol Ann Dalton	Richard McHugh	Samuel Skogstad	Sally Wallace
Martin F. Grace	Robert E. Moore	Bruce Seaman	

Associates

Curtis Augustin	Systems Analyst
Larry Gess	Research Associate II
Richard Hawkins	Research Associate I
Bradley Moore	Training Coordinator

Graduate Research Assistants

Mary Alao	Barbara Edwards	Adam Korobow	Joey Smith
Harold Ball	Steve Everhart	Fitzroy Lee	Tom Stevens
Grant Black	Dagny Faulk	Steven Maguire	Stephanie Stich
Jamie Boex	Robert Flagge	Robert McNab	Joe Timmerman
David Bowes	Kate Gardner	James Murphy	Wen Tsui
Edith Cash	Chris Geller	Jim Palen	
Robbie Collins	Jill Gunderson	Glenwood Ross	
Jessica Bye	Janet Keene	Sal Sehili	

Administrative Staff

Dawn Baldwin	Microcomputer Specialist
Kathleen Banks	Administrative Coordinator
Bettye Davis	Assistant to the Director
Joan Y. Hippolyte	Microcomputer Specialist
Kate Nickerson	Librarian
Helen Rosier	Microcomputer Specialist
Rosetta Smith	Senior Administrative Secretary
Arthur D. Turner	Microcomputer Specialist

Journal

of

Economic

Development

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

Robert E. Moore

CAN TRADE LIBERALIZATION LEAD TO AN INCREASE IN POVERTY IN CENTRAL AMERICA?[*]

Robert Moore[**]

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]

A common observation is the reluctance of developing country governments to undertake the opening to the international economy necessary to implement a liberal trade policy.

[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.

In the present paper a scenario is presented that can explain a developing country government's reluctance to undertake trade liberalization because of the political cost of the adverse impact that it might reasonably be expected to have on the distribution of income and on the incidence of poverty.[4] This may tend to make trade liberalization not only politically infeasible, but also at odds with the thrust of any aid package to which it is tied.[5]

The simplest analysis of the impact of trade liberalization can be performed using the basic two-factor, two-good, small-country trade model. Many less developed countries impose tariffs on the imported manufactured goods (M) and taxes on the exported agricultural goods (A). In the two-sector (M,A), two-factor (K,L) model, where manufacturing is assumed to be relatively capital intensive, trade liberalization (lowering or removing the import tariff or the export tax or both) will increase the reward to labor, and decrease the reward to capital. Given the distribution of property, such a result implies that trade liberalization not only increases GNP, but does so in a way that decreases the inequality of the distribution of income. With a slightly more complex model this is not the case.

A few basic observations about trade and domestic resources are used 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

---

[4]It is straightforward to demonstrate the gains from trade (see Kemp, 1962 and Samuelson, 1962) and simply announce that the gainers can compensate the losers. The sort of lump-sum transfer necessary for this compensation simply does not occur. Feasible redistribution schemes have the drawback that they change incentives and therefore introduce inefficiencies that can overwhelm any gains to trade liberalization. The most appealing redistribution scheme is proposed by Dixit and Norman (1980). In their scheme the government provides a series of taxes and subsidies such that consumers face the tariff-distorted prices and producers face the nondistorted world prices. In such a case the gains to trade accrue to the government to distribute as it wishes. The practical problems of such a scheme are immense. No market is left free of government intervention and the intervention must be perpetual. Furthermore it is implied that the appropriate taxes are costlessly collected and administered with perfect efficiency by the government. Then, the surplus (or at least some of it) is distributed without creating any distortions. There are other minor difficulties with this scheme. Throughout this paper, redistributing the gains from trade is not considered a feasible option.

[5]Krueger (1986), p.24, dismisses the concern of high food prices for the low-income poor as a worthy consideration when considering liberalizing agricultural markets because she argues that superior methods of income transfer are available. In some Central American countries an income transfer program would need to reach 60% of the population. It is not only that the price of food will rise, but that the cost of resources used to produce food, resources not generally owned by the poor, will also rise and be diverted to other uses. In such a situation I can not share her faith in the alternative transfer measures.

