

Agricultural Protectionism and Welfare in a Small Open Economy

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Abstract

The recently concluded multilateral trade agreement, GATT, proposes to reduce export subsidies on agricultural items. This paper discusses, in a general equilibrium framework, the welfare implications of such a move on a small open economy that imports as well as exports agricultural products. The paper shows that, depending upon the pattern of agricultural trade as a whole, the volume of trade and price sensitivity of import demand, the welfare implications of agricultural trade liberalization can go either way.

I. Introduction

The recent controversies and debates surrounding liberalization of international trade have come to a conclusion with multilateral agreement being achieved on the GATT draft proposals and the formation of the World Trade

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Organization (WTO). The most significant aspect of the successful conclusion of the Uruguay round of discussions is the fact that countries with diverse endowments, advantages and interests were able to reach a common ground of regime liberalization. It may be expected that most member countries will take up to five years to complete the institutional and legal changes that are necessary to make domestic structures consistent with those required by the WTO. It is only then that the impact of trade liberalization on various economies may be discussed in the light of empirical evidence.

One important aspect in which the new multilateral trade agreement differs from other bilateral or group agreements reached in the past is that this agreement seeks to reduce tariff barriers and completely remove non-tariff barriers and subsidies on agricultural products. The significance of this aspect of the GATT treaty will not be lost to the interested observer. The focus of the present paper is to study the impact of reduction or removal of tariff barriers and subsidies (on agricultural products) on output and employment in a less developed economy. The relevance of the problem will be seen through a brief background review.

A. Tariff Barriers, Farm Subsidies and GATT

All negotiations prior to the Uruguay Round of talks were notably silent on decisions pertaining to the removal of trade barriers on agricultural commodities. This was not due to any lack of concern in the matter among the participating countries. Liberalization of trade in agricultural commodities were discussed in the Kennedy and Tokyo rounds. In these rounds, most countries tended to stress the need to retain national priorities in preference to uniform rules for trade in agricultural items. The outcome was the decision that trade discipline could not be applied to imports and exports of agricultural commodities.

Historical record will show that most developed economies, notably the US, the EC countries, Japan and Switzerland as well as many developing countries pursued a vigorous policy of tariff and non-tariff barriers with respect to agricultural trade, provided direct and indirect (input) subsidies and conducted various agricultural 'programs' designed to protect and bene-

fit the farmers of the member nations.

This situation made it extremely difficult for any agreement to be reached on the removal of barriers on agricultural trade in the framework of a multi-lateral discussion. In spite of this, attempts were made to reach some understanding in this matter by introducing specific articles in the draft proposals designed to regulate the level of quantity restrictions and export subsidies. This attempt was thwarted as U. S. A., Japan and Switzerland applied for and obtained waivers from such clauses on the ground that obedience to these articles would place the governments of these countries in conflict with existing laws in their respective countries.

Another similar example of disagreement regarding the removal of agricultural subsidies can be found in the EC. When the Rome treaty was signed bringing the European Community under the Common Agricultural Policy (CAP) the GATT neither approved nor disapproved of the same. This is significant since the CAP clearly sought to raise a common subsidy-based trade barrier around member economies against the rest of the world and as such went against the tenor of negotiations under GATT up to that time. It is fair to summarize that the pre-Uruguay round situation in this regard was dominated by the opinion that agricultural production and trade played a very important and unique role in the economies of each country and any attempt to remove or discipline trade restrictions in agriculture would be met with uniform disagreement and would, therefore, be infeasible.

B. Consensus and the Uruguay Round

The consensus achieved at the conclusion of the Uruguay round is significant in this direction. The final treaty was based upon the uniform understanding that there was a need to bring stability and discipline in world agricultural trade by removing existing distortions, including those related to structural surpluses. Further, that greater liberalization in agricultural trade was the route to achieve such discipline.

Thus the final GATT treaty issued three operative guidelines and the World Trade Organization was founded to oversee the implementation of these guidelines. These were:

- i) Improved market access, that reductions of trade barriers.
- ii) Improved competitive conditions through the removal of direct and indirect subsidies.
- iii) Minimizing the adverse the effect on trade due to national laws relating to health and safety.

