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International Agricultural
Trade Research Consortium

Estimating the Gains from Less Distorted Agricultural Trade

By

Jerry A. Sharples*

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*Jerry A. Sharples is an Agricultural Economist with the International Economics Division, Economic Research Service, U.S. Dept of Agriculture. Thanks go to Nancy Schwartz, William Kost, Vernon Roningen, Praveen Dixit, and Walter Gardiner, for constructive comments. Correspondence should be addressed to:

Jerry A. Sharples
USDA, ERS, IED
1301 New York Aven, N.W. Room 624
Washington, D.C. 20005-4788

ABSTRACT

A review of recent research suggests that conventional trade models grossly underestimate the country and global gains from trade liberalization. They typically ignore potential sources of gains such as economies of scale; reduced costs of evasion, rent-seeking and lobbying; and X-efficiency associated with competitive trade. Improved estimates of welfare gains should be high on trade economists' research priority list.

ESTIMATING THE GAINS FROM LESS DISTORTED AGRICULTURAL TRADE*

Jerry A. Sharples

INTRODUCTION

The theme of this paper is that our conventional trade models appear to grossly underestimate the welfare gains from trade liberalization. I think that this has potentially serious policy implications. Thus I recommend that the issue receive further research attention.

First, just a few words about the policy implications. Policymakers are likely quite aware of the short-run social and political costs of reducing protection to a sector. Lobbyists make sure of that. But these policymakers have little evidence of the long run gain across the economy of trade liberalization. Here is where the economist should be able to help. So what are we saying? Later in the paper I review some estimates, obtained over the last 10 to 15 years, of potential welfare gains from liberalized trade for individual countries and for the world. Those estimates are very small and in some cases they are negative for individual countries.

Lets suppose that policymakers in the United States and abroad believed those results. Might they appropriately ask, "Why bother with trade liberalization? The economists' estimates seem to be saying that the potential net gain from liberalization is too small and uncertain to justify the tough adjustments that would be necessary." (But then maybe the policymakers do not believe the economists' estimates.)

This issue is important right now because (a) another round of GATT trade talks are coming up, and (b) many respected agricultural economists and respected research institutions from around the world are currently investigating trade liberalization. We have the IIASA (International Institute of Applied Systems Analysis) trade modeling efforts, the OECD trade mandate, trade liberalization work in ERS, the work of Tyers and Anderson--to just name a few. Based upon what has been done up to now, my guess is that they all will provide similar welfare implications of liberalization--large sectoral adjustments; small overall net gains, with some countries actually losing. These estimates take on additional importance if there appears to be some consensus across the international community of economists. Consequently, I think the time is at hand for agricultural trade economists to focus more attention on accurately estimating gains - and loses - from less distorted trade.

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ESTIMATES OF WELFARE GAINS

There have been many studies of trade liberalization over the last 10 years. Some have examined individual countries, some have examined global markets for individual commodities, some have examined global markets for groups of commodities (e.g., agricultural goods, manufactured goods), and there have been a few global general equilibrium studies. Here I review results from several of the more comprehensive models of total trade and agricultural trade.

The Comprehensive Trade Models

Baldwin reviewed estimates of static welfare gains from four trade liberalization studies; Baldwin, et.al. (1980), Cline, et.al. (1978), Deardorff and Stern (1979), and Whalley and Wigle (1982). The Baldwin (1980) study showed an annual welfare gain equivalent to 0.01 percent of GNP from a 50 percent multilateral cut in tariffs of industrial countries, using a 1967 data base. The largest global welfare gain in this group of studies was obtained by Deardorff and Stern. They cut non-tariff barriers in 18 industrial countries using 1976 data and obtained a welfare gain equivalent to 0.11 percent of GNP. Whalley and Wigle, using a 4-country model (EC, Japan, U.S. and Rest of World) with 1977 data, cut all tariffs 50 percent. The annual world welfare gain was 0.03 percent of global GNP but the United States showed a net loss in welfare of 0.05 percent of U.S. GNP.

In a more recent report, Whalley analyzed trade liberalization issues using both a 4-region and a 7-region world trade model. Whalley's work has added significance because it examines trade with a more comprehensive general equilibrium model. Cross-sector welfare effects can be observed. Results showed that complete elimination of U.S. tariffs generated a loss equivalent to 0.2 percent of U.S. GNP. The other regions gained just slightly more than was lost by the United States to yield a very small global welfare gain. The 7-region model was used with 1977 data to analyze the abolition of tariffs in all regions. Results showed a small welfare gain for the U.S., larger gains for the EEC, Japan and OPEC, and loses for the NIC's and LDC's. The global net gain was only $27 billion.