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 observations justify a stylized model in which the agricultural sector is significantly export oriented. By contrast the manufacturing sector will be primarily import competing. In addition to the export agricultural sector there is a subsistence sector that uses land to grow subsistence crops. This sector is characterized by very labor intensive production on small plots of land. These observations justify a model in which export agriculture in less labor intensive and more land intensive than subsistence agriculture.

---

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

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.

A secondary observation is that a large proportion of the rural population can be classified as landless or near-landless (LNL). This includes agricultural workers who own no land, tenant farmers with small and insecure access to land, and farmers who own an inadequately sized parcel of land to provide for a subsistence livelihood (see Table 2). This suggests that the ownership of land and, therefore, the income from land is rather concentrated. Furthermore, large parts of the population will receive income only from labor. For example, using the figures from Table 2, at least 59.5% of the population of Guatemala is LNL and will have income almost exclusively from labor.

Table 2
Selected Central American Countries' Population Statistics

Country	Rural Population as % of Total	LNL as % of Rural
Costa Rica	60	55
El Salvador	60	80
Guatemala	70	85

Source: Esman, 1978, p.7a.

The stylized model presented below has two basic sectors, agriculture (rural) and manufacturing (modern-urban). The agricultural sector has two sub-sectors. In one sub-sector the output is primarily an export good. In the other sub-sector, the output is primarily a domestic consumption (subsistence) good. All three goods are traded, and without intervention are sold at

the world price. Let the subsistence good be the numeraire. Then the three goods; subsistence (S), agricultural export (X), and manufactured goods (Y) have world prices 1, q, and p, respectively.

Output prices are not variable with respect to domestic output changes (in the relevant range), because of the small-country assumption. Competition insures zero profits by bidding the price of scarce factors up with 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 production functions can be expressed as follows:

$$S = H(T,L) , \tag{1}$$

$$X = G(T,L,K) , \tag{2}$$

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:

$$Y = F(L,K) , \tag{3}$$

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

The general equilibrium conditions for the economy are:

for labor:

$$p_d F_L = w^* , \tag{4}$$

$$q_d G_L = w^* ,$$

$$H_L = w^* ;$$

for land:

$$q_d G_T = \pi^* , \tag{5}$$

$$H_T = \pi^* ;$$

for capital:

$$p_d F_K = r^* , \tag{6}$$

$$q_d G_K = r^* ;$$

where the F_i's, G_i's, and H_i's are the respective marginal products of the subscripted inputs. w^*, π^*, and r^* are the equilibrium factor payments to labor, land, and capital.

World prices will remain stable. In accordance with the previous section, it is assumed that subsistence agriculture is more labor intensive and less land intensive than is export agriculture[7], so that:

$$a_{LS} > a_{LX} , \text{ and } a_{TS} < a_{TX} , \tag{7}$$

for all equilibrium factor price ratios (π^*/w^*), where a_{ij} is the per unit input requirement of factor i in the production of j. That is, there will be no factor intensity reversals and the subsistence production will always be the labor intensive sub-sector of agriculture.

Full employment[8] of labor, land, and capital implies:

$$\bar{L} = L_S + L_X + L_Y , \tag{8}$$

$$\bar{T} = T_S + T_X ,$$

$$\bar{K} = K_Y + K_X .$$

The above conditions (4 - 8) allow w^*, π^*, and r^* to be considered implicit functions of the output prices ($q_d, p_d, 1$).

---

[7]It would be preferable to actually estimate the input coefficients. Unfortunately, sectoral level data on the Central American economies, especially that include data on a subsistence sector are not readily available.

[8]Full employment, especially of labor, may not be generally accepted as characteristic of Central American countries. It is, however, a standard assumption of basic trade models. It is employed here to reassure those who might be skeptical that the results do not rely on an unemployment equilibrium concept. Allowing for unemployment complicates the model but does not change the results.

Trade liberalization implies that q_d rises (p_d falls) as the export tax (import tariff) is removed. Of course the export tax and the import tariff could be removed separately or simultaneously. Following the method in Jones (1979) the percentage change in the output prices are expressed as functions of the factor prices and the factor shares.[9] So that:

$$\hat{p}_d = \beta_{LY}\,\hat{w} + \beta_{TY}\,\hat{\pi} + \beta_{KY}\,\hat{r}\,, \tag{9a}$$

$$0 = \beta_{LS}\,\hat{w} + \beta_{TS}\,\hat{\pi} + \beta_{KS}\,\hat{r}\,, \tag{9b}$$

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

where β_{ij} is the ith factor's share of the output of j (e.g., $\beta_{LX} = a_{LX}w^*/q$) and the ^ 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 (0).