This signifies the beginning of a new era in international trade agreements that incorporates the belief that the world is in fact moving towards a free-trade situation in agricultural commodities, particularly, food products.

C. The Case of the Developing Countries

The final text of the Uruguay round draft has now been signed by all negotiating countries. This agreement seeks to implement the three operative guidelines mentioned above. It would be interesting to ask if the result of reduced trade barriers and increased international competition will be uniformly hold across economies, whether developed and developing. In particular, one may seek to hypothesize the impact of these policies on output and welfare of small developing countries. This paper is an attempt to investigate the impact of tariff reduction policies on welfare and sectoral output of small developing economies in a general equilibrium framework.

In this paper a typical less developed economy is characterized as a net importer of foodgrains. Prior to the global agreement on trade liberalization, these economies were operating under their own system of import restriction. At the same time they faced a quota-tariff-subsidy system in foreign trade from the rest of the world. This helped in restricting balance of payment obligations, protected local farmers but also placed impediments on exports, with usual consequences.

While most less developed countries are net importers of food, some of these are net exporters in specific food items. It is this group of countries that exhibit interesting consequences of trade liberalization. To see this point further, let us consider the trade in wheat and sugar. While most less developed economies are net importers of wheat, some of them are net exporters in sugar. Table 1 lists major countries that are involved in the international trade in these two commodities.

Table 1
Trade in Wheat and Sugar: Major Countries

| Major Exporters of Wheat | Major Importers of Wheat | Major Exporters of Cane Sugar |
|--------------------------|--------------------------|-------------------------------|
| U. S. A. | Erstwhile Soviet Union | Cote-de-Ivory |
| Canada | Union | Ethiopia |
| EEC* | Egypt | Pakistan |
| France | Nigeria | Philippines |
| Australia | Iran | Bolivia |
| Argentina | Iraq | Brazil |
| | Saudi Arabia | Cuba |
| | South Korea | Dominican Rep. |
| | Brazil | Jamaica |
| | Cuba | Trinidad |
| | Mexico | Argentina |
| | | Thailand |

Note: While all EC countries are exporters of wheat, France is mentioned separately to reflect its export volume.

It can be seen that most developed countries are exporters of wheat, which is imported by a large number of developing countries and the members of the erstwhile Soviet Union. On the other hand sugar from cane, which is a tropical product faces competition from beet-sugar (a temperate zone product) produced under high domestic protection in the U. S. A., Canada and the EC as well as from artificial sweeteners. Some developing countries are exporter of cane-sugar.

If, among the developing countries, all major and minor importers of wheat and exporters of sugar are considered, it will be possible to identify a small set of less developed countries that belong to both groups.

Cote-de-Ivory is an interesting example. This is a country known for its domestic policy of discrimination against agriculture in favor of industry and services (World Dev. Report [1991]). Cote-de-Ivory is, at present, an exporter of sugar and an importer of wheat, though not a large one. Philippines is a fairly large exporter of sugar and a substantial importer of wheat.

Bolivia and Brazil are small exporters of sugar and large importers of wheat. Finally, there is Cuba, which is a large exporter of sugar and a small importer of wheat.¹

All these countries have so far operated under a tariff-quota-subsidy system of trade restrictions that is about to be dismantled in a phased manner in conformity with the global agreement. It would be interesting to study the impact of trade liberalization in agricultural commodities on these economies. This paper describes a general equilibrium framework for this purpose. This model focuses on small developing economies that are net importers of food but exporters in specific items. To this end the model divides agriculture (stylistically) between two sub-sectors. The economy is a net importer in one product (cereals) and a net exporter in the other (grains). The economy also has a small manufacturing sector. Trade liberalization is captured by a reduction in tariff rates. This model captures the situation in most of the economies discussed above. The impact of such tariff reduction on sectoral output, welfare and employment in the economy is studied. The welfare effects of the liberalization process are standard and well-known. It will be seen, that in this framework some of the standard results of trade liberalization will be substantially altered.

II. The Model

This section presents a model of a small open economy that exports grains and imports cereals. In order to understand the inter-sectoral adjustments following a price change in the external market, the model also includes an import competing manufacturing sector. To capture the transition from protection to trade liberalization, it is assumed that there initially exists a tariff on the cereal producing sector.