Agricultural Trade Models

Results from 2 comprehensive agricultural trade studies recently have been made available. Both provide estimates of impacts upon welfare of trade liberalization.

The IIASA Model

Two sets of results are available from IIASA's world food and agriculture model; those reported by Parikh, et. al. from IIASA's version, and those reported by Maxwell from the ERS version. Several equations (mostly for the United States) differ between the two models, but they yield similar overall welfare results. The Parikh results are reported here.

The IIASA model divides all trade among 9 agricultural commodities and one non-agricultural commodity. It also contains submodels for the major trading countries plus the rest of the world. It is an annual model that makes projections out to the year 2000. I'll report on results from two of their scenarios: global free trade, and free trade among OECD countries. "Free trade" in the IIASA study means the removal of border measures. For example, the United States beef import quota would be considered a border measure but grain acreage control programs would not. For each analysis, a free trade scenario was compared with a baseline solution that maintained present trade barriers out to the year 2000.

The IIASA model estimated that with global free agricultural trade (phased in during the mid-1980's), the annual world welfare gain would be 0.28 percent of GDP by the year 2000. The OECD countries would gain more (0.63 percent) while some regions would experience loses (CMEA, -0.30 percent; LDC's, -0.22 percent). The percentage gains and loses are larger when measured against agricultural GDP.

Free agricultural trade among OECD countries (with other countries maintaining their trade barriers) would raise world GDP only 0.22 percent by 2000. Again, OECD countries gain while CMEA countries and LDC's lose. The United States gains 1.8 percent of agricultural GDP but the total economy gains only 0.1 percent of U.S. GDP. EC agriculture, however, loses 7.1 percent of agricultural GDP but the total EC economy gains 0.2 percent of GDP.

Tyers and Anderson

Tyers and Anderson used a 7-commodity, 30-region model of world agricultural trade to examine trade liberalization. Though their basic model is dynamic and stochastic, for this analysis

they used a static long-run version. They examined 10 liberalization scenarios but I will only report results for complete liberalization by the industrial market economies (IME). In this scenario developing countries and centrally planned countries do not liberalize trade. The model is based upon 1985 data and protection levels.

They estimate that complete trade liberalization by IME countries would increase net welfare in those countries somewhat less than 1.0 percent of their GNP. Japan would be the biggest gainer at 1.9 percent, the EC would gain 0.8 percent, and the United States would lose -0.1 percent. This translates into a per capita gain of $196 in Japan, $82 in the EC and $-14 in the United States. Centrally planned economies and developing countries experience a small net loss in welfare.

The welfare implications of the Tyers and Anderson study are about the same as for the IIASA model: Small global welfare gains (0.5 percent of GNP or less), somewhat larger gains to the developed countries, and losses to centrally planned and developing countries. Note, however, that these welfare estimates for liberalization of agricultural trade are substantially higher than those obtained from the above studies of all trade.

Summary of Studies

The studies reviewed here showed (a) some countries gained and some lost from trade liberalization, (b) the net gains or losses were quite small for individual countries, and (c) the estimates of global gain were very small. And these results came from major reductions in or complete elimination of the levels of protection. Welfare gains from less radical tariff reductions might not have been even worth mentioning.

The reaction of most authors was that these estimates grossly understated the welfare gains from trade liberalization. They indicated that their models by assumption eliminated important sources of gains. For example, Cline, et. al., observing their very small estimates of welfare gains, noted:

> It is essential, however, to note a fundamental feature of the detailed welfare estimates: they are almost certainly far below the true welfare gains to be expected from trade liberalization. They represent "static efficiency" gains (page 26).

SOURCES OF WELFARE GAINS

Before getting into a discussion of sources of welfare gains that tend to be omitted from trade models, lets first review some basics.

Static Welfare Gains

The static welfare gains from trade liberalization are shown in figure 1 for one commodity in a small country. Let Pw represent the world price, Pt the domestic price before liberalization (the import tariff is Pt - Pw), and Pt' the domestic price after a reduction in the tariff. In this example the tariff may also represent the tariff-equivalent of any other trade restriction. Welfare gains from the specified liberalization are represented by areas A + B + C + D. Areas A and B represent net gains to consumers from the lower domestic price, and areas C + D represent added tariff revenue from the expanded imports. If tariffs would be reduced to zero, an additional welfare gain of areas E and F could be obtained.