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

$$\hat{w} = \hat{p}_d\,[\beta_{KX}\beta_{TS}/D] + \hat{q}_d\,[-\beta_{KY}\beta_{TS}/D]\,, \tag{10a}$$

$$\hat{\pi} = \hat{p}_d\,[-\beta_{KX}\beta_{LS}/D] + \hat{q}_d\,[\beta_{KY}\beta_{LS}/D]\,, \tag{10b}$$

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

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:

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

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:

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

---

[9]See "The Structure of Simple General Equilibrium Models," Chapter 4, Jones, 1979. The derivation of these equations is straightforward and simply takes the Jones case of a 2x2 model and applies it to a 3x3 model.

[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.

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 lowered, ($\hat{q}_d > 0$), the wage falls, the reward to land rises, and the rental for capital rises. Finally, if both the export tax and the import tariff are simultaneously removed or lowered, the wage falls, the reward to land rises, and the rental for capital may increase or decrease depending on the magnitudes of the factor shares and the price changes (See Table 3).

Table 3
Policy Results from Model Equations (10a-c)

Policy	Factor Price Changes
$\hat{p}_d < 0, \hat{q}_d = 0$	$\hat{w} < 0, \hat{\pi} > 0, \hat{r} < 0$
$\hat{p}_d = 0, \hat{q}_d > 0$	$\hat{w} < 0, \hat{\pi} > 0, \hat{r} > 0$
$\hat{p}_d < 0, \hat{q}_d > 0$	$\hat{w} < 0, \hat{\pi} > 0, \hat{r} <?> 0$

The results are actually quite intuitive. As q_d rises, the return to land used to produce the export good (the relatively land intensive sub-sector of agriculture) rises, bidding up the factor reward for land. To match the higher return for land, owners of land used to produce the subsistence good must either switch to the production of the export good or apply more labor (only possible as the price of labor drops). This is an expansion of the basic Stolper-Samuelson (1941) result. As p_d drops, the wage in manufacturing necessarily drops. This, combined with the downward pressure on wages from the agricultural sector, will result in the drop of the equilibrium wage, w*.

In this case, with a majority of the population LNL and land holdings being concentrated, trade liberalization increases the inequality of the distribution of income. The combination of the wage drop along with the recognition that a large segment of the population will not receive income from sources other than labor is sufficient to indicate that trade liberalization (in any of the three forms) will result in an increase in the incidence of poverty.

IV. Concluding Remarks

A stylized Central American economy trade model is constructed in order to consider the impact of a trade liberalization policy. The key characteristics of the model include the following observations. First, the 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 loses 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.

References

Cline, W.R., and S. Weintraub, (eds.), *Economic Stabilization in Developing Countries,* Washington, D.C.: Brookings Institution, 1981.

Dixit, A., and V. Norman, *Theory of International Trade.* Welwyn: James Nisbet & Co., 1980.

Esman, Milton J., *Landlessness and Near-Landlessness in Developing Countries,* Ithaca, New York: Center for International Studies, Cornell University, August 1978.

Jones, Ronald W., *International Trade: Essays in Theory,* Amsterdam: North–Holland, 1979.

Kemp, Murray, "The Gains from International Trade," *Economic Journal,* v. 72, no.288, December 1962, 803-819.

Krueger, Anne O., "Problems of Liberalization," in *Economic Liberalization in Developing Countries,* ed. A.M. Choksi and D.Papageorgiou, New York: Basil Blackwell Inc.,1986.

Krueger, Anne O., "Trade Policies in Developing Countries," in *Handbook of International Economics,* vol.I, ed. R.W. Jones and P.B. Kenen, Amsterdam: North–Holland, 1984.

Samuelson, Paul A., "The Gains from International Trade Once Again," *Economic Journal,* v. 72, no.288, December 1962, 820-829.

Stolper, W.F., and Paul A. Samuelson, "Protection and Real Wages," *Review of Economic Studies,* 9, November 1941, 58-73.

Vanek, Jaroslav, "Free International Trade and Investment: Curse or Blessing?" Cornell University, Department of Economics, Working Paper #374, October 1986.