Iranian Economic Review, Vol.11, No.16, Spring 2006

EU Enlargement: The New Member States and Agricultural Trade Potentials*

Hossein Pirasteh**

Abstract

In May 2004, ten countries joined the European Union. Most of these countries that are located in the central and eastern part of Europe have different historical background and economic structure, compared to the older EU members. Doubt, the economic consequences of the enlargement of the EU toward Eastern Europe, is one of the main interests of the researchers in recent years and it will be extended well over the first decades of the new Millennium.

With the expansion of Eu, the implications of regional economic cooperation and competition for all EU members, in terms of resource allocation, the concentration of economic activities and its welfare consequences, depends upon utilization of economic resources. Effective utilization of resources in turn, rests upon realization and exploitation of comparative advantage in different arrays of economic activity. Given the fact that most of the old members of the EU have relatively a well-established, internationally competitive industrial base, with their manufacturing firms closer to the technological frontier whereas the new members are endowed with more heterogeneous natural resources and more diversified agricultural products, the potentials of agricultural trade seems to exist for the hew corners for the years to come.

The main purpose of this paper is to measure the degree and the extent of comparative advantages in agricultural crop production and to compare the results for the old and new members. The Bowen comparative advantage index as well as a simple regression model will be used in this regard. This demonstration will highlight the relative strengths of the new members in exploiting their agricultural trade potential and may help to formulate effective policies for domestic production, distribution and marketing activities in the enlarged EU for further exploitation of potential agricultural commodities trade.

Keywords: EU Enlargement, Bowen Index of Comparative Advantage, Common Agricultural Policy.

---

*- This is an updated and revised paper submitted to the 7th Uddevalla Symposium 2004 on "Regions in Competition and Co-operation", Norway.

**- Associate Professor at the Department of Economics, Isfahan University, Isfahan, Iran.

1- Introduction

The historical, political and economic arguments in favor of enlargement, has a long history in Europe. It is believed that new member states (NMS) benefit from the accession by adopting EU criteria and regulatory framework. However, to reap economic benefits, all EU members must take initiatives to expand production only where their comparative advantage lies. In fact, by the EU enlargement, the overall market is expected to expand by 100 million consumers which will increase trade and provide substantial new output and employment opportunities for European industrial firms, businesses as well as farm sector. In particular, the enlargement seems to offer considerable opportunities to the NMS to make efficient use of their agricultural production potential. However, It should be reminded that:

• This potential will not immediately be used to the full, given the fact that most NMS still have to overcome many structural handicaps.

•Taking advantage of those opportunities all depends upon joint cooperation to remove the remaining deficiencies and obstacles to trade in the short run, as well as collective participation to overcome rural underdevelopment in the NMS by initiating new agricultural production projects as well as to upgrade NMS farm technology in the long run.

The aim of this article is to integrate product-wise indicators of trade potential in order to take account of both enlarged EU members' specialization and weak competitiveness in the farming sector. These indicators are based on Bowen model of comparative advantage. It is shown that the potential agricultural trade structure of the enlarged EU constitutes a significant array of agricultural crop products that can be considered in any future agricultural investment projects as well as expansion of farm trade networks.

In the following sections, first the importance of agriculture in the economies of OMS and NMS is presented. Then, the pros and cons arguments in the case of the accession will be reviewed briefly. A brief discussion of trade potential and RCA models is the subject of the following section. Finally, a version of Bowen's comparative advantage indices and its application to EU agricultural crop production will be presented. The final section concludes with a summary and some broad policy recommendations.

2- The Importance of Agriculture in the OMS and NMS

The structure of agricultural sector of the NMS at the present time does not resemble that of OMS. In fact it has inherited the characteristics of past communist regimes which in all the NMS, with the partial exceptions of Poland and Yugoslavia, pursued an agri-industrial model of development based on large collective and state-owned farms (Friends of the Earth Europe, 2004). After the Second World War, farms in Central and Eastern Europe were collectivized (although in Poland and Slovenia most farms remained in private hands). Apart from being unproductive, intensification and construction of large livestock "farm factories" led to serious environmental pollution and a loss of biodiversity, which until recently, has hardly been recognized as a problem. Nevertheless, farming landscapes in the NMS still include many areas with less intensive forms of production and characterized by rich wildlife and biodiversity.

Although, after the collapse of communism some farmland has been returned to its original owners, but, there are significant disparities between farmers' economic situation in the OMS and those in the NMS:

- Agriculture in most of the acceded countries is much more important than it is in most of the OMS. For example, in some of the NMS, agriculture represents more than a quarter of their GNP (Pappaioannou, 2001).
- In contrast to OMS, the agricultural share of total employment is relatively high in the NMS, for some countries reaching more than a quarter of their total employment.
- The energy consumption efficiency in the agricultural sector of the NMS is considerably low due to ageing machinery inherited from the previous economic system where state controlled agricultural production units.
- Prices have increased dramatically during the first years of transition to the market economy of the many NMS because of the abolition of distorting state price subsidies (Pappaioannou, 2001).
- Many farmers in the NMS lack capital. They require modernization and investment to become competitive. Only a small proportion of farms are now competitive in international terms.

