Agricultural Competitiveness in an Interdependent World

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Abstract: The concept of competitiveness and its measurement are cast within a general equilibrium interdependent framework that juxtaposes home country with rest-of-the-world trade behaviour. The quantitative index constructed here, called "revealed competitiveness," is a useful indicator that can be readily applied to any aggregate commodity or specific sector. Here it is applied to total agriculture. Econometric analysis is used to identify the importance of government intervention and real economic factors affecting global agricultural competitiveness. Time-series and cross-section data covering 78 countries during 16- to 26-year periods provided the empirical basis for this study.

Introduction

Expansion of world trade beginning in the early 1970s dramatically increased both real economic welfare and economic interdependence among sovereign nations. However, many governments are currently under increasing pressure to erect protective trade barriers because of contraction in world demand. As a consequence, many individual exporters are confronted with potential market losses. More importantly, global prosperity is threatened because of the possibility that specialization in production and commodity exchange among countries will be reduced.

Given this global environment, considerable attention is understandably being focused on international competitiveness, a complex issue with many dimensions (Davis, 1987). In the present paper, the concept of competitiveness and its measurement are cast within a general equilibrium framework. The measure, called "revealed competitiveness," is a useful indicator that can be readily applied to any aggregate commodity or specific sector.

Statistical measures of revealed competitiveness are applied to total agriculture. In addition, the underlying components of global competitiveness in agriculture are examined using econometric analyses that isolate important causal relationships among key factors affecting trade flows. This is helpful in ascertaining the relative importance of real economic factors and government intervention.

Competitiveness Index and Its Components

The following revealed agricultural competitiveness index (RAC) is posited:

\[ (1) \ RAC = \ln (RACS) - \ln (RACD), \]

where revealed agricultural comparative supply (RACS) is the ratio of the relative (home country to rest-of-the-world) agricultural export share ratio (RAX) to the relative nonagricultural export share (RNX); and revealed agricultural comparative demand (RACD) is the ratio of the relative agricultural import share ratio (RAM) to the relative nonagricultural import share (RNM).

The revealed competitiveness index is analogous to the concepts of comparative advantage and comparative disadvantage because both the statistical measure and the theoretical concepts embody a comparison between two trading entities (i.e., any home country and the rest of the world) as well as a comparison between two commodities (i.e., any traded commodity and all other traded goods and nonfactor services).

Equation (1) can be rewritten as a triple trade relative:

\[ (2) \ RAC = \ln \left[ \frac{(RAX/RNX)}{(RAM/RNM)} \right]. \]
A positive value means that the home country reveals a competitive advantage in agriculture; a negative value means that the home country reveals a competitive disadvantage in agriculture.

Time series RAC estimates for the USA, Argentina, Japan, and South Korea are shown in Figure 1. Argentina and the USA are characterized by positive RAC coefficients, indicating that both countries have a competitive advantage in agriculture. By contrast, Japan and South Korea, two countries with relatively unfavourable factor endowments for agriculture, show negative and declining RAC trends. This shows that Japan and South Korea possess competitive disadvantages in agriculture that are intensifying with time.

\[ RAC \]

Figure 1—Revealed Agricultural Competitiveness: Argentina, Japan, South Korea, and the USA

RAC estimates for high-, middle-, and low-income country groupings show that between 1961 and 1986, the developing world has been more competitive in agriculture than the developed world (Figure 2). But, the RAC gap between the developed and developing countries is narrowing. Since the late 1970s, the high-income countries have markedly increased their competitiveness in agriculture. By contrast, the developing world and the low income countries in particular have seen their agricultural competitive position severely eroded. The middle-income-country category displays a slight long-run decline in agricultural competitiveness. This is not surprising given the success of middle-income countries in exports of manufactured goods. Some might argue that deteriorating agricultural competitiveness in the low-income group is disturbing because agriculture is a leading growth sector in countries at this level of development and these developing countries should maintain both a comparative and competitive advantage in agriculture.
An econometric model was developed to identify the importance of real economic ($e$), government intervention ($g$), relative price ($p$), and exogenous ($z$) elements influencing revealed agricultural competitiveness and its four components, $RAX$, $RNX$, $RAM$, and $RNM$. The factors directly affecting these four components were independently regressed rather than regressing all the related determinants of agricultural competitiveness on $RAC$ to mitigate simultaneity problems. The structural equations, using variables expressed in relative terms (i.e., home country with respect to the rest of the world), are specified as follows:

\begin{align*}
(3) \quad RAX &= f\{e(TP, LP, KL, KT); g(M1, PP); p(FE, AT); z(PL)\}, \\
(4) \quad RNX &= h\{e(EP); g(M1); p(FE, TT); z(PS)\}, \\
(5) \quad RAM &= k\{e(YP, CA, UR); g(M1, PC); p(FE, AT); z(PS)\}, \text{ and} \\
(6) \quad RNM &= l\{e(YP, CA); g(M1); p(FE, TT); z(PS)\}.
\end{align*}

