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*The Outlook for Trade in Agricultural Commodities***

INTRODUCTION

In the last twenty-five years the growth in the volume of world trade in agricultural commodities has averaged less than 4.5 per cent, while that of trade in manufactured goods has averaged 7 per cent. The difference in the trend growth rates of agricultural commodities and manufactured goods is unlikely to change unless new policy initiatives are adopted. This paper uses a set of econometric models of international trade for eight agricultural commodities to illustrate future trend expectations under unchanged economic conditions, and to assess the potential effects of alternative policies on those outcomes.

In the past, the principal channel through which nations sought to reduce the disparity between the growth rate of trade in agricultural products and that in manufactured goods was through international policy initiatives, such as price stabilization schemes. The 1981–2 world recession sharply curtailed trade and instigated inward-looking policies. Consequently, interest has recently focused on domestic policy initiatives to improve trade conditions. This paper assesses the potential effects of three types of national policies; two from the point of view of the principal geographic markets for agricultural commodities, the other from the point of view of the exporting countries.

A common modelling framework has been applied to the characterization of the underlying data-generating processes in agricultural commodity trade while, at the same time, commodity-specific features have been retained. The features that differentiate trade in one agricultural commodity from those of another are the structure of the market, which determines what parameters are included in the model, and the model specification, which defines what values are assigned to the parameters. In agricultural commodity trade, the lag structures of the supply and demand relationships in the model specification are particularly important since they give rise to observed cycles in commodity markets. The econometric models are structural in form, so that calculation can be made of the effects of different policy alternatives, and market prices are determined within the system.[1]

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The plan of this paper is as follows: the next section presents the results of projections for commodity trade when the basic economic structure under which trade is conducted remains unchanged. These results establish a control solution against which to measure the effects of policy alternatives. The following section assesses three types of policies: macroeconomic policy changes and trade liberalization in the principal geographic markets for agricultural products – the industrialized countries, and strategic trade policies in the exporting countries. The final section presents the conclusions.

TRADE PROSPECTS

The conditions influencing the projections of agricultural trade for the eight major traded commodities covered by this study are based on a common set of assumptions used by the three groups of modellers in this session. Briefly, it is assumed that there will be a moderate growth in real gross domestic product (GDP) during the remainder of this decade (which is in line with the June 1988 OECD forecast), followed by a downturn in GDP of the industrialized countries at the turn of the decade, after which economic growth will gradually accelerate in the 1990s (which is in line with the April 1988 WEFA long-term forecast). These assumptions and those concerning inflation, interest rates, and exchange rates are key determinants of trade in the models used to generate the projections. In addition, the present set of simulation results assumes unchanged conditions regarding macroeconomic policies in the principal markets, unchanged levels of protectionism and subsidies, discontinued price stabilization schemes after existing international commodity arrangements expire, and an unchanged competitive position of the exporting countries. The potential effects of changes in each of these conditions on agricultural trade prospects are the subject of later sections of the paper.

Separate simulations have been generated for import prices and quantities of the principal geographic markets of each commodity. Table 1 presents a summary of the disaggregated estimates. The average annual growth in the real value of the eight agricultural commodities is equal to 3.9 per cent in 1988–2000. In comparison, the growth in trade of manufactured goods projected by others[2] is equal to 4.2 per cent. The average growth rate of trade prices of the agricultural commodities is somewhat higher than that of manufactured goods as a result of recent weather-related disturbances in production of several products.

The lag structure in commodity market relationships is generally different from those in the markets for manufactured goods since agricultural output tends to respond with a greater delay to changes in economic conditions. As a result, the cyclical swings in trade brought about by business cycles do not cause identical trade cycles in agricultural commodities and in manufactured goods. Nor are the responses the same. Commodity market prices have a greater response to changes in economic activity than do the market prices of manufactured goods because both supply and demand are usually less price-elastic. On the other hand, this characteristic means that the quantity traded of agricultural commodities tends to have a smaller response to changes in markets conditions than does trade in manufactured goods. Consequently, price swings in agricul-

TABLE 1 *Trade growth of selected agricultural commodities 1980–2000 (average annual percentage change)*