The above factors have affected the competitiveness and the efficiency of the agricultural sector in all of the NMS. In contrast, the OMS has a larger average yield and higher percentage of organic farming, because of higher farm technology and more intensive use of agro-chemicals.

Table (1) shows a comparative picture of the importance of agricultural sector for both NMS and OMS. By looking at product contribution and labor force participation of the agricultural sector to the overall economy of the two groups of countries, the relative importance of agriculture in the NMS becomes evident. In the last thirty years, an increasing specialization of agricultural production as well as concentration of livestock farming is observed in the OMS countries. Productivity has been boosted in parallel with reductions in the agricultural labor force. In contrast, the agricultural share of total employment in the NMS is relatively high (with the exception of the Czech and Slovak Republics). These shares are above 25 percent for Poland and 10 percent for Hungary and Slovenia. In spite of relatively high employment share, the NMS produces on average 30% lower yields. The larger average yield and higher percentage of organic farming in the OMS is due to high technology adaptation and more intensive use of agricultural inputs.

Table 1: Comparison of the Key Features of Agriculture in the OMS and NMS

	NMS	OMS
Number of farms (millions)	9.2	7.0
Employment in agriculture (% of labor force)	20.7%	4.3%
agriculture as % of GDP	7.0%	1.7%
Cereal yields (tons/ha)	3.0	5.0
Use of pesticides (kg of active ingredients/ha)	0.7	2.3
Use of nitrogen fertilizer (kg/ha)	35.0	66.0
Organic farms as % of total farmland	0.8%	3.7%

Source: Friends of the Earth Europe: EU Enlargement and Agriculture
www.foeeurope.org/activities/accession/agriculture

However, it is been argued that attempts to increase farm productivity in the NMS may well lead to the ignorance of the environmental health and social aspects of food production. The improvement of productivity of agricultural labor force in the NMS may well imply the destruction of 4 million agricultural jobs in those countries (European Commission). This will be more pronounced in Poland and Romania (Pouliquen, 2001).

Due to the sharp economic decline and cuts in farm subsidies in the early 1990s, use of agro-chemical inputs such as fertilizers and pesticides rapidly dropped in the NMS. In fact, their use of chemical inputs is now much lower than the OMS. However, the improvement was not caused by more environmental concerns, but rather by financial constraints. Although some argue that Common Agricultural Policy (CAP) subsidies, EU cosmetic standards for food market pressures and eastward expansion of big supermarket chains, all are likely to lead once again to more intensive use of such agricultural inputs (FoE, 2004), but The EU legislation and policies on pesticides, nitrates, water protection, soil and biodiversity can help the NMS as well, to mitigate these negative impacts.

The NMS can also use the EU agri-environmental programs to support organic agriculture and other environmentally friendly farming systems which use little or no agro-chemicals. Though, organic agriculture is much less developed in the NMS than in the OMS, but it has a great potential given the low use of agro-chemical inputs and abundant labor force. The lower use of agro-chemicals in the NMS gives them an advantage before many West European countries, which are now striving to reduce their dependence on chemicals. In fact, organic agriculture and other environmentally friendly farming systems are good alternatives to rural depopulation that would result from a narrow focus on productivity increase. It employs much more labor than intensive farming both on the farm and outside the farm, in related activities such as processing and marketing (Häring et al., 2004). It is also wiser and cheaper to preserve the existing social and ecological wealth in the NMS than to recover it at a high cost, once it has been destroyed (FoE, 2004).

Although the NMS have made good progress since the enlargement negotiations began, but since agriculture plays an important part in their economic life, the modernization of their agricultural sector and their integration into the CAP will remain a major challenge in the foreseeable future (European Commission 2002).

3- The EU Accession and Agriculture

There are both pros and cons arguments in the case of the accession which affects the economy of the acceded countries in general and their agricultural sector in particular. The alleged arguments are presented below:

• Accession to the EU is neither a necessary nor a sufficient condition for economic growth. The fruits of the accession will be ripened only if the combined effects of market access and economic liberalization optimize economic growth (Tupy, 2003).

• Accepting EU standards means that farmers are confronted with an obligation to invest in order to reach the standards required or with ever increasing production costs or in most cases both. This is a natural consequence of leveling the playing field for producers in the 'old' and 'new' EU countries. In the process, the price competitiveness of the eastern suppliers would doubtless deteriorate. Increased production costs detract from the competitiveness of those supplying the domestic market vis-à-vis importers and put exporters at a disadvantage in other EU-country markets

• Accession to the EU implies the removal of barriers to agricultural and food trade as well as the adoption and application of EU codes regarding its commercial policies which may result in social and economic problems in acceded countries, bearing in mind the low productivity and hidden unemployment in many of the acceded countries.

• Compliance with Western European labor regulations will diminish the comparative advantage that workers in many NMS enjoy over their more highly paid western counterparts (Heathcoat, 2003).

• This negative effect will be further exacerbated by the unfair nature of OMS agricultural subsidies. These subsidies are seen in the context of unfair EU competition. It may reduce production capacity of many NMS and endanger the export orientation of their agriculture.

