Analysis of International Trade Distortions Arising from Agricultural Policies: The Case of Wheat

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Abstract: With the prospect of greater uncertainty in world markets, additional progress will be required to minimize the adverse effects of domestic support policies on international trade; otherwise, turbulent global economic conditions will generate even greater uncertainty and instability in world commodity markets. To obtain greater rationalization of agricultural production and trade, improved empirical measures of the impacts of alternative domestic support programmes on international trade in farm products are required. Previous studies based on rates of protection have not adequately identified the effects of protection. An alternative concept—the "rate of distortion" of world market prices—is developed in this paper to provide an improved measure of the impact of agricultural policy measures and to provide a more meaningful basis for future trade negotiations. The case example of wheat is used to illustrate the potential benefits of such a new concept. In order to identify a balanced reduction in the effects of protection on international markets, evaluating rates of distortion is preferable to analyzing the impacts of a proportional change in rates of protection undertaken by all countries.

Introduction

Past rounds of multilateral trade negotiations within the framework of the General Agreement on Tariffs and Trade (GATT) have focused primarily on tariff reductions. In agriculture, however, domestic farm income support policies and (often associated) nontariff trade barriers typically account for considerably greater trade volume and price distortions than do tariffs. Significant adjustments in both domestic agricultural policies and border measures remain necessary for an improved functioning of commodity markets and an expansion of international trade in agricultural products. The rise in protectionism, structural surpluses, and the use of export subsidies, together with prospects for greater uncertainty in world markets, illustrate the need for progress in reducing the adverse effects of agricultural policies on international trade. To at least some extent, OECD's "Agricultural Trade Mandate" study and the work programme of GATT's Committee on Trade in Agriculture reflect a recognition of this.

Empirical measures of the impacts of various agricultural programmes and policies on trade volumes and prices could facilitate future multilateral trade negotiations (MTNs) by providing an objective basis for judging whether any specified joint "concessions" would be "balanced" or "fair." A methodology emphasizing the international effects of protection is called for. Many previous empirical studies, however, have focused primarily or exclusively on calculating some form of rate of protection, of which several variants have been developed in the international trade theory literature (OECD, 1984; and FAO, 1975), or of rate of support. However, a rate of protection or of support afforded by any given policy measure or combination of measures does not necessarily bear any relationship to the global effects of such protection, which motivates an alternative concept; namely, the "rate of distortion" of world market prices. The rate of distortion is a better indicator of the impacts of a country's agricultural policy instruments and is a potentially useful criterion in the context of future MTNs aimed at scaling down such trade impediments and distortions in an manner that results in net benefits to all negotiating parties. The case example of wheat is used to illustrate the potential use of such a new concept.

Issues

Previous measures of support or protection, such as programme expenditures per producer (or per unit of production) and "nominal" or "effective" rates of protection, place insufficient emphasis on analyzing the differential impacts of various types of agricultural policy instruments employed by individual countries. The most serious shortcomings of previous studies are that:

- a small country is usually assumed, and therefore the possible impact of that country's own measures on the world price is ignored;
- other countries' policies and their relevance to the existing world price are often ignored;
- cross-commodity effects (cross-price supply and demand elasticities) are typically ignored; and
- rates of protection or support are often not distinguished from effects of protection, and therefore the importance of the form as well as the level of intervention in determining production, consumption, and trade effects is overlooked.

The rate of protection can be defined as the proportional increase in the domestic price facing the producers that finally results from protection (Corden, 1971). For most types of protection, this rate will vary with the world price and therefore with policy changes by other countries. Furthermore, a positive rate of protection can be associated with either a positive or negative impact on world price and, therefore, either benefits or costs to each of producers, consumers, and taxpayers in other countries. For example, if a country's protection for a given commodity is associated with production-reduction measures, the net effect of such a commodity policy may be perceived by other producing countries as beneficial to them.