		HISTORICAL			PROJECTED			
		1980–3	1984–7	1988	1989	1990	1991–5	1996–2000
Beef	Q	0.4	6.5	2.1	4.2	8.1	6.8	5.4
	P	–2.7	–0.4	–0.9	–4.3	–4.4	8.8	3.4
	V	–2.4	6.0	1.1	–0.4	3.4	15.8	9.0
Maize	Q	–14.3	1.0	2.1	4.2	3.4	2.4	2.6
	P	9.0	–10.7	35.4	–19.8	–6.1	0.7	0.9
	V	–4.8	–10.1	38.2	–15.0	–2.8	3.2	3.5
Bananas	Q	–1.9	5.4	3.3	3.3	2.9	3.4	3.3
	P	7.6	–1.6	9.6	0.7	2.8	3.3	3.4
	V	5.3	3.9	11.3	3.6	6.1	6.6	6.8
Sugar	Q	–7.7	17.7	1.9	1.1	2.9	1.0	1.3
	P	16.9	–4.3	17.0	–5.1	8.4	4.5	3.1
	V	8.0	11.1	19.1	–4.4	11.0	5.3	4.5
Coffee	Q	–0.8	4.2	0.3	–5.9	8.7	6.0	–0.5
	P	–5.0	0.9	9.8	5.7	–32.3	–6.2	9.7
	V	–5.8	5.0	10.1	–0.2	–23.6	0.0	9.1
Cocoa	Q	6.1	4.7	3.0	5.4	0.1	2.3	1.6
	P	–15.2	3.4	3.5	2.7	4.9	2.1	4.7
	V	–10.8	8.3	6.5	8.1	5.0	4.4	6.3
Soybeans	Q	1.6	8.7	–11.0	20.0	12.5	5.9	6.1
	P	–2.2	–4.0	41.0	–15.4	–9.2	4.7	5.5
	V	–1.1	3.9	25.5	1.5	2.2	11.8	9.7
Cotton	Q	–0.1	3.5	0.9	–19.4	–13.3	0.2	3.9
	P	–0.3	0.3	–6.4	9.8	4.1	–6.3	8.9
	V	–0.5	3.9	3.9	10.4	7.8	–5.8	11.2
TOTAL	Q	–1.7	4.3	2.6	2.5	1.7	4.9	3.9
	P	–2.1	–0.3	9.1	2.6	–0.2	–0.1	4.1
	V	–4.2	4.2	11.9	5.6	1.5	4.9	8.1

Notes: Q – Import quantity. P – Unit import value. V – Import value
Sources: Historical data from Food and Agricultural Organization (FAO) of the United Nations; projected data from simulations of econometric models described in Lord and Boye (1987) with assumptions described in text.

tural commodity trade are greater, and quantity changes are smaller, than are those of trade in manufactured goods during the projected period.

ASSESSING ALTERNATIVE POLICY EFFECTS

Economic growth and agricultural trade expansion

The performance of agricultural trade, particularly that of agricultural exports by the developing countries, has been closely associated with the economic performance of the industrialized countries. As Arthur Lewis (1980, p. 556) has noted, 'We need to elaborate statistical proof that [primary commodity] trade depends on prosperity in the industrial countries'. This dependence, according to Lewis, has a detrimental effect on exports of the developing countries since economic growth in the industrialized countries tends to induce a smaller increase in demand for primary commodities than it does for manufactured goods. Estimates of the price elasticity of import demand for the eight agricultural commodities support Lewis' view. The trade-weighted average income elasticity of import demand, adjusted by the distribution elasticities, is equal to 1.1.[3] In comparison, the income elasticity of import demand for manufactured products estimated by others is somewhat over 1.5, according to the survey by Goldstein and Khan (1984, Table 4.4).

However, reports of income elasticities of import demand can be misleading. A change in economic activity influences import demand not only through its direct effect, but also indirectly through changes in market prices. When economic activity expands in the industrialized countries, the demand for agricultural commodities increases and stimulates a price rise which, in turn, influences both the quantity supplied and demanded of the goods. Usually, a rise in market prices resulting from an increase in economic activity will bring about an increase in the quantity of trade.