• The EU has continued to dump its subsidized agricultural produce on the NMS market (Szamuely et al., 1998). If one looks at the balance today between the Central East European Countries (CEEC) and the OMS, even in the agricultural sector, the OMS is exporting more to the EEC than vise versa (Tupy, 2003). Since the beginning of the CEEC transition to market economy, agri-food trade between the two groups has increased dramatically. However while OMS agri-food imports from the CEEC have doubled, OMS exports to CEEC have increased almost tenfold between 1988 and 1998 (European Commission). Today, the OMS enjoys agricultural trade surpluses vis-à-vis the NMS. Those venerated surpluses are both an outcome of higher productivity of OMS farmers as well as its ability to "out-subsidize" its eastern competitors.

• To ensure compliance, the OMS have taken measures to "protect" its internal market against CEEC agricultural produce for three years after the accession. Ostensibly, those measures are intended to guarantee the safety of CEEC exports, but some observers justifiably fear that they may turn out to be protectionist measures. Implementation of OMS measures by the acceded countries, demanded by consumers and environmentalists may also restrict the OMS imports of food and agricultural goods.

• The CAP was designed as a "food security" mechanism and evolved into a system for supporting inflated agricultural prices. Those measures have resulted in price levels that are constantly above world market prices which in turn, have led to overproduction of agricultural produce by the OMS. Moreover, since the prices of the agricultural products in the NMS are very low, their accession will mean that, with the implementation of CAP prices, overproduction will occur in these countries, worsening the problem of overproduction in overall EU.

• The effect of some of the outcomes of the liberalization process, such as high levels of unemployment in Poland and Hungary, inadequate safety nets and rising consumer prices in all the countries, together with a rapid fall in agricultural profitability, have created big social and economic problems in large parts of the population (Pappaioannou, 2001).

In all, EU export subsidies; quality differences; the competitiveness of the EU food marketing, processing and retailing industry; and a more developed institutional framework, point to comparative disadvantageous aspect of the accession. A counter argument in favor of the accession has been put forward by many scholars and officials, both in private and government agencies in the European continent. Many of those arguments are as follows:

• The compatibility of EU enlargement process with the objectives of the new WTO Round acts as a force for opening markets, ensuring non-discriminatory rules for trade and investment and reinforces the efforts undertaken within the WTO to further liberalize trade in goods and services (EU Commission, Directorate-General for Agriculture).

• The rapid growth in trade will help the NMS to overcome many of their handicaps. Full integration with accession, together with the adoption of common rules and standards across the world's largest single market, will

further enhance the opportunities to achieve economically viable and sustainable growth.

• The continuing intensive technical and financial assistance provided to the NMS, particularly in the field of agriculture, will help consolidate agricultural reform and strengthen their farm comparative advantage. In that line, there have been three main pre-accession instruments among which, the so called SAPARD, pre-accession aid for agriculture, has been intended to contribute to the implementation of the acquis communautaire in the NMS agricultural sector and to encourage sustainable adaptation of the rural areas.

• The enlargement's impact on EU agriculture is dramatic. A further 4 million farmers will be added to the existing population of 7 million in the EU community. The NMS will add about 30% hectares of utilized agricultural area to that of OMS, while production in the EU will expand by about 10-20 % for most products. The gross value added of agriculture will only increase by 6 %. These numbers confirm that the NMS have a large agricultural production potential but it is still far from being used to its full extent (Enlargement Weekly Bulletin).

• With enlargement, agricultural productivity in the NMS should increase further because of the economic conditions that will have been fulfilled and because of improved access to capital, technology and other factors of production.

• Inevitably, competition will be stiffer, but the larger market of 454 million consumers free of tariff restrictions, export quotas or trade barriers will create positive challenges and increased opportunities as well as provide greater stability to previously volatile agricultural markets. Integration should lead to greater prosperity for EU farmers as a whole. The CAP will help farmers to gradually develop a sustainable production potential.

• Older and less efficient farms may be more at risk but rural development measures should reduce this risk and sharper competition will benefit both OMS and NMS farmers. On the one hand, many farmers in the NMS may try to target the relatively high income consumers in the OMS who demand high quality, sometimes niche, products. On the other hand, the predicted income growth in the NMS will lead to growing markets in the OMS. All EU-25 farmers have to realize that developments in world markets will become an increasingly decisive factor for the agriculture market outlook.

• Looking beyond the short-term, there is likely to be a rapid convergence of agricultural economies in the OMS and NMS. The later will not be condemned to be producers of low-cost food and feed while others corner all the value added markets. Furthermore, the extended EU will have new neighbors and trading partners such as Russia, and will be able to play a strong role on world markets, including the far eastern markets with huge demand potential.

• In the OMS, farmers will benefit notably from the expansion of the single market, and from the widening of the EU product base and agricultural expertise. In agriculture, as in other sectors, a gradual process of adaptation has been taking place for many years through Association Agreements (allowing freer trade between the OMS and NMS members), and pre-accession funding by the EU of rural development and agri-food industry restructuring programs in the acceded countries.

• In the NMS, many farmers have already enjoyed the benefits of membership in advance of enlargement. Targeted rural development schemes have already been put in place in the CEEC (via SAPARD), and the progressive liberalization of farm trade with the OMS via bilateral trade concessions on agricultural products under the Europe Agreements and the 'double zero' and 'double profit' arrangements, has helped their preparations to operate and compete within the same market.