This paper illustrates a concept that measures the impact of policies on the world (as opposed to domestic) price. The "rate of distortion" of international market prices is proposed and is defined as the proportional change in the world free trade price that finally results from a particular country's policy instrument or set of instruments. It should be calculated assuming that no trade-affecting policy measures are in place in all other countries nor in place for related commodities in all countries, since only then will it be independent of policy changes by other countries and in other commodity sectors. This rate of distortion will reflect the effects of that country's protection and will depend on:

- the rate of protection (or level of intervention);
- the form of policy instruments by which the rate of protection is achieved;
- the economic characteristics of the commodity sector under examination; and
- the size of that country's market (production and consumption) relative to the total world market.

It will not depend on an existing world price or the policy interventions of other countries or those of all countries for other commodities.

The Case of Wheat

Wheat policies in the USA, EC, and Canada are evaluated to illustrate the usefulness of rates of distortion as compared to rates of (nominal) protection. Table 1 gives the level of government expenditure and the regulatory impacts of major policy instruments used in each in 1983.

All three rates of protection were positive, with the USA the highest at US$45.80 per t of output while Canada's rate of protection was significantly lower at US$15.60. Each employs distinctly different policy instruments to achieve protection of its wheat producers. Canada employs forms of assistance to expand exports indirectly via their impacts on producer prices and thus on output. The EC, in addition to production aids, employs domestic price supports and export subsidies to expand exports directly. The USA, on the other hand, employs acreage diversion and deficiency payments to support both the loan rate and target price of wheat. The net impact of these US programmes can be to contract exports if the output reduction due to diversion payments and government stockholding is greater than the output expansion due to loan rates and target prices.

What would or should a "balanced" reduction of protection for a particular commodity involve if, for example, the EC employs price supports and export subsidies, the USA employs price supports and production controls, and Canada employs output-based payments?

In the example used in this paper, proportionate reductions in the rates of protection are unlikely to be a politically feasible negotiation outcome. For example, Canadian producers and US taxpayers (or at least the US Federal Treasury) clearly benefit if the EC reduces its rate of protection, whereas if the USA reduces its rate of protection, EC budgetary costs may well be higher. An equal, absolute reduction in the rates of protection has the same major concept disadvantage.

A negotiable multilateral protection reduction scenario will depend on the potential effects of a reduction in protection rather than on the rate by which it is to be reduced. Any two policy instruments can imply very similar rates of protection but at the same time have very different impacts on world prices and trade, as described in the example above for wheat.

Empirical Estimation of Rates of Distortion

Estimation of rates of distortion with no other policy measures in place requires the use of a multicountry, multicommodity structural model, which is not yet available to us. For illustrative purposes, however, and by employing formulae developed in Gorter and McClatchy (1984), we can more easily estimate the following rates of distortion at current world prices for the 1983 wheat crop:

Canada, -0.6; USA, +5.0 to +9.0; and EC, -5.0. These numbers may be at best only rough approximations to "true" rates of distortion of free market world wheat prices by 1983 policies as defined in this paper. In the case of the USA, the value of the estimate depends on one's assumption about the net production reduction impact of the acreage diversion programme.

The world price distortion due to Canadian wheat policies was small because Canada employs programmes that have an indirect impact on international trade, is a relatively small country, and the level of assistance was relatively modest (US$428 million). The EC, on the other hand, is a smaller exporter but employs a policy instrument that has a direct impact on international trade, and the EC policies involved higher expenditures (US$832 million). The USA is, however, the largest exporter and also had the largest impact on world prices, but this impact was positive due to the overriding influence of production controls via the payment-in-kind (PIK) programme and acreage diversion payments in 1983.

Table 1—Domestic Protection from Government Policies for the 1983 Wheat Crop: Canada, USA, and EC

Programme	Government Support Expenditures (million US$)	Rate of Protection (US$ per t)
- - - *Canada* - - -		
Stabilization	61	
Crop insurance	43	
Advance payments	5	
Transport*	307	
Total Canada	416	15.60
- - - *USA* - - -		
Deficiency payments	775	
Acreage diversion	305	
PIK entitlements†	1,940	
Total USA	3,020	45.80
- - - *EC* - - -		
Production aid	139	
Production refunds	29	
Export refunds‡	496	32.20
Total EC	664	35.10

[*Payments under the *Western Grains Transportation Act*, commonly referred to as the Crow's Nest Pass Agreement or simply "Crow" subsidy. †Payment-in-kind programme. ‡Export refunds resulted in a gap between EC producer and world prices. Domestic market prices in Canada and the USA were close to world prices. The calculated rate of protection is based on the quantity of exports. Note: The Canadian figures do not include export credits of US$12 million, the USA figures do not include reserve storage payments of US$235 million, and the EC figures do not include storage aid estimated at US$168 million. Sources: Canadian Wheat Board (1983); Carter and Glenn (1983); OECD (1984); USDA (1984); and EC Commission (1983).]