The combined effects of these direct and indirect influences on agricultural trade have been measured by multiplier analysis. In particular, a sustained one-time 1 per cent increase in economic growth of the industrialized countries has been introduced, and the results have been compared to those of the control solution. The difference between the two solutions indicates that the effect of a 1 per cent increase in GDP of the industrialized countries in any one year would cause a 1.4 per cent expansion in the combined real value of world trade in the agricultural commodities. As such, were steady-state economic growth to equal 4 per cent a year, rather 3 per cent, through the 1990s, trade in the agricultural commodities would have a steady-state growth of 5.8 per cent a year.

These results point to the significant impact that economic policy changes influencing economic growth in the industrialized countries can produce on the long-term growth of agricultural trade. Multiplier analysis indicates that the combined direct and indirect effects of an increase in economic activity cause a more-than-proportional response of agricultural trade in the eight agricultural commodities. The fact that agricultural trade depends on the economic performance of the industrialized countries simply underscores the interdependence

created by trade among countries and the consequences of economic policies of industrialized countries on the world economy.

Trade liberalization

Initiatives to reduce protectionism and subsidies in agricultural trade under the present Uruguay Round of multilateral trade negotiations evolved from the growth of trade disputes among the industrialized countries over access to agricultural export markets and the financial burden created by their domestic support programmes. The potential effects of reductions in the level of government intervention will depend on the amount of protection and subsidies and on the responsiveness of domestic producers and consumers to the resulting lower prices for agricultural products.

The United States, the European Economic Community (EEC) and Japan all impose severe restrictions on their agricultural trade in the form of tariffs, non-tariff barriers (NTBs) to trade and subsidies. The aim of these measures has been to protect domestic producers from foreign competition and to maintain the level of their earnings.[4] In the United States, producers are assisted by both price and income support programmes that include nonrecourse loans, stock programmes, deficiency payments, and target prices. In the EEC, producers are protected from world market fluctuations through guaranteed prices, preferential treatment in agricultural trade, import quotas, health and sanitation restrictions, and variable levies. In Japan, income support and price stabilization policies are based on administered prices.

Protectionism and subsidies are greatest in those products that are domestically produced in the three market areas. For example, based on data of the USDA (1987b), the *ad valorem* tariff-equivalent level for sugar is 222 per cent in the United States, 581 per cent in Japan and 157 per cent in the EEC; for beef, it is102 per cent in the EEC and 93 per cent in Japan; for soybeans, it is 24 per cent in the EEC. On the other hand, the EEC tariff rate on coffee is only 5 per cent, and it is 3 per cent on cocoa, although the tariff rate on bananas is 30 per cent in Japan and 20 per cent in the EEC. No trade barriers currently exist on either maize or cotton imports by the three market areas.

The partial or complete elimination of intervention measures would have a major impact on agricultural trade, despite the generally low price elasticities of import demand in these markets. The trade-weighted average price elasticity of the commodities, adjusted by distribution elasticities, is equal to –0.5. This average lies within the lower range of estimates by others for total merchandise imports of the industrialized countries, according to the survey by Goldstein and Khan (1985, p. 1076). Much higher price elasticities, of the order of –2.0, have been estimated for import demand of manufactured goods (Goldstein and Khan, 1985, Table 4.4). Nevertheless, the range of elasticities varies greatly, both among agricultural commodities and among major market areas. For example, the average price elasticity for the commodities under consideration of -1.7 in Japan is larger than that of –0.5 in the EEC and –0.3 in the United States.[5] Thus, while generalizations about differences between price elasticities for manufactured goods and those for primary commodities are supported by the estimates

for the agricultural commodities, the elasticities for individual products and markets vary widely within this class of goods.