Land and labor is used in the production of grains and cereals while capital and labor is used in the manufacturing sector. Production functions exhibit neo-classical properties and markets are competitive. General equilibrium properties of such models have been worked out extensively dis-

1. Material in this section draws mainly from World Development Report [1991] and Raghavan [1991].

cussed in Jones and Marjit [1992].²

The following symbols are used in this paper:

- G Total grain production
 C Total cereal production
 M Total production in the manufacturing sector
 a_{Li} Labor-Output ratio in the i th sector; $i = c, g, m$
 a_{Ti} Land-Output ratio in the i th sector; $i = c, g$
 a_{Ki} Capital-Output ratio in the i th sector; $i = m$
 P_i World price of the i th product
 L Total supply of labor
 T Total supply of land
 K Total stock of capital (given)
 t Tariff rate for the cereal sector
 w Wage rate
 r Rate of return to capital
 R Rate of return to land

The following equations describe the general equilibrium of the model:

$$wa_{Lg} + Ra_{Tg} = P_g \quad (1)$$

$$wa_{Lc} + Ra_{Tc} = P_c(1+t) \quad (2)$$

$$wa_{Lm} + ra_{Km} = P_m \quad (3)$$

$$a_{Lg}G + a_{Lc}C + a_{Lm}M = L \quad (4)$$

$$a_{Tg}G + a_{Tc}C = T \quad (5)$$

$$a_{Km}M = K \quad (6)$$

Given P_g , $P_c(1+t)$ and P_m , and assuming production functions exhibit constant returns to scale (1)–(3) determine w , r , R . Next, a_{Li} , a_{Ti} and a_{Ki} are determined with the help of w , r , R . Finally, C , G and M are obtained from (4)–(6).

2. Related papers in this context are Gruen and Cordon [1970], Neary and Grada [1991], Marjit [1991a], Beladi and Marjit [1992] and Marjit [1992].

Such an economy, in order to conform to the multilateral trade agreement, will require to cut country-specific farm subsidies on grain and cereal, which in turn will tend to raise P_g and P_c .

In this paper, we are interested in constructing a benchmark case where P_g and P_c increase by the same proportion. This is similar to the simulation analysis conducted by Tower and Loo [1989]. We submit the following propositions without explicit proof at this stage. All mathematical proofs are relegated to the appendix.

Proposition 1: *A process of agricultural liberalization which raises P_g and P_c by the same proportion must contract the manufacturing sector.*

Proof: An increase in P_g and P_c by the same proportion must increase w and R by the same proportion. As w/r increases, K is used more intensively in M . With a given stock of capital, M must go down. QED.

Proposition 2: *Liberal agricultural policies may reduce grain production and increase cereal production.*

Proof: Note that grain or cereal sector cannot expand without any effect on production in the manufacturing sector. This follows from the fact that w/r remains unchanged and it is evident from the full employment condition it is evident that the same values of G and C must solve (4) and (5). However, as M contracts, labor is released into the agricultural sectors. If cereal is more labor-intensive, it must expand, thereby contracting the grain sector. Also note that if the country is a net importer of agricultural product in terms of value, a uniform change in P_g and P_c must reduce social welfare. QED.

Proposition 3: *Increase in cereal production may lead to a welfare loss if (i) volume of trade is not large, (ii) import demand is not too sensitive to price changes.*

Proof: This is a more involved proposition than (1) or (2). However the intuitive argument may be described as follows: An increase in P_g and P_c by the same proportion constitutes a "terms of trade" improvement as long as the economy is an importer in M . The welfare gain from such a change depends on the initial volume of trade. An increase in P_g and P_c have oppo-

site effects on the demand for cereal. As production of cereal expands, the volume of imports of cereal can go either way. However, if the net effect of an equal change in P_g and P_c on cereal demand is negligible, then due to production effect, the volume of cereal imports must go down, causing a welfare loss (since the cereal sector is already protected). Therefore, if initial trade volume is low and demand effect is negligible, welfare must decrease. QED.