Similar graphics can be used to show the welfare gains from a reduction in an export subsidy.

One way to have very small welfare gains is to have very inelastic supply and demand functions. Figure 2 illustrates that point. Though the initial tariff, the initial volume of trade, and the tariff reduction are the same as in figure 1, the welfare gain is much smaller. Thus if our model of world trade contains very inelastic estimates of supply and demand functions (possibly short run elasticities), we should expect small gains from trade liberalization. A more elastic (longer run ?) set of elasticity estimates would show larger gains from trade liberalization. This once more points out the key role played by our estimates of elasticities.

Other Sources of Welfare Gains

Trade economists have long been concerned about gains from trade liberalization beyond those measured in the static model's welfare triangles. They list many potential sources (with some apparent overlap). The following list is compiled from Bergsten and Cline; Corden; and Cline, et. al. I also added a few.

1. Economies of scale. Trade liberalization should lead to expanded trade and opportunities for domestic export industries to expand and capture economies of scale. This would be most likely for potential export industries in small countries that serve a small domestic market.

2. X-efficiency (term used in production and marketing literature). Reduced trade barriers may force import-competing industries to improve their management and cut costs, even though the industry appears to have a competitive structure.

FIGURE 1

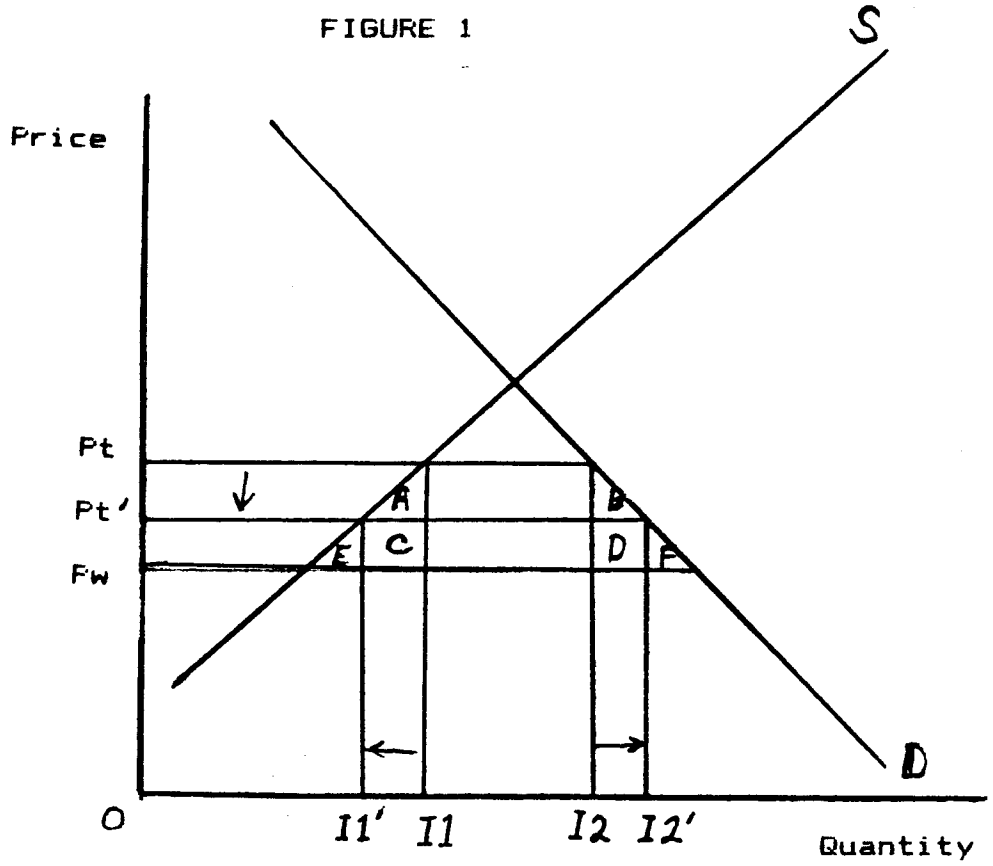
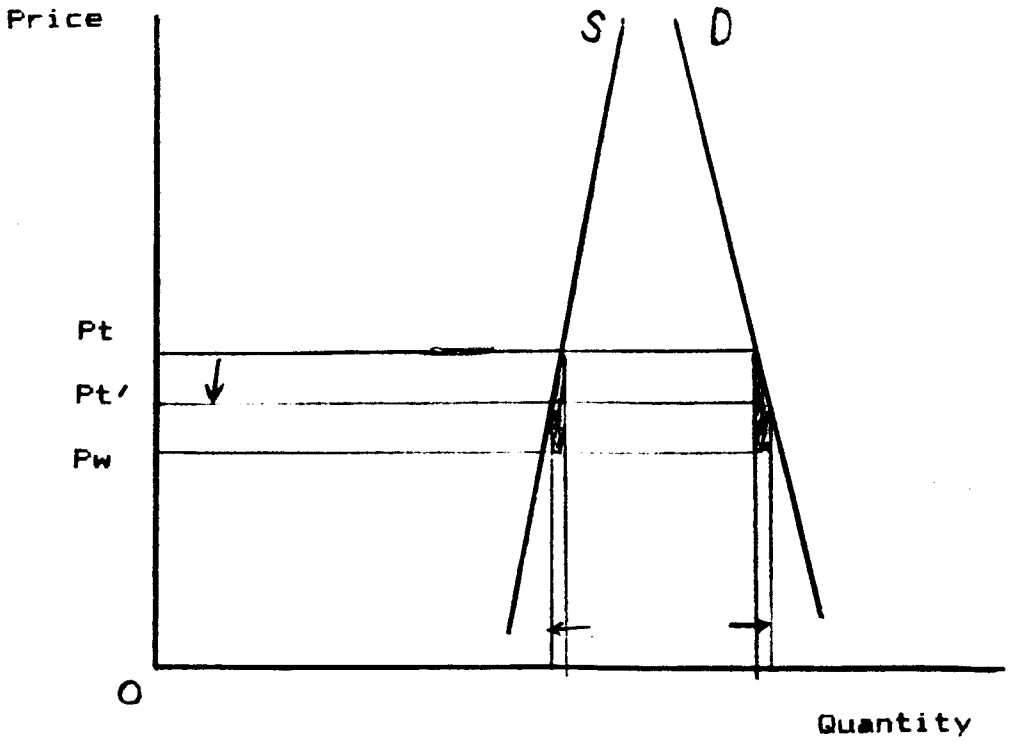