The potential effects of trade liberalization have been considered in the context of a 50 per cent reduction in the existing tariff-equivalent levels of protectionism and subsidies in each of the major areas (for details of the modeling methodology, see Lord, 1987). The results of the simulations indicate that the largest increase in imports would occur in those agricultural commodities that are also produced in the industrialized countries, these being sugar, beef, and soybeans. The exception is banana imports into EEC member countries, particularly Germany. Imports of this product would increase, as a result of the high level of protection that currently exists in the EEC and the relatively high price elasticity of import demand for the product. Sugar imports would expand more than any other agricultural product in all three market areas since the level of protection of domestic sugar producers is much greater than that of any other (for a comparative analysis of agricultural trade liberalization studies, see Valdes, 1987).

The results of the simulations indicate that trade liberalization could have a significant impact on agricultural trade. The overall expansion in the value of agricultural trade in the eight commodities would be equal to 6.4 per cent. Although the price elasticities of the agricultural commodities are in general quite low, the United States, the EEC and Japan give a large amount of protection to agriculture, particularly domestically produced products. Thus, the elimination of government intervention measures could bring about significant increases in world trade as domestic prices were lowered and trade expanded as a result of a greater demand for the products.

Strategic trade policies

The models that have been used to characterize the data generating process of the eight agricultural commodities give explicit recognition to the fact that trade takes place in a world of imperfect competition, since exporters offer their goods under a variety of conditions and importers have distinct preferences. As a result, differences in the export growth rates of agricultural commodity exporting countries can be explained not only in terms of their supply responsiveness to changing market conditions, but also in terms of the responsiveness of export demand to relative price changes.

In this market structure, strategic policies aimed at the expansion of agricultural exports can consist of measures designed to shift the supply curve and increase the quantity of exports demanded as a result of lower relative export prices. Sector-specific or industry-specific policies, according to Diaz-Alejeandro (1975, p. 121), tend to be more visible to policy makers and can therefore be more difficult to implement. This argument would apply to reductions in taxes, but it would be less relevant to measures that improved market information systems. It would also apply to the removal of government administered producer price systems, which generally have low financial costs but probably have high political costs. These systems impede the transmittal of market signals to domestic producers and exporters and thus do not allow these economic agents

the opportunity of changes in market conditions. The extensive use of administered producer price systems in the developing countries, particularly for traditional agricultural exports, provides much scope for improvements in the efficiency of producers and exporters.

Paradoxically, both sector and macroeconomic policies have been found to create disincentives for traditional agricultural exporters in some of the developing countries. Schiff and Valdes (1986) have measured the levels of taxation on particular agricultural exports in five countries of Latin America and found that, for the commodities covered by the present study, Argentina has imposed taxes on beef and maize production, as well as wheat exports; Brazil has taxed soybean production; and both Colombia and the Dominican Republic have taxed coffee production. In macroeconomic policies, Valdes (1986) has determined that import substitution policies in several of the developing countries have lowered the competitive position of traditional agricultural exports. The reason is that policies aimed at protecting semi-manufacturing and manufacturing industries have raised the cost of imported inputs for agriculture. The resulting higher cost of imported products has required reductions in the real exchanges rates of these countries and these appreciations, according to Valdes, have raised the cost of exportables through indirect taxation that eventually follows in order to finance the more expensive imported protected goods. Thus, the promotion of traditional agricultural exports could, in many cases, simply be brought about by the removal of policies that have been adversely affecting these exports.

The effects of strategic trade policies aimed at increasing export demand have been analysed in one developing region – Latin America. An expansion in the market shares of countries in this region need not be at the expense of agricultural exports of other developing regions since, as Kravis (1970) has noted, the industrialized countries compete in many of the same products. In fact, the industrialized countries now account for 35 per cent of total trade in agricultural commodities, compared with less than 30 per cent two decades ago.

In order to empirically assess the effects that a shift in export supply would produce on the quantity of exports demanded, relative prices were systematically reduced during a six-year period. It has been assumed that the Latin American countries would alter their relative export prices by the amount necessary for their average annual export growth rate in 1990–5 to equal that of manufactured exports from the industrialized countries in the last fifteen years, namely 5.5 per cent a year. This objective would require them to reduce the relative price of their exports by 1.25 per cent each year during the six-year period.