Another simple extension of the above model would be to incorporate unemployment as a fundamental characteristic of a developing economy.³

The existing structure of the model is altered by assuming the presence of Harris-Todaro type urban unemployment. There is a fixed urban wage rate W_u and a flexible rural wage rate w .

Incorporation of this feature implies a minor modification in the general equilibrium structure described in (1) to (6) above. In equation (3) w is replaced by W_u and (4) is replaced by (4)' below:

$$W_u \frac{a_{Lm}M}{L - (a_{Lg}G + a_{Lc}C)} = W \quad (4)'$$

(1) – (3) continue to determine w , r and R . (4)' – (6) determine G , C , and M (given w). (4)' determines the rate of unemployment.

We now focus on a different result. Consider the case where $t = 0$ and C is labor intensive. Then the next proposition follows immediately.

Proposition 4: *Liberalizing trade in grains must increase rate of urban unemployment. Liberalizing trade in both grains and cereals must reduce the rate of urban unemployment.*

Proof: The proof follows from the fact that if $\hat{P}_g > 0$, $\hat{P}_c = 0$ then $\hat{w} < 0$ and if $\hat{P}_g = \hat{P}_c$ then $w > 0$. QED.

Proposition 2 gets altered in this case as the value of production must increase following an increase in P_g and P_c when there is unemployment and this tends to affect the welfare loss.

3. See Marjit [1991b].

III. Conclusion

The existence of a multilateral trade agreement under GATT implies major changes in the global trade regime. Some of these implications can be quite surprising for a small open economy which is both an exporter and an importer of agricultural commodities. We believe that there is enough scope for applying some meaningful general equilibrium models in understanding these implications in such a scenario. We conclude that the effect of trade liberalization may not be unambiguously beneficial to such economies. Such general equilibrium models may also be used to extend the field of enquiry in the context of such an economy. For example, an exercise may be carried out where this economy is compelled to withdraw tariff altogether, from cereals (say) while facing an external borrowing constraint. We hope to work on such extensions in the future.

Appendix

For propositions (1) and (2) see "Uniform Tariffs in General Equilibrium – A Simple Model" by S. Marjit [1992] *Zeitschrift Fur Nationalokonomie*, 57(2) pp 189-196.

Proof of Proposition 3

Balanced trade condition implies:

$$P_g G + P_c C + P_m M = P_g D_g + P_c D_c + P_m D_m. \quad (1A)$$

where D_i is the demand for the i th good, $i = g, c, m$.

Rewriting (1A)

$$P_g G + P_c(1+t)C + P_m M - tP_c C = P_g D_g + P_c(1+t)D_c + P_m D_m - tP_c D_c. \quad (2A)$$

Differentiating (2A) and using envelope condition one gets,

$$\begin{aligned} dP_g G + dP_c(1+t)C - tdP_c C - tP_c dD_c \\ = dP_g D_g + dP_c(1+t)D_c + P_g dD_g + P_c(1+t)D_c \end{aligned}$$

$$+ P_m D_m - t P_c d D_c - t d P_c D_c \quad (3A)$$

Let us define $d\Omega \equiv P_g dD_g + P_c(1+t)dD_c + P_m D_m$

which is nothing but the change in the real national income or welfare.

$$\text{Therefore, } d\Omega = dP_g(G - D_g) + dP_c(C - D_c) + tP_c(dD_c - dC) \quad (4A)$$

$$\text{Let, } \frac{dP_g}{P_g} = \frac{dP_c}{P_c} = \alpha > 0 \rightarrow dP_g = \frac{P_g}{P_c} dP_c$$

Therefore,

$$d\Omega = \frac{dP_c}{P_g} [P_g(G - D_g) + P_c(C - D_c)] + tP_c(dD_c - dC) \quad (5A)$$

Since our country is an importer of the manufacturing item

$$P_g(G - D_g) + P_c(C - D_c) = P_m(D_m - M) > 0$$

However, exporting grains and importing cereal do not necessarily imply the bracketed term in (5A) to be positive. It depends on $(D_m - M)$.