Land and labour are primary economic determinants of agricultural trade because they are essential to the agricultural production process. Capital, a manufactured element, is not necessarily, however, a required input. It is, therefore, considered to “augment” the land and labour endowment. Real economic factors affecting export behaviour include relative land productivity ($TP$), agricultural labour productivity ($LP$), nonagricultural labour productivity ($EP$), agricultural labour-augmenting capital (tractor/labour ratio in agriculture) ($KL$), and land-augmenting capital (irrigation/cropland) ($KT$). Real economic factors
affecting import behaviour include relative urban population ratio (UR), income per capita (YP), and per capita foreign exchange earnings (CA).

Governments may alter market outcomes by manipulating the money supply and influencing relative prices. In this model, government intervention factors include the relative money supply growth rate (MI) and nominal rates of agricultural protection (the producer-to-import-price ratio, weighted by production or consumption) (PP and PC).

Other relative prices included in the model were the relative real foreign exchange rate index (FE), agricultural terms of trade (AT), and total merchandise terms of trade (TT). Finally, exogenous variables that account for size differentials affect country export and import shares. Two exogenous shift factors were used; i.e., the relative land to population ratio (PL) and population share (PS).

Time-series, cross-section regressions were used with data from 78 countries (which represent 85 percent of total agricultural trade) and covering 16 years (1967-82). The Parks generalized least-squares procedure was selected as the solution algorithm because of its ability to address time-series correlation and cross-sectional heteroskedasticity problems. Empirical results are shown in natural log-log functional form as follows:6

(7) \[ \ln(RAX) = -5.355 + 0.006 \ln(FE) - 0.348 \ln(MI) - 0.306 \ln(AT) - 0.108 \ln(PP) \]
\[ (-72.42)(0.46)(-5.08)(-34.90)(-15.49) \]
\[ + 0.126 \ln(TP) + 0.310 \ln(LP) + 0.182 \ln(KL) + 0.031 \ln(KT) \]
\[ (2.67) (7.61) (12.01) (3.12) \]
\[ + 0.164 \ln(PL), \]
\[ (8.44) \]

(8) \[ \ln(RNX) = -5.32 + 0.033 \ln(FE) + 0.896 \ln(MI) - 5.04 \ln(TT) + 1.726 \ln(EP) \]
\[ (-254.99) (1.68) (12.32) (-28.24) (76.23) \]
\[ + 27.426 \ln(PS), \]
\[ (35.39) \]

(9) \[ \ln(RAM) = -5.780 - 0.105 \ln(FE) - 1.300 \ln(MI) + 0.451 \ln(AT) + 0.025 \ln(PC) \]
\[ (-271.93) (-9.05) (-15.58) (55.27) (4.01) \]
\[ + 0.481 \ln(YP) + 0.098 \ln(CA) + 0.480 \ln(UR) + 30.763 \ln(PS), \text{ and} \]
\[ (23.78) (6.33) (8.87) (11.92) \]

(10) \[ \ln(RNM) = -5.318 - 0.157 \ln(FE) - 1.649 \ln(MI) + 0.377 \ln(TT) \]
\[ (-852.01)(-165.51) (-156.35) (181.09) \]
\[ + 0.644 \ln(YP) + 0.296 \ln(CA) + 24.687 \ln(PS). \]
\[ (171.19) (230.56) (23.87) \]

Discussion about the economic implications of the empirical results are presented in three behavioural categories: real economic factors, government intervention, and relative prices.

**Real Economic Factors**

The empirical results show that real economic factors explain trade behaviour in a manner consistent with trade theory. The relevance of Ricardo's concept of comparative costs is evident, given that relative labour and land productivity (LP, TP, and EP) are directly related to country export shares (RAX and RNX).
Positive $KL$ and $KT$ coefficients lend support to the Heckscher-Ohlin explanation of trade. The direct relationship between the intensity of capital usage and competitiveness in agriculture is consistent with the Heckscher-Ohlin factor proportion theorem.