Interpretation of Empirical Results

The first thing to note is that the above relative rates of distortion are totally different from the relative rates of protection presented in Table 2. Secondly, the existence of different signs on the numbers forces us to question more seriously what is "good" and what is "bad." Traditionally, both agricultural economists and politicians have tended to favour the interests of food producers over food consumers, and thus to most a higher world price may seem to be "good." Such a judgment may lead to the conclusion that government policy interventions such as those applied to wheat in the EC and Canada should be made the subject of GATT disciplines, while US-type interventions should be excluded.

A more comprehensive analysis on economic efficiency or welfare grounds may, conversely, lead to the conclusion that any departure from a free trade price, upwards or downwards, must be considered undesirable. This line of thinking, given the relative degree of distortion apparently caused by the US policy in 1983 (an atypical year because of PIK) could lead to the quite different conclusion that it is the PIK-type measures that should, first and foremost, be constrained in GATT.

Clearly, before such a world-price-based indicator of distortion can be useful in the context of GATT, such questions of interpretation will have to be resolved.

Summary

International trade in farm products can only expand significantly if domestic agricultural policies are adjusted. Despite (or because of) this recognition, progress towards a greater measure of liberalization of agricultural trade continues to be very limited.

Insufficient information is available on the benefits of reduced protection. The benefits are associated with increased trade and with significant savings in government expenditures on support. To date, discussion of government support measures has tended to treat all measures as having the same impact on international trade. A need exists to differentiate among the various types of instruments employed by governments.

Estimates of rates of protection or of rates of support are not useful in the context of MTNs. Estimated rates of distortion, on the other hand, being more indicative of the world price impacts attributable to each individual country's measures, may provide a more useful and objective guideline to politically more feasible (more "balanced") multilateral protection reduction scenarios.

Note

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Discussion Opening – *Julian Briz*

The substance of the interesting paper by Denbaly and Williams deals with actual problems at two levels: the first is the incidence of monetary policy in foreign agricultural trade affecting particular countries and world prices, and the second is the idea of validating the model with the world coarse grains market, one of the more representative sectors.

According to the authors, the model was validated by historical simulation. However, validating the behaviour of the model in the new situation with the US money supply restrictions would be interesting, although, in the authors' opinion, "...contractionary monetary policy has only a small effect on the domestic US coarse grains market..." and, under certain circumstances, on US exports in general.

The country groupings are not sufficiently homogeneous to obtain results that are applicable to any particular country, including estimates of dynamic responses to the increase in the US money supply. Some countries (like Argentina) had very high rates of inflation due to domestic causes, with perhaps more influence on cereal exports than variations in the US money supply. Also, excluding the EC because of the relatively insulated domestic market does not mean that its influence on world prices has been excluded, and, consequently, it should be taken into consideration as a large developed country importing region, now increased in size by the integration of Spain and Portugal.

The model is a good tool of analysis, but one must always consider that the world market is strongly influenced by other actions not incorporated into the model, such as international and bilateral agreements where the distortions to quantities and prices are so notorious that many experts consider the world market to be a residual.

Wilde's paper addresses a topic of great interest and undertakes the task of using short-run demand elasticity estimates "...to understand better international demand for imported grains under economic and political constraints." Standard trade models based only on comparative advantages do not explain trading relationships, and, with the world's changing conditions, we need to broaden our analyses of trade. This paper is a step in that direction in that it incorporates agricultural policies and macroeconomic factors.

If price elasticities of import demand are usually negative and small, with relatively low significance, why are some critics concerned about world market price instability? What are the main factors that explain why the income elasticity estimates are significantly different among countries (Table 2)? Is the use of cereals (human consumption versus animal feeding) an important factor?