The full impact of the fall in relative export prices would take several years to be completed. The initial fall in relative prices would cause exports to expand by an additional 0.7 percentage points in the same year, over-and-above the projected growth rate. In the sixth year, the difference between the export growth rate with and without the change in relative export prices would be 1.6 percentage points. This amount takes into account both the 1.25 per cent fall in relative export prices in that year and the lagged effects from earlier relative price changes. The effects of relative price changes in the first part of the 1990s would carry over into the second half of the decade. In all, the 7.5 per cent cut in relative export prices as a result of the shift in export supplies would bring about an additional 12.8 percentage point expansion in exports.

These results are not intended to diminish the importance either of government policies aimed at influencing the quantity of export supply or of increased access to foreign markets resulting from trade liberalization. What this section has attempted to suggest is that strategic trade policies aimed at increasing the quantity demanded of agricultural exports can also be used by countries to expand their exports.

CONCLUSIONS

This paper has examined the trade prospects of agricultural commodities under unchanged economic conditions and under alternative policy initiatives. The analysis was conducted with a set of econometric models for eight commodities using a common modelling methodology. The projections made under unchanged economic conditions used the same set of assumptions as the three groups of modellers in this session and provide a control solution against which to assess the different policy initiatives. The results of the simulations suggest that a one-time 1 per cent increase in economic growth of the industrialized countries generates an additional 1.4 per cent growth in the overall volume of agricultural trade in the commodities and that a 50 per cent reduction in existing barriers to trade in the major geographic markets for these commodities would generate a 6.4 per cent increase in the value of trade.

In addition, simulations were performed to explore the possible effects of strategic trade policies aimed at increasing the demand for agricultural exports of countries of one region, Latin America. Simulations of a six-year 1.25 per cent annual reduction in relative export prices, brought on by an increase in export supplies (that is, a shift in the export supply curve), would cause exports of the region to grow by 2 per cent a year more than that of overall world trade in the eight commodities.

These results suggest that there are several ways in which agricultural commodity trade could be increased in the rest of this decade and in the 1990s. The mechanisms examined in this paper are based on domestic policy initiatives, rather than attempts to establish international commodity agreements to either stabilize prices or improve the trend growth rates of commodity prices. Given the generally greater inward-looking policy initiatives that have been adopted by governments in the 1980s, these channels might prove to offer more realistic and viable means of expanding international trade in agricultural commodities.

NOTES

[1]For a description of the models, see Lord and Boye (1987) and references therein.

[2]OECD projections for 1988–9; WEFA projections for 1989–93. For purposes of comparison, it has been assumed that the 1990–3 average growth will be maintained through the remainder of the decade. The assumptions underlying the OECD and WEFA projections are similar, but not equivalent, to those used in the present set of simulations.

[3]The income elasticities vary widely among both commodities and importers of the same product, so that agricultural trade growth of a particular group of products is likely to depend on the commodity composition and geographic destination of agricultural trade.

[4]According to the United States Department of Agriculture (USDA, 1987a), government assistance accounted for 22 per cent of producer revenues in the United States, 72 per cent in Japan, and 33 per cent in the EEC in 1982–4.

[5]Khan and Ross (1975) and Thursby and Thursby (1984) also found the price responsiveness for aggregate imports to be much greater in Japan than in the United States for aggregate imports, and their estimates for both of these countries were larger than the elasticities calculated by Boylan, Cuddy, and O'Muircheartaigh (1980) for certain EEC member countries.

[6]This rate, as well as that of the other products in this study, is based on average 1984–6 data compiled by the USDA (1987b).

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DISCUSSION OPENING – VIJAY VYAS

Montague Lord's paper is a neat exercise in conventional simulation methodology that uses estimated econometric models to analyse the effects of policy changes on trade in agricultural commodities. People better qualified than I have commented on the methodological aspects of such modelling exercises. I will not venture into that territory. However, I cannot help commenting on two generic weaknesses of their models. First, there is very little appreciation of the

volatile nature of agricultural supplies and the attendant problems of instability and adjustment. Second, models are weak for policy purposes because of the aggregations resorted to, that is, aggregating countries with dissimilar trade regimes and trade prospects, aggregating commodities with varying production and trade characteristics. Coming to Dr. Lord's paper, a further question can be raised on the usefulness of treating each policy intervention separately, rather than considering a 'policy package'. While the procedure adopted by the author has greater pedagogical value, the latter approach is more relevant for policy analysis.