In the $RAX$ equation, the productivity of agricultural labour ($LP$) was found to be a more influential factor than land productivity ($TP$) in explaining agricultural export behaviour. The differential in the $LP$ and $TP$ coefficients show that country agricultural export share was 2.5 times more responsive to changes in agricultural labour productivity than to changes in land productivity.

The responsiveness of $RAX$ to increases in agricultural labour and land productivity are greater than its responsiveness to increases in capital-augmenting investments of tractors and irrigation. This finding suggests that inputs other than machinery and irrigation (such as human capital, research and development, and infrastructure, which were not included in empirical model because of inadequate data) contribute significantly to export performance and, hence, to agricultural competitiveness.

The empirical estimates indicate that targeting capital to agricultural labour is more effective than targeting capital to land. In other words, capital investments that substitute for agricultural labour generate higher agricultural export returns than do capital investments that substitute for land. This suggests that human capital is likely to enhance agricultural competitiveness more than infrastructural capital.

The significant import response to income growth underlines the limitation of supply-oriented explanations of trade. In both the $RAM$ and $RNM$ equations, per capita income ($YP$), a demand factor, was more responsive than all other independent variables, with the exception of changes in the money supply. These findings indicate that consumers spend more of each additional dollar earned on nonagricultural imports than on agricultural imports.

The high $RAM$ elasticity with respect to the relative urban population ratio ($UR$)—a proxy measure for development within the context of cross-sectional analysis—provides additional evidence that demand considerations influence trade patterns. This indicates that rural-to-urban migration, which lowers domestic agricultural production because of a decline in the agricultural labour force, increases the demand for agricultural imports and reduces $RAC$.

Agricultural and nonagricultural import shares were relatively unresponsive to per capita foreign exchange earnings. The estimated $CA$ coefficients do, however, suggest that agricultural imports are "necessities" in comparison with nonagricultural imports, while nonagricultural imports are "luxuries" relative to agricultural imports.

**Government Intervention**

An inverse relationship was hypothesized between agricultural export share ($RAX$) and the relative domestic-to-import-price ratio ($PP$) because the higher producer prices are relative to traded prices, the less internationally competitive countries are likely to be. Further, agricultural price protection policy (i.e., $PC$) was hypothesized to be positively related to agricultural import share ($RAM$) because consumers generally purchase commodities with lower prices, irrespective of their production origin. The empirical results confirmed both of these hypotheses.

Changes in the money supply growth rates affect exchange rates values. Unanticipated increases in the money supply induce a rise in the price of home country exchange rates; i.e., the home country’s exchange rate decreases in value on the international market. Initially, domestic traders respond by increasing exports and decreasing imports of goods and services.

The initial exchange rate effects of changes in the money supply on current account transactions can, however, be offset by responses occurring on capital accounts. Increases in monetary supply growth lowers home country interest rates, inducing an outward flow of domestic capital and a smaller inward flow of foreign capital. The upshot of these capital
movements is that the home country's currency increases in value in the international market. As a result, exports (imports) of goods and services become more (less) expensive to foreign (domestic) consumers, inducing a decrease (increase) of exports (imports) of real goods.

Parameter estimates for $M1$ were, for the most part, consistent with the initial current-account-induced effects of unanticipated changes in domestic monetary growth. The $RAX$ elasticity with respect to $M1$ was, however, negative. The capital-account-induced exchange rate effect of changes in the money supply may explain the asymmetrical $RAX$ response with respect to $M1$. Other possible explanations include: (1) the fixed and quasi-flexible exchange rate régimes in developing countries; (2) the relative importance of agricultural exports as a source of foreign exchange in developing countries; and (3) intervention policies in developed countries' agriculture.

The explanation that exports increase in response to unanticipated increases in the domestic money supply assumes that exchange rates are permitted to fluctuate. In the actual world, not all real-world exchange rates float freely. Exchange rates in many developing countries are either fixed or are tied to a basket of currencies, becoming only quasi flexible. When nominal exchange rates are not allowed to freely fluctuate, increases in the domestic money supply lower real exchange rates, increasing domestic prices relative to rest of the world prices. Commodity trade responds little at first because nominal exchange rates are fixed. However, a failure to devalue in response to domestic inflation causes real exchange rates to become overvalued. Overvalued rates discriminate against exports, encourage imports, and foster home country trade deficits and rest-of-the-world trade surpluses.