Considering that large short-run income elasticities of demand in importing countries have a great influence on international trade, exporting countries may increase their subsidies and export credit programmes to compete for those markets. Perhaps the time has come to think about ways of regulating the international market in cereals, including an international agreement on stocks to offset production variability in certain regions.

The main thrust of Gorter *et al.*'s paper is the intention to use new concepts in the area of trade distortions. The "rate of distortion" in world market prices is a useful measure of the impacts of certain agricultural policies and is an alternative to analyzing proportional changes in rates of protection.

Gorter *et al.*'s analysis is focused on the short run. Would the "rate of distortion" be helpful in looking at the medium or long run? While the paper focuses on Canada, EC, and USA, what about the problem of world welfare distortions? Many developing countries are not cereal importers and cereals are basic to their survival.

Perhaps the "rate of distortion" should take into consideration other dimensions such as the effective rate of protection. In some sectors (like poultry), the type of protection given to coarse grains is a significant factor in the costs of production.

The authors expressed the pessimistic view that "...progress towards a greater measure of liberalization of agricultural trade continues to be very limited." That assertion may bring us to a discussion about world social welfare. Liberalization of agricultural trade may be a good measure to improve the world economy. But one must take into consideration other important points like the equity distribution of welfare and other direct and indirect measures that influence international agricultural trade.

General Discussion – *J.R. Wildgoose*, Rapporteur

On Denbaly and Williams' paper, the difficulty of measuring the money supply was mentioned by several speakers, and the authors were asked which measure they had employed and indeed whether they had run their model with alternative definitions. Questions were also asked about the underlying macroeconomic basis of the model.

Williams indicated that the model had been verified over different historical periods. He also indicated that the choice of countries has been determined mainly by reference to levels of involvement in world grain trade. The EC had been excluded simply because it is insulated from the world market, in view of the support policies pursued. Extension of the analysis to include the EC would be desirable, although doing so would not affect the results very much. As far as the choice of the money supply variable is concerned, $M2$ was used in the model. The difficulties of measuring the money supply were acknowledged, and the choice of definition had simply been taken on pragmatic grounds. Finally, Williams confirmed that the underlying macroeconomic basis of the model is Keynesian.

On Wilde's paper, questions were asked about the precise definition of the world market price employed in the calculations and about how sensitive the estimates of rates of protection and distortion were likely to be to dollar exchange rate movements. Are both rates (as calculated) higher for the USA than for the EC because of the high value of the dollar? Because support policies vary among commodities, the effects on world markets are also like to vary. For wheat, the world-price-reducing effects of EC supports appear to have been accommodated by the acreage restriction policies pursued by the USA. For soyabeans, however, the EC does not impose variable levies on entry and hence the USA has been able to increase its soyabean exports to the EC.

Wilde indicated that low price elasticities of demand have direct implications for price variability. Domestic prices and policies have significant effects on world prices; e.g., US loan rates give a direct point of reference for world prices. On turbulence, Wilde indicated that increased interdependence among countries (reflected through increased trade) gave rise to an increased potential for conflict in trade and domestic policies and that economists need to be aware of these interrelationships. On the choice of the data period for estimation, Wilde indicated that this was important for the debt variable included in the equations.

Gorter, McClatchy, and Lohoar were asked about their view of the future development of the rate of distortion and other protection measures they had calculated. In particular, policy makers would be much more interested in the effects of policy actions on actual world market prices than on their effects on hypothetical free world market prices.

McClatchy indicated that an actual world price quotation (US Gulf ports) had been employed in the calculations. An analysis of the sensitivity of the results to changes in the exchange rate had not been carried out, although such changes would probably have little impact on the results presented. McClatchy also indicated that wheat had been taken only as an illustrative example of the methods outlined, and he agreed that taking a different commodity (such as soyabeans) would indeed give different results. McClatchy further indicated that (due to space constraints) including a full set of calculation equations in the paper had not been possible. The equations are extensive and vary with the type of domestic support policy under review. The method does allow nontariff barrier policies to be included in the analysis.

Participants in the discussion included S. Borland, A.B. Lewis, L. Moore, K. Parton, G.H. Peters, F. Uhlmann, and H. von Witzke.