• Under the latest revision of the CAP, support is given to the farmers' income and not to agricultural production. This is done in order to meet the needs of international demand and remove the market distortions that were created in the past. The new CAP target will give incentives to the producers to earn most of their income from the free market rather than from EU interventions. Acceeded countries will have to adapt to this new situation and as a result, their agricultural production will be made more competitive.

• With the enlargement, agricultural productivity in the NMS will increase further because of the economic conditions that will have been fulfilled and because of improved access to modern capital, technology and other factors of production available in the OMS.

• The implementation of higher OMS standards by NMS, have two opposite effects: lower administrative and processing costs of NMS imports and higher quality, both will improve access to the OMS market.

But what really is that determines whether or not a particular sector will thrive or suffer as a consequence of the enlargement? Agriculture is clearly a special case, since its function is not only affected by governments' economic policies (i.e. the EU-CAP) but it is also dominated by factor (natural resource) endowments and comparative advantage. There are some quantitative evidence for the case of accession:

3-1- Improvement in Agricultural Balance Sheet: Table (2) shows a partial result of a study by the European Commission which has estimated both the present and the future status of the balance of agricultural products for 8 countries of the CEEC which have acceded to EU. The table shows that due to the accession, the total balance of agricultural products for cereals improves from a negative to positive status, while the positive balance for the oil seeds increases significantly by a factor of 70.

But, in order to improve the NMS agricultural position and its commodity balance, the European Commission insists that agriculture in those countries must undergo a deep "restructuring" and "modernization" process. This raises the question as to whether NMS should go through another period of damaging agricultural practices (through intensive use of fertilizers and pesticides) or will they shift directly to sustainable forms of agriculture.

Table 2: Present and Projection Perspectives of the Balance of Agricultural Products* in the CEEC-8 for 2000 and 2007

CEEC	CEREALS (10^6 TON)		OIL SEEDS (10^3 TON)	
Year	2000	2007	2000	2007
Czech Republic	0.01	1.00	172.00	198.00
Estonia	-0.15	-0.11	30.00	36.00
Hungary	0.62	4.25	-2.00	27.00
Latvia	-0.10	0.01	0.00	0.00
Lithuania	-0.10	0.08	10.00	10.00
Poland	-3.45	1.39	-83.00	153.00
Slovak Republic	-0.68	0.70	-16.00	72.00
Slovenia	-.49	-0.36	0.00	0.00
TOTAL	**-4.34**	**6.96**	**111.00**	**496.00**

Source: EU Commission, Prospects for Agricultural Markets (2000-2007)

* Difference between production and domestic use

In other words, will they focus on productivity increases (with subsequent rise in their unemployment) or will they use the EU funds to boost organic farming and revitalize their countryside?

Although, the first initiative will improve agricultural comparative advantage status of the acceded countries in the short run, but their environmental and natural degradation may lead to deterioration of their advantageous position in the long run. However, it seems that the provision of technical assistance for organic farming practices by the OMS and the use of CAP funds for rural development and restructure in the second approach is more likely to lead to a long and sustainable economic growth of the NMS.

3-2- The Existence of Potential Agricultural Trade: In many instances, the agricultural terms of trade within enlarged EU seems to be more in favor of the NMS compared to pre-accession EU. Table (3) demonstrates that the intra-OMS trade of agricultural products comprised more than 80 percent of its total agricultural trade in 2001, new CNN is a face his real reason she whereas the corresponding figure for the NMS was about 55 percent in that year. So, there seems not much left over to attribute to intensifying agricultural trade within OMS bloc. In comparison, the intra-NMS agricultural commodity trade was less than 14 percent in the same year. Moreover, the NMS conducted between half and two-thirds of their total trade with the OMS in year 2002 (Commission of the European Communities, 2002), and its agricultural commodity exports to OMS was about 55 percent in that year. Therefore, it looks there is more room for intra-agricultural trade within enlarged EU in the coming future. Moreover, due to the labor–intensiveness of agricultural produce and the involvement of a considerable portion of the population of the NMS in the agricultural sector, agricultural trade expansion will be to the benefit of the economic well-being of the majority of NMS population.

Table 3: The OMS and NMS Total Exports of Agricultural Products ($1000)- 2001

EU	ENLARGED EU INTRA EXPORTS		EXPORT TO THE REST OF THE WORLD	TOTAL EXPORTS
	OMS	NMS		
OMS	79768781	4266903	15488660	99524344
NMS	3040867	763923	4799882	5563805

Source: ITC/UNSD 2003.

In an empirical investigation, the attempt was made to estimate the potential for trade increase between the CEEC and the EU (Oxana, K., *et al.*, 2003). The estimates were computed using the gravity equation. It was shown that trade with the EU countries, could increase in the long-run. Furthermore, the convergence of institutional variables towards the EU standards can be expected to deepen the level of the European trade integration.