Another possible reason for the asymmetrical response is that agriculture is a relatively more (less) important source of foreign exchange earnings than non-agriculture in developing (developed) countries. The inelasticity of agricultural exports regarding the value of the home country exchange rate could cause a dominance of the inverse-versus-direct relationship between $M1$ and $RAX$ in the sample where the majority of observations are of developing countries.

Government intervention may provide yet another explanation for the negative $M1$ coefficient in the $RAX$ equation. Developed countries insulate their agricultural producers from income losses attributable to declining world commodity prices. Seldom do farm-gate prices move downwards because of official support prices. For example, export restitutions (subsidies) in the EC provide export outlet guarantees. The negative $M1$-induced exchange rate response in the $RAX$ equation could, therefore, have been muted because of these income support policies.

The magnitude of the four estimated $M1$ coefficients suggest that importers are more responsive to growth in the domestic money supply and, hence, to short-run price changes than are exporters. This is not surprising since domestic changes in money supply growth rates has a more direct effect on domestic consumers (i.e., home country importers) than foreign consumers (i.e., importers of home country exports). Furthermore, domestic exporters are less price sensitive in the short run because of the long-run nature of establishing a market niche. For instance, customers need to be identified, contracts signed, goods transported, etc. By the time exporters are ready to respond, the capital-account-induced exchange rate effect becomes operative.

In addition, the estimated $M1$ coefficients suggest that exporters of non-agricultural commodities respond more quickly to price changes than do exporters of agricultural commodities. This is reasonable given the comparatively long-run nature of the agricultural production process. In addition, the decomposition analysis of $M1$ on trade shares reinforces an earlier finding that agricultural imports are "necessities" in comparison with non-agricultural imports and that non-agricultural imports are "luxuries" in comparison with agricultural imports.

Finally, the net effect of monetary growth on agricultural competitiveness was found to be negative. Taking the derivative of $RAC$ with respect to $M1$ indicates that a 1-percent increase in relative monetary growth decreases the home country's competitiveness in agriculture by 1.58.
AGRICULTURAL COMPETITIVENESS IN AN INTERDEPENDENT WORLD

Relative Prices

Negative relationships were expected between terms of trade (AT and TT) and export shares because a country’s competitiveness ranking is believed to be low when export prices are high relative to import prices. In addition, positive relationships were envisioned between terms of trade and import shares because of the inverse relationship between import prices and import levels. The empirical results confirmed these two hypotheses and showed that the trade-share responsiveness to changes in the terms of trade is inelastic.

In the long run, money is neutral. Foreign exchange rates merely provide the means through which trade takes place as one currency is valued in terms of another. Movements in the long-run real foreign exchange rate should not, therefore, affect international trade behaviour. 18

Indeed, the empirical results demonstrate that fluctuations in the relative (trade-weighted) real foreign exchange rate index (FE) do not affect changes in either agricultural or nonagricultural export shares (RAX and RNX). Furthermore, FE is a relatively unimportant determinant of agricultural and nonagricultural import shares. 19 This suggests that movements of real exchange rates do not significantly affect market shares because money eventually becomes neutral. Also, other determinants, most notably unanticipated growth in the relative money supply (M1), which affects foreign exchange rates in the short run, capture much of the variation in trade shares.

The FE coefficients show that importer behaviour, unlike export behaviour, was somewhat more sensitive to fluctuations in relative real foreign exchange rates. 20 In the event of adverse movements in the home country’s FE (appreciation), exporters were, evidently, willing to cut profit margins in order to retain market share and to stay in business. Importers, on the other hand, tended to purchase commodities from the least costly supplier, be they foreign or domestic. In other words, when the home country’s FE appreciates (depreciates), its consumers prefer foreign to domestic goods.

Conclusion

The analysis suggests that countries tend to export goods for which an underlying comparative advantage really exists. Country agricultural and nonagricultural export specialization patterns exhibit a certain inevitability. Real economic fundamentals are important. Relative productivity and factor endowments affect export behaviour more than policy instruments such as changes in the money supply or protectionist price policies.

On the other hand, the analysis shows that the real economic fundamentals underlying demand, such as relative per capita income, foreign exchange availability, and the structure of urbanization, are not as important as government intervention in shaping import behaviour.