Now, $D_c = D_c \{P_g/P_m, P_c/P_m, \Omega\}$

$$dD_c = \frac{\partial D_c}{\partial(P_c/P_m)} d\left(\frac{P_c}{P_m}\right) + \frac{\partial D_c}{\partial(P_g/P_m)} d\left(\frac{P_g}{P_m}\right) + \frac{\partial D_c}{\partial\Omega} d\Omega \quad (6A)$$

Choosing M as the numeraire ($P_m = 1$) one can express Ω in terms of M .

One can then define the marginal proportion to consume C as

$$\beta = (1+t)P_c(\partial D_c/\partial\Omega) \text{ where, } 0 < \beta < 1.$$

$$\begin{aligned} dC &= \frac{\partial C}{\partial P_c} dP_c + \frac{\partial C}{\partial P_g} dP_g \\ &= \frac{\partial C}{\partial P_c} dP_c + \frac{\partial C}{\partial P_g} \cdot \frac{P_g}{P_c} dP_c \\ &= \frac{dP_c}{P_c} \left[P_c \frac{\partial C}{\partial P_c} + P_g \frac{\partial C}{\partial P_g} \right] > 0 \text{ if } C \text{ is labor intensive.} \end{aligned}$$

$$\text{Hence, } d\Omega = \alpha(D_m - M) + tP_c \left[\frac{\partial D_c}{\partial P_c} dP_c + \frac{\partial D_c}{\partial P_g} dP_g + \frac{\beta}{P_c(1+t)} d\Omega \right] \\ - tP_c \left[dP_c \left(\frac{\partial C}{\partial P_c} + \frac{P_g}{P_c} \cdot \frac{\partial C}{\partial P_g} \right) \right]$$

$$\text{or, } d\Omega \left(1 - \frac{\beta t}{1+t} \right) = \alpha(D_m - M) + tP_c \left[\left(\frac{\partial D_c}{\partial P_c} + \frac{P_g}{P_c} \cdot \frac{\partial D_c}{\partial P_g} \right) - \left(\frac{\partial C}{\partial P_c} + \frac{P_g}{P_c} \cdot \frac{\partial C}{\partial P_g} \right) \right] dP_c$$

Note that $\beta t/(1+t) < 1$, $(\partial D_c/\partial P_c) < 0$, $(\partial D_c/\partial P_g) > 0$,

and $\left(\frac{\partial C}{\partial P_c} + \frac{P_g}{P_c} \cdot \frac{\partial C}{\partial P_g} \right) > 0$ if C is labor intensive

If $(D_m - M)$ is small and $\partial D_c/\partial P_c$ and $(P_g/P_c) \cdot (\partial D_c/\partial P_g)$ tend to cancel each other, welfare must go down. It could also happen if $\partial D_c/\partial P_c$ is quite strong relative to $\partial D_c/\partial P_g$.

References

- Beladi H. and S. Marjit [1992], "Foreign Capital and Protectionism," *Canadian Journal of Economics*.
- Gruen F. and W.M. Corden [1970], "A Tariff that Worsens the 'Terms of Trade'" in *Studies in International Economics*, I. McDougall and R. Snape (eds), North Holland, Amsterdam.
- Jones R.W. and S. Marjit [1992], "International Trade and Endogenous Production Structures" in *Economic Theory and International Trade – Essays in Honor of J. Trout Radar*, Springer, Verlag.
- Marjit S. [1991a], "A Simple Production Model in Trade and its Applications," *Economics Letters*.
- Marjit S. [1991b], "Agro-based Industry and Rural-Urban Migration – A Case for an Urban Employment Subsidy," *Journal of Development Economics*.
- Marjit S. [1992], "Uniform Tariffs in General Equilibrium – A Simple Model," *Zeitschrift Fur Nationalökonomie*.

- Neary J. P. and C. Grada [1991], "Protection, Economic War and Structural Change – The 1930s in Ireland," *Irish Historical Studies Vol XXVII*.
- Raghavan C. [1991], *Recolonization : GATT, Uruguay Round and the Third World*, Third World Network, Penang, Malaysia.
- Tower E. and P. Loo [1989], "Agricultural Protectionism and the Less Developed Countries" in *Macroeconomic Consequences of Farm Support Policies* A. Stockell and D. Vincent (eds), Duke University Press.
- World Development Report [1991], published by Oxford University Press for The World Bank.