In another empirical work, an attempt was made to show the integration of the CEEC into a single market and the enactment of the CAP will boost trade further (Lejour *et al.*, 2001). By using trade equations based on a gravity model, they found positive trade effects for most sectors with the largest effect for agriculture, where trade could become more than three times as high as actual trade. According to their estimation, total exports of the NMS-5 (Czech Republic, Slovakia, Slovenia, Bulgaria and Romania) to the EU could increase by almost a third. By contrast, the aggregate trade increase of the EU was shown to be only 2% with a small proportion of their exports to be directed to the CEEC. Using a computable general equilibrium model, they also showed that GDP of the CEEC could grow by 5% due to the accession to the internal market, while the EU's GDP is hardly to be affected.

Generally, three different types of categories of potential (or new) trade could develop among EU countries after the enlargement: trade of products sensitive to economies of scale; trade of products sensitive to input-sharing; and trade of distance-sensitive products. It should be noted that these three types of potential trade can be combined to meet widened opportunities, using diminished distance, larger-scale production; bigger markets; and new sources of inputs in various combinations (Hirsch, *et al.*, 1995).

a) Scale Sensitive Trade: Economies of scale in production can either augment or neutralize a country's comparative advantage in a particular field such as agriculture. They can also provide the basis for creating new comparative advantages and thus change the production pattern of the agricultural sector, which at least in the early years of the accession and development, is largely determined by nature endowment (Hirsch, *et al.*, 1994). A plantation may be set up to produce an agricultural product if the product's intended market is big enough to meet a minimum efficient scale (MES). The minimum is set according to the product characteristics, and the costs of factors of production in the proposed plantation location. The EU liberalization policies

enable NMS farms to adjust and prepare for global scale competition. But as they become competitive, the enlargement provides the NMS with a market large enough to realize the economies of scale.

The smaller an EU member country is, the less likely that its domestic market will surpass the MES level within the EU. Small domestic markets do not justify producing goods that could substitute for items being imported. But a joint market of several states might justify a specific plantation in one of the countries, especially if the MES-market for a given agricultural produce is comprised of more than 20 to 30 million people. For scale-sensitive trade to develop; economic criteria for investment will have to be used for each potential member state.

b) Input-based Trade: The second type of new trade involves sources of inputs, which can be final products, raw materials, or intermediate goods, mainly found in agricultural sector. Cheaper inputs can enhance the competitiveness of a firm, industry, or economy of a European nation, and can be the basis for the expansion of EU trade. Trade in inputs makes it possible to develop or expand processing and other manufacturing units in both countries trading, as well as it enables industries to improve their competitiveness in local and export markets. Purchases of competitive inputs from neighboring countries can either substitute for locally produced inputs or for more expensive imported inputs.

c) Distance-sensitive Trade: There are many types of products sensitive to geographic distance, particularly agricultural produce, including items sold on the basis of their freshness such as dairy products, fresh fruits, and vegetables. Similarly, heavy or bulky agricultural goods, such as melon products, incur high transport costs. The shorter the distance between the sources of supply and demand and or the higher the per capita incomes of importing countries, the more potential trade exist for such products. Economic distance refers to differences in tastes and consumption patterns between countries. These are especially important when incomes vary significantly between two states.

4- Models of Trade Potential

Trade potentials as one of the important issues in international trade, has attracted the attention of many scholars in the decade of 1980s and 1990s, particularly those who have been studying the establishment of free trading blocks, common markets, and economic integration. The objective of those

studies has been either to reveal a country's trade potentials within an already existing regional trading bloc or, to demonstrate trade potentials under the circumstances that other countries are supposed to join and expand an existing regional trading bloc.

The methodological approaches of those studies have been different and were mainly based on export similarity models, gravity models or models of revealed comparative advantage (RCA). Even within the framework of the last two models, different methods, such as Liesner, Ballasa, Volrath, Kunimoto and Balance indices of revealed comparative advantage or the domestic resource cost (DRC) have been used. Moreover, the regression equations in gravity models have been specified in variety of forms. For example, where the exchange rates have been introduced to these regressions in recent years, the distance variable has gradually been set aside. Even though one of every approach undertaken in such studies has its own merits, but due to the use of different methods, the results of such studies can not be directly compared.

Regarding RCA estimation, economists have used indirect methods which use information derived or revealed from post-trade situations. In the simplest case, involving only two countries, two commodities and two factors, a straightforward application of the RCA model can be expected to yield a deterministic relationship between comparative advantage and trade, production and consumption. A country's comparative advantage could be expected to vary proportionately with the share of net exports in production. The same type of relationship would be expected for a measure showing the share of production in consumption where the latter is defined as production plus imports less exports. Finally, comparative advantage could vary inversely with the share of imports in consumption.