An important implication for policy makers is that rather than become overly preoccupied with unfair trading practices of competitors, they should put more emphasis on opening up markets for their exportable commodities. International trade rewards the efficient producer. And the consumer also benefits through lower commodity prices. More attention and resources therefore need to be devoted to eliminating policies that prevent consumers from importing low-priced commodities.

Notes

2 A relative measure of competitiveness was developed using the two-good, two-country neoclassical model of comparative advantage.
3 The use of logarithms has the advantage of rendering estimates of relative trade shares symmetrical through the origin.
High-, middle-, and low-income countries are defined, respectively, as having annual per capita incomes greater than $4,500, between $4,500 and $2,000, and less than $2,000 (using 1980-82 averages of GDP expressed in 1980 US dollars that were adjusted by purchasing power parities). The high-income countries include the following 18 countries: Australia, Austria, Belgium-Luxembourg, Canada, Denmark, Finland, France, Italy, Japan, Netherlands, New Zealand, Norway, Saudi Arabia, Sweden, Switzerland, UK, USA, and FRG. The following 21 countries comprise the middle income category: Algeria, Argentina, Brazil, Chile, Costa Rica, Greece, Republic of Ireland, Israel, Malaysia, Mexico, Panama, Portugal, RSA, South Korea, Spain, Syria, China (Taiwan only), Turkey, Uruguay, Venezuela, and Yugoslavia. The low income category includes the following 39 countries: Bangladesh, Bolivia, Burkina Faso, Cameroon, Colombia, Benin, Dominican Republic, Ecuador, Egypt, Ghana, Guyana, India, Indonesia, Ivory Coast, Jamaica, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Nicaragua, Niger, Nigeria, Pakistan, Paraguay, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Sri Lanka, Sudan, Tanzania, Thailand, Togo, Tunisia, Zaire, and Zambia.

All variables, except population share (PS), are expressed in relative terms.

Witness the 0.31 elasticity for relative agricultural labour efficiency and the 0.12 elasticity for relative agricultural land efficiency.

The sum of the RAX elasticities with respect to LP and TP (0.44) was over twice the sum of the RAX elasticities with respect to KL and KT (0.21).

Agricultural export share (RAX) was not only more responsive to changes in agricultural labour efficiency (LP) than to changes in land efficiency (TP), but it was also more responsive to changes in agricultural-labour-augmenting investment (KL) than to land-augmenting investment (KT).

A 1-percent increase in the real per capita income ratio between the home country and the rest of the world induced a 0.48- and 0.64-percent increase in relative agricultural imports and relative nonagricultural imports, respectively.

A strong positive relationship exists between urbanization and development level.

The elasticities of CA with respect to RAM and RNM were 0.10 and 0.30 respectively, smaller than anticipated. A more complete measure for CA is likely to generate larger coefficients. The capacity to pay for imports depends not only on exports of goods and services in the current account but also on debt service payments. Unfortunately, information on country debt is often confidential. As debt service payment data were not readily available for all countries, they could not be used in this analysis.

Nonagricultural import share (RNM) was found to be more responsive to fluctuations in per capita foreign exchange earnings (CA) than was agricultural imports (RAM). Given a decline in the availability of foreign exchange, country imports of nonagricultural commodities decrease more than agricultural imports.

This is the case for the RNX, RAM, and RNM equations.

Both the RAM and RNM elasticities with respect to M1 were elastic, while the corresponding RAX and RNX elasticities were inelastic.

Note that the M1 elasticity for nonagricultural exports is greater than the M1 elasticity for agricultural exports.

Note also that the M1 elasticity for nonagricultural imports is greater than the corresponding elasticity for agricultural imports.

Dervis, de Melo, and Robinson (1982) argue that the real exchange rate has no role to play in traditional two-good models of exchange.

The elasticity of RAX with respect to FE was not statistically significant. In other words, the null hypothesis that the foreign exchange rate coefficient is equal to zero could not be rejected. The RNX elasticity with respect to FE was, however, significant at the 90-percent level. But the estimated coefficient was 0.03, which is close to zero. The FE coefficients for RAM and RNM, though statistically significant, were small relative to the elasticity magnitudes of the other exogenous determinants.

Even though the FE coefficients in the RAM and RNM import equations are small, they are greater in magnitude than those in the RAX and RNX export equations.