FIGURE 2



3. Increased competition. Trade liberalization may reduce the monopoly power of domestic industries by providing more competition from abroad.

4. Anti-inflationery impact. Increased import competition leads to downward pressure on inflation which leads to a more rational long term macro policy, which leads to output gains.

5. The investment effect. The dynamics and vitality of an industry successfully competing on an international market may attract and generate additional capital for investment.

6. Outside stimulus to technical change. Reduced trade barriers create a dynamic environment that increases the flow of technical knowledge across borders and also leads to innovation in the domestic market--closely related to X-efficiency and competition listed above.

7. Evasion costs. Trade protection provides opportunities for the development of a smuggling "industry" that may employ scarce resources.

8. Administrative costs. There are tariff collection costs and other costs associated with the public management of protection. In developing countries, however, tariff collection costs may be efficient relative to alternative ways of obtaining public revenue.

9. Rent-seeking. Substantial resources may be used to obtain import or export quota licenses. Competition among bidders could lead them to expend resources equivalent to the value of the license in the process of seeking the license.

10. Lobbying. Similar to rent-seeking. Border protection provides rents to the protected. Lobbying activities consume resources during the process of seeking that protection. The cost is especially high if the protection is "soft," i.e., if the rules are subject to negotiation each year. Then the lobbying effort may be continuous rather than once-for-all.

To this list I add:

11. Uncertainty generated by protection. This could be a significant cost if the level and type of protection at home--and abroad--continually was expected to change. This uncertainty would lead to inefficient investment decisions, as well as high costs for lobbying.

12. Estimates of price elasticities of supply and demand may be too inelastic--discussed above.

It helps to put the above into the context of the classical 2-good general equilibrium trade model for a small country (figure 3). In figure 3, PP is the production possibilities frontier, TT is the price ratio of good M relative to good X (the