Using the above indices, empirical researchers have either questioned the degree of comparative advantage exhibited by a particular country over various goods, where many goods are being exported and imported or, have enquired into the degree of advantage exhibited by various countries with respect to a particular traded good, with a number of countries trading in the same good. However, some scholars have argued that in a world populated by many countries, products and factors, deterministic links between two sets of variables no longer hold (Drabicki and Takayama, 1979). Balance et al., (1987) have illustrated this point by using data for the steel industry in Brazil and South

Korea. When the share of imports in total consumption was used, it indicated that Brazil has comparative advantage than South Korea. But when the other three expressions were applied to the data, they revealed that South Korea rather than Brazil have greater comparative advantage. The above contradictory result seems to stem from several distortions caused by the size of countries, intra-industry trade and data aggregation problem:

- The size of countries may vary widely. A large country with only a minor cost advantage (i.e. a small degree of comparative advantage) can still be a relatively important exporter in comparison to a smaller country that enjoys a significant cost of advantage. Ideally, indicators of cost advantage or disadvantage would be needed in order to distinguish between the two countries. But such indicators require data on the domestic costs that would prevail in the absence of trade. Since actual costs are incurred in the presence of trade, this line of reasoning is not promising. Two obvious alternatives for way out of the dilemma are; (a) to relate exports to domestic production, or (b) to relate imports to domestic consumption.

- Trade statistics are not available for each and every single trade item. In case countries are both importers and exporters of the same product category, the most common method of adjustment is then to express the revealed comparative advantage in terms of net exports for each item traded.

- The level of data aggregation can be so great as to obscure the true pattern of comparative advantage. Researchers have attempted to minimize the aggregation problem by using data for more narrowly defined product categories. Their efforts are complicated by the fact that most countries employ different classification systems for production and trade. Detailed production data is often not available and exports data does not exist at a single commodity level for many commodities and countries.

The Model

The method of estimating RCA in this paper is based primarily on the Bowen's and Balassa's comparative advantage indices to reveal agricultural trade potentials among EU-25 member countries. The Bowen index in particular, measures trade potentials based on production and consumption of commodities in each country.

While criticizing the Balassa index, Bowen (1983) introduced two alternative measures of comparative advantage. These two measures were called '*net trade intensity*' and '*production intensity*' index. They were based on the notion that a country's consumption and trade is related to a hypothetical world with no comparative advantage or disadvantage (RCA=1). These indexes have been introduced in the following:

$$RCA_a^i = NI_a^i = PI_a^i - 1 \quad (1)$$

$$NI_a^i = T_a^i /$$

$$NI^i_a = T^i_a / (Y^i/Y^w) * Q^w_a \quad (2)$$

$$PI_a^i = Q_a^i / (Y^i / Y^w) * Q_a^w \quad (3)$$

NI and PI in the above relations are net trade and production intensity indices respectively; Q is domestic production; T is net trade (T= Q-C) where C is domestic consumption; Y is gross national product and a, i and w stand for commodity, country and world, respectively.

The net trade intensity index, NI, takes both positive and negative values and is zero when there is no comparative advantage or disadvantage. The production intensity index, PI, takes only positive values and equals one when there is no comparative advantage or disadvantage. Since values of the production intensity index above (below) unity indicate comparative advantage (disadvantage), it is evident that both indices may be used as indicators of comparative advantage.

An appealing feature of this line of reasoning, as Ballance (1986) mentioned, is that it highlights the fact that comparative advantage depends on the interaction between consumption and production. In addition, the Bowen index takes into account the scale effects related to the enlargement and the importance of country and commodity in question. Nevertheless, in order to relate the concept of expected value to observable variables, Bowen (1983) assumes a hypothetical world where 1) the consumer preferences of countries are not only identical but also homothetic, each country's consumption of a

specific commodity is proportional to the world's consumption of that commodity[1]; 2) production technology, relative supply factors, etc. of countries are identical, each country's production of a specific commodity is proportional to the world production of that commodity[2]. These assumptions have been challenged in the literature:

- Since the two measures of comparative advantage are taken to be identical, based on the two assumptions stated above, expected production and consumption are considered to be identical. So, even that happens to be true, the expected net trade will be equivalent to zero. In that case, no comparative advantage is going to be revealed.
- Estimation of expected production (consumption) of a country, on the basis of the share of that country in total production (consumption) of the world under identical production and supply conditions in all countries has no theoretical and empirical justification.
- The assumption of identical and homothetic preferences are in line with the popular (H-O) theorem of comparative advantage. Its extension to the real trading world, however, has been questioned as a result of empirical studies involving actual patterns of trade, production and consumption (Ballance, *et al.*, 1985). The test of Bowen's indices [$NI^{1}_{a}= (PI^{1}_{a} -1)$], was based on the equation restated in regression form as:

$$(T^{i}_{a} / EC^{i}_{a}) = \alpha + \beta (Q^{i}_{a} / EC^{i}_{a}) + \epsilon^{i}_{a} \qquad (4)$$

Or

$$NI^{i}_{a} = \alpha + \beta (PI^{i}_{a}) + \epsilon^{i}_{a} \qquad (5)$$

where ECia =Si*Qj is expected consumption of commodity a by country (i) under the homothetic preferences hypothesis. Coefficients α_{1} and β are the intercept and slope of a simple regression model, with ϵ^{1}_{a}, the random disturbance term, assumed to be normally and independently distributed with

---

1- $E(C^{i}_{a}) = (Y^{i}/Y^{w}) * Q^{w}_{a}$
2- $E(Q^{i}_{a}) = (Y^{i}/Y^{w}) * Q^{w}_{a}$

zero mean and constant variance. The authors note that under the homothetic preference hypothesis and with free trade: $\alpha = -1$ and $\beta = +1$.