148
DISCUSSION OPENING—Shun-yi Shei (Academia Sinica)

Vollrath and Vo’s paper is an important piece of work. Conceptually, they developed a useful indicator, called “revealed competitiveness,” which can be easily applied to measure a country’s competitiveness in agricultural production and trade. Empirically, they examined the underlying determinants of competitiveness in agriculture using time-series and cross-section data and covering 78 countries during a 16-year period. The paper thus provides both theoretical and empirical contributions for the understanding of the sources of international agricultural competitiveness. I read their paper with great respect and congratulate the authors on their success in obtaining satisfactory quantitative results that are, in general, consistent with their prior expectations. However, since their paper involved many explanatory variables, they also produced several conflicting and unanswered questions.

The revealed comparative advantage index, initially developed by Belassa, has some undesirable properties. It may fail to serve either as a reliable cardinal or ordinal measure of a country’s revealed comparative advantage. Key properties of the RAC concept developed in Vollrath and Vo’s paper may also suffer from similar undesirable properties.

Figure 1 shows that the developing countries have been more competitive in agriculture than developed countries in the past 20 years. This does not agree with recent findings by Hayami.

The empirical study focused on measuring the accuracy of the RAC model. If it were shown that the model is accurate, then one could claim that the model is also useful in studies relating to structural adjustment or trade and development issues. In that limited sense, the hypothesis that the RAC is useful can be and is tested. Unfortunately the accuracy of the model, usually expressed by the $R^2$ or $R^2$ and $F$ test statistics, was not shown in their paper.

The more-developed countries, the developing countries, and the LDCs may reveal different patterns of comparative advantage. Their underlying determinants may not be the same. This is especially true in agriculture. We might thus gain some useful information if these three groups of countries were treated differently by using dummy variables and subjected to statistical tests.

The change in the market share on which the RAC is based depends both on changes in competitiveness of the exporting countries and on changes in the demand of the importing countries. The RAX equation included only the supply side of the comparative advantage and ignored the demand side by assuming that consumer preferences were internationally identical and homothetic. This implicit assumption seems too strong for agricultural products, especially if the stages of economic development among countries differ greatly.

The empirical results are informative and useful. However, the validity of these results is questionable due to a lack of theoretical foundation. For example, in the RAX equation, the authors claimed that positive coefficients for $KL$ and $KT$ lend support to the Heckscher-Ohlin explanation of trade. However, the empirical test of the theory should involve net exports, factor intensity, and factor abundance. One cannot, therefore, appropriately regress export share on factor intensity and infer factor abundance. A rigorous test would be the comparison of factor ratios in production, consumption, and trade.

The finding that fluctuations in the relative real foreign exchange rate index do not affect change in $RAX$ is surprising. The real world would indicate the opposite result. I
would rather explain this undesirable outcome as a consequence of bad luck or lack of patience to get the right sign.

The finding that country agricultural export shares were 2.5 times more responsive to changes in agricultural labour productivity than to changes in land productivity is interesting. Does this finding agree with prior thinking?

Why was the nominal variable (changes in the money supply) more responsive than the real variable (per capita income) in the $\text{RAM}$ and $\text{RNM}$ equations?

An important question before we seriously discuss the meaning and statistical and economic significance of the estimates is the sensitivity tests of the coefficients. How sensitive do these coefficients respond to model specification? Traditional regression techniques are not enough to deal with this estimation problem. A useful approach to the reliability and robustness issues of these coefficients should be based on Bayesian econometrics.

These are some of the minor points. Once again, I applaud the authors' success in identifying the sources of international comparative advantage in agriculture. This paper serves as a useful reference in studies relating to policy recommendations for the farm sector.

**GENERAL DISCUSSION—Jacques Brossier, Rapporteur (Institut National de la Recherche Agronomique, Dijon)**

A participant commented that LDCs have lost competitiveness. Do LDCs still have some comparative advantage? Another commented that the "revealed competitiveness" index was too aggregated and that he would like to see indices by sector and product.

Vollrath replied that the index is only for the agricultural sector. LDCs always have a comparative advantage for at least one product, but they tend to not want to exploit it when its in agriculture because that would imply that they are not developing their industrial sectors. The index is not a measure of comparative advantage but competitiveness with respect to supply and exports. The theoretical background of the index is not developed here. Nor are the tests used very accurate or rigorous.

Participants in the discussion included T. Takavarasha and J.C. Wells.