FIGURE 3

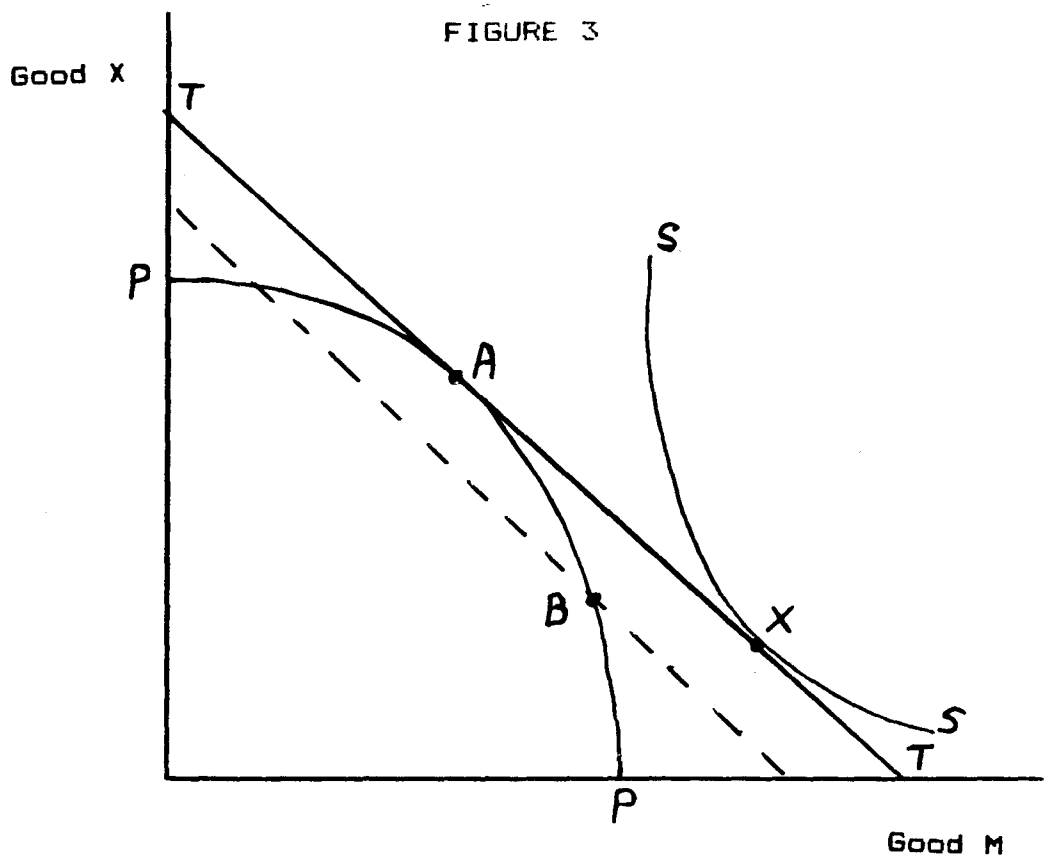
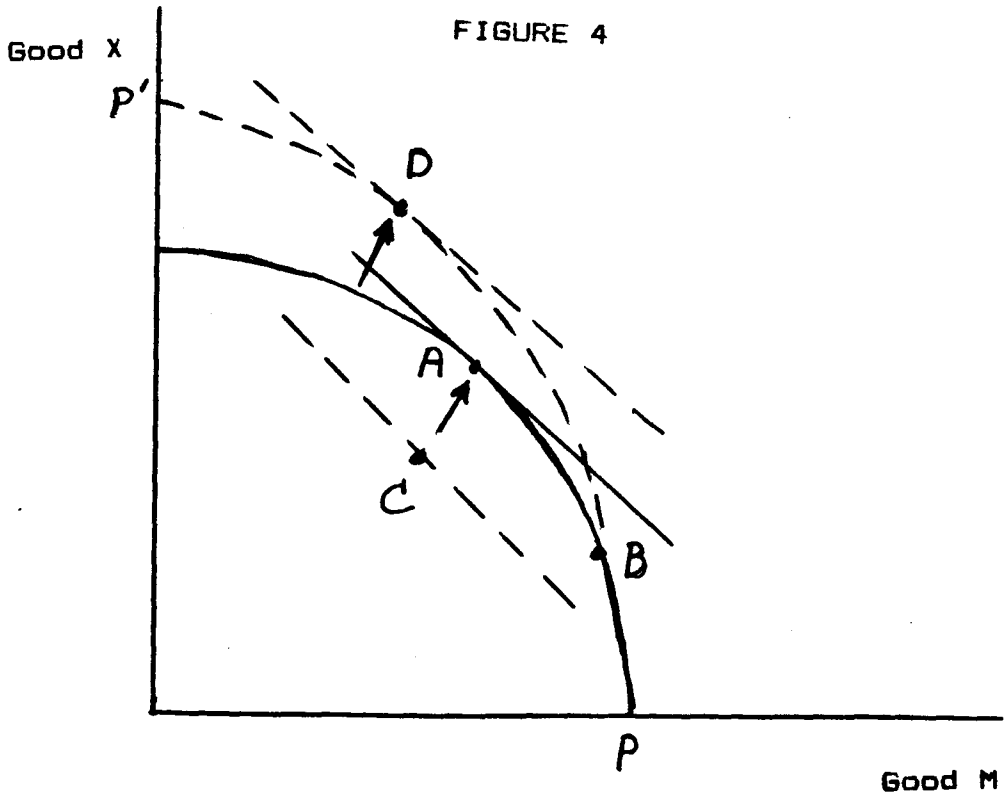