My main comments, however, pertain to some of the conclusions emerging from Lord's paper, and the way in which these conclusions are translated into policy prescriptions. I admit at the outset that my comments are not sharply focused on this paper, they are rather in the nature of general observations on the outlook for trade in agricultural commodities. I will put forth my comments around three propositions.

1. Rate of growth in agricultural trade will decelerate in coming years

According to the paper, volume of world trade in the last 25 years was rising at approximately 4.5 per cent per annum. (In value terms the growth was slightly lower.) The author's model suggests that even with steady-state economic growth in the world economy to equal 4.5 per cent per annum (a rather optimistic assumption), trade in agricultural commodities would have a steady-state growth of 3.3 per cent. Although potential effects of trade liberalization and domestic policy reform could be quite significant, these are more likely to be in the realm of distribution of the share of the world trade in particular commodities, among different exporters, rather than on an overall increase in the world trade in agricultural commodities.

Other independent studies have also shown that the rate of growth in trade in agricultural commodities is likely to be lower in the coming decade, even under favourable assumptions. (*World Development Report 1986*, The World Bank, 1986; *Market Prospects for Raw Materials,* paper prepared by the staff of the World Bank and International Monetary Fund for the Development Committee, 1987.)

2. Within a group of agricultural commodities, only a few commodities, principally food articles, are likely to have higher rates of growth in trade

As the author notes, the range of import elasticities varies greatly both among agricultural commodities and among major market areas. In the author's estimation, among the eight commodities selected for analysis, sugar, beef, soybeans (and banana) will have the largest increase in imports by developed countries.

Other studies also report that world trade in food articles is expected to grow faster, while the growth in the trade of, say, agricultural raw materials is likely to be slower. In the report *Market Prospects for Raw Materials* cited earlier, trade in these two groups of commodities will move at the rate of 3.2 per cent per annum and 1.1 per cent respectively.

3. Share of developing countries in agricultural exports has declined including their share in the more 'dynamic' food articles and this trend is expected to continue

According to the source I have quoted earlier (*Market Prospects for Raw Materials*) the share of developing countries in total agricultural exports has come down from 61.3 per cent (in 1969–71) to 57.7 per cent (in 1984–6). Corresponding figures for the developed countries are 33.5 per cent and 45.3 per cent. Various projections for the year 2000 suggest that developing countries' share in agricultural exports will further decline. This decline is largely accounted for by the deceleration of rates of growth in the exports of cereals, beef and sugar. Projections of future trends in the exports of agricultural commodities from developing countries, even with reasonable growth in world economy, a more liberal trade regime and favourable domestic policies, are not optimistic.

This bleak picture emerges because most of the models of world commodity trade do not take into account the potential contribution of the technological and institutional changes in developing countries. While a growing world economy, liberalized trade and domestic trade regime will play a positive role, all these factors will prove to be of transient value if a *cost-reducing* technology and organization changes are not fuelling the process of growth, especially in commodities with high income elasticity.

Growth of soybean exports from Brazil, increase in palm oil exports from Malaysia, rubber from Thailand, coffee from Côte d'Ivoire and tea from Kenya are illustrations of the critical role of technology and organizational changes in expanding agricultural exports of the developing countries.

Finally, a common weakness of the policy prescriptions based on forecasting models is that inadequate attention is paid to the *process* of policy formulation. In the paper this comes out quite clearly when the author suggests lowering the relative prices of the selected commodities each year, for a number of years, to boost exportable surplus. How is this relative fall in prices engineered? With what mechanism? With what consequences for the supply response for the commodities concerned, for the agricultural sector and for the economy as a whole? Who will be the gainers, and who will be the losers?

In order to give credibility to our exercises, we should address ourselves to these and similar issues while analysing the implications of our models for the concerned parties.