Ballance, *et al.*(1985) run a commodity-specific cross-country regression for 13 commodities providing 596 country-commodity observations. The data referred to 1980 and were all expressed in physical units. The countries included in their sample were those which reported production and also export and import data. They tested for the joint hypothesis that, $\alpha = -1$ and $\beta = +1$. Their conclusion was that "....the hypothesis that, consumer preferences are identical and homothetic across countries, was uniformly rejected for every industry in our sample".

■ By empirical estimation of a simple linear expenditure system, using international cross-section data for thirty-four countries and eleven commodities, Hunter and Markusen (1988) assessed both 'the statistical and economic' significance of deviations from homotheticity. Their results showed that income elasticity for the eleven commodities deviated significantly from unity which indicates that preferences deviate from homotheticity.

In this article, an adjusted Bowen index (suggested in 7), is used, based on the following assumptions[1]:

■ The excess supply of a commodity in each country reflects the trade potential of that commodity

■ A commodity's world supply and demand are equal (no excess supply or demand for a commodity's world market).

■ The comparative advantage of a commodity trade in a certain country depends upon the scale of production of that commodity in that country and its relative importance in the world economy.

1- The only limitation in the empirical application of the Bowen's index arises when a crop or commodity is not produced in a country and thus production data is nonexistent. Regarding EU, very few such cases occurred, where a Balassa index was used, applying only import data, to demonstrate comparative disadvantage of the crop in question.

$$RCA_a^i = [(Q_a^i - C_a^i)/Q_a^i]/(Q_a^w/Y^w) \quad (6)$$

$$RCA_a^i = [(X_a^i - M_a^i)/Q_a^i]/(Q_a^w/Y^w) \quad (7)$$

$$C_a^i = Q_a^i - X_a^i + M_a^i \quad (8)$$

The suggested index, though very similar to that of Bowen's ((NI_a^1)), but the difference lies in the fact that instead of estimating expected consumption variable, based on unrealistic assumption, the commodity trade balance is directly used instead. Moreover, the relative importance of a commodity's "*production surplus*" is measured by the share of that surplus in its total national output $[(Q_a^i - C_a^i)/Q_a^i)]$, instead of taking its ratio to grand national output $[(Q_a^i - C_a^i)/Y^i)]$.

Data

It is evident that estimation of suggested indexes or those of Bowen requires detail statistical data pertinent to production, consumption, export and import of individual commodities which by itself limit the scope and the extent of calculation of comparative advantage indexes in many empirical works. Fortunately, Food and Agriculture Organization of the United Nation (FAO) provides extensive statistical data on production, consumption and trade of many agricultural products which facilitates the estimation of Bowen indexes. Our aim first is to measure those indices only for agricultural primary crops which amounted to a total of 55 individual crops in the FAO database, but we are confined to estimated RCA indices only for 37 commodities that were traded among enlarged EU members. There are several points about data used in our estimation:

1- Annual crop trade flows seem not be the appropriate measures of specialization due to fluctuations in weather and other uncertain factors. Actual output differs from the expected or anticipated, and it is the latter that actually reflect the observed comparative advantage (Carter et al. 1991). So, the simple average of each required data was first calculated for the entire period and for each commodity and every country in question, in order to reflect the expected value of observed variables.

2- Production data provided by the FAO are all in physical Metric tons, while export and import data are furnished both in physical units and $US. Since, all data required must be measured by a common unit, the conversion of production data into values was necessary. Moreover, for alleviating the effect of inflation, all values are transformed into real terms. However, there were no reports of unit values of each agricultural crop produced by every country in that data base. Thus, export values of each commodity for each country were divided to its physical units in year 1992 to obtain unit values in that year. In case there were no export/ import data for a crop commodity for a country in a particular year, a weighted average price of all the EU countries were calculated and used instead. The weights were physical quantities of that commodity for the corresponding country.

3- The estimated price values were then applied to the physical units of all commodities produced, consumed and exported by each country during (1992-200) period, to show all data in constant (1992) prices. The reason for selecting year 1992 was due to the fact that time series data for all economies of the NMS were only available for the period starting from 1992 thereafter. Thus, period under consideration for the analysis was 1992-2000.

The Results

Tables (4) and (5) in the appendix present the results of calculation of Bowen RCA indices foe each of 36 agricultural crops by every enlarged EU member states. In total, when all countries in each group and all crop products are taken together, the OMS shows to have comparative advantage in less than %15 of the cases, whereas the corresponding figure for the NMS is about %19. These results point to the fact that for many crop products, the agricultural trade potential either does not exist or they are not as significant as expected. There seems to be two main reasons for this: One is the fact that the structure of agricultural sector of the NMS, as it is inherited from old communist regime in most cases, is not as developed as that of the OMS. This has also contributed to the difference in food consumption basket of the two groups of countries. The second has to do with the conditions that have affected agricultural trade between these two groups of EU. Due to provision of subsidies provided by the OMS to their agricultural sector on one hand and the establishment of stringent rules and regulations enforced on export of agricultural products of NMS to the

OMS on the other hand, the estimation of RCA indices for many crops have been subject to serious bias. In brief, the NMS seems to have larger and more commodity trade potentials with the OMS than that revealed by RCA indices.