FIGURE 4



terms of trade), and SS is a social indifference curve. Optimal production is at A and optimal consumption is at X where some of good X is exported and some of good M is imported. Most of the studies reviewed above assume that observed production is on the long-run production possibilities frontier for each country but trade barriers on good M force production to a sub-optimal point such as B in figure 3.

The above list of 12 items suggest modifications in this model. Item 1 states that the production possibilities frontier is convex to the origin (not shown). Items 2 through 6 are dynamic processes that would be difficult to capture in a static model. They imply that freer trade initiates processes within an economy that reshape and expand the static production possibilities frontier. Thus by liberalizing trade the production possibilities frontier might shift to PP' (figure 4) where D would be the optimum point of production, rather than A or B.

Items 7 to 11 imply that with trade protection, the country is operating at a point interior to the production possibility frontier, such as point C in figure 4. Resources are being invested in unproductive activities that are directly linked to the existance of the protection. Item 12 merely suggests a close examination of our estimates of elasticities.

Attempts to Estimate Impact of Other Sources of Welfare Gains

Whalley points out that the assumption of constant returns to scale could prevent the model from generating larger gains from trade liberalization. He cites studies by Wonnacott and Wonnacott (1967) and a recent study by Harris. They assume that by being open to U.S. trade, Canada's industries will perform more efficiently. They show gains to Canada of 8 to 16 percent of Canada's GNP from free trade with the United States. The gains for both countries combined, however, are much smaller relative to joint GNP.

Cline, et.al., used previous research results by Balassa to argue that their small estimates of welfare gains from trade liberalization (reported above) greatly underestimated reality. Balassa studied the economic implications of EC integration and attempted to incorporate some of the nontraditional sources of welfare gains such as economies of scale and additional investment due to expanded markets. Based upon Balassa's results, Cline, et.al. suggested that a more accurate (but conservative) estimate of the annual welfare gains would be 5 times as large as their static estimates. That is an annual estimate. They also calculated the present value of an assumed future stream of those annual benefits. Using a discount rate of 10 percent, they obtained a value that was 100 times the size of the original static annual estimate of welfare gains. Thus they conclude that contrary to their static model results, trade liberalization likely has a very large impact on welfare.

IMPLICATIONS

The above information leads me to conclude the following:

1. Our conventional trade models show very small global welfare gains from trade liberalization.

2. We know that there are potential sources of welfare gains from trade liberalization that are not captured in our conventional models.

3. These "potential sources" are difficult to measure but several studies suggest that they could lead to much larger gains from trade liberalization than currently obtained from our conventional models.

4. It is very important that we improve our estimates of the welfare impacts of less distorted trade.

I recommend that trade economists address this problem two ways. First, some of us need to specifically investigate each of the potential sources of welfare gains from trade liberalization listed above. Do they relate to agriculture? Are there opportunities for economies of scale in the production and marketing of agricultural products to be reaped by liberalizing trade? Are there large costs of evasion, administration, rent-seeking, and lobbying, associated with agricultural protection? If trade barriers are cut in half, are these costs cut in half? Though not mentioned earlier in the paper, we also need to consider adjustment costs of the resource shifts that accompany reduced protection.

It would seem appropriate to do some additional experimentation with models that focus upon linkages between trade (and protection) and long run dynamic growth factors such as economies of scale and technological change. In order to keep these models managable, however, they may need to be limited to a few aggregate commodities and countries.

Many of us will continue to use our static partial equilibrium trade models to study trade policy issues, knowing that they assume away many of the factors affecting long run welfare. We will use these models because they perform quite well in estimating prices and quantity flows in the short and intermediate run. But we still need to address welfare issues. My second recommendation is for analysts using these models to provide some post-solution evaluation and interpretation of the longer run welfare implications of their results. Point out to the reader that the model by assumption eliminates longer run dynamic impacts upon welfare. Then give some qualitative assessment of the potential for additional welfare gains from trade liberalization.

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