If such subsidies are removed or reduced and the rules and regulations regarding agricultural export of the NMS to the OMS are eased, then NMS-RCA indices will not only show stronger results, but more products will show up in their RCA basket. The results are summarized for each NMS member as follows:

• **Cyprus:** In regard to agricultural crops, Cyprus has revealed to have RCA in production and trade of potatoes, roots, other and tobacco. Regarding all these products, it is interesting to notice that Cyprus has the first place in the rankings of RCA indices among all EU-25. Moreover, production and trade of roots, other is shown to have a very strong RCA.

• **Czech Republic:** This country has shown to have RCA in 7 out of 36 agricultural commodity crops, namely barley, bran, millet, oats, peas, pulses and rape and mustard cake. The country has the first ranking in pulses with the tenth rank in barley. Regarding millet production, the country shows to have a strong RCA. For other products, this country does not seem to have any RCA. However, the Czech Republic is one of the NMS that has agricultural trade potential for a larger variety of agricultural crops.

• **Estonia:** The agricultural sector of Estonia has shown to have RCA in only sugar beets and rape and mustard cake production and trade. Rape and mustard cake has strong RCA with the first ranking among all EU members. Estonia is the only country that has RCA in production and trade of sugar beets within the enlarged EU.

• **Hungary**: The commodity basket of agricultural crops of Hungary shows 18 agricultural crops that have RCA, the largest variety of produce among the NMS as well as the OMS. These crops include barley, bran, cereals, maize, millet, oats, onion, peas, pimento, pulses, rape and mustard cake, sorghum, soya beans, sunflower seed, tomatoes, all ty[ ]getables and wheat. Among all these products, Hungary shows to be the only country to have RCA in cereals and soya beans. She has also the largest RCA and the first ranking in millet production and trade among all EU members.

• **Latvia:** This country has shown to have RCA in only molasses and rape and mustard cake. Thus, accession to the EU does not seem to have significant

impact on the export of Latvia's agricultural crops to other EU countries. On the contrary, Latvia imports of such products seem to increase after the accession.

• **Lithuania:** There are only three agricultural crop produce in the production basket of Lithuania that shows to have RCA. These are namely wheat, rape and mustard cake and rye. Like Latvia, Lithuania does not seem to have the opportunity to take advantage of the EU accession, as far as export of agricultural crops to the EU is concerned.

• **Malta:** This country does not show to have a comparative advantage in production and export of any agricultural crops reported in this study. On the contrary, it seems that the import of crop commodities from the rest of the EU to this country will be intensified after the accession.

• **Poland:** This country shows to have RCA in 6 out of 36 products studied. These are namely beans, molasses with the largest RCA index among all EU, and onions, all types of pulses and rape and mustard cake. Poland is the only country among EU that has RCA in beans.

• **Slovakia:** Among all the NMS and after Hungary, Slovakia has the largest combination of agricultural crops for which she has RCA. These crops include barley, bran, maize, millet, molasses, oats, peas, all types of pulses, rape and mustard cake, sorghum, sunflower seeds and tobacco. Among these products, she has the first RCA rank in bran, peas and sunflower seeds. Production of millet, molasses and rape and mustard cake shows to have strong RCA among all the crops mentioned above.

• **Slovenia:** The calculation of Bowen indices shows that Slovenia has RCA only in molasses production.

In order to evaluate the degree of exploitation of comparative advantage in trade of agricultural crops, the following regression was estimated for the OMS and NMS separately, by pooling commodity-country data in each group, comprising only those crops for which the Bowen RCA index has shown to be positive.

$$\text{Ln } X = a + b \text{ Ln (RCA)}$$

where X is export intensity. The results are reported in the appendix. The two coefficients of RCA are both positive and significant at 1 percent level. However, both the RCA and the regression coefficients for the OMS are more

than 2.5 and 3 times greater than that of the NMS respectively, indicating greater exploitation of comparative advantage and thus potential agricultural trade by the old EU members. This is expected since the OMS is comprised of advanced European countries taking advantage of a free trading zone for a long time, whereas the recent accession of the NMS, with a less developed economic structure, to the EU, has just provided the opportunity for them to exploit their comparative advantage and enhance trade for the years to come.

Conclusion

The accession of NMS to the EU is going to expand the internal EU market and result in the expansion of trade and provides substantial new output and employment opportunities for the NMS particularly in the field of agriculture. In particular, the enlargement offers considerable opportunities to the newly joined countries in helping them to make efficient use of their agricultural production potential.

Taking advantage of economic opportunities rendered by the accession of NMS to the European community, depends upon joint cooperation of member states to remove the remaining deficiencies and obstacles to trade in the short run, as well as collective participation of the European nation to overcome rural underdevelopment in NMS and to upgrade its farm technology in order to enhance their farm comparative advantage and hence their farm income in the long run.

One of the approaches to facilitate agricultural production and trade within enlarged EU is to embark upon new agricultural production project initiatives both in the OMS and MNS. These initiatives should integrate comparative advantages in agricultural production of each member states in any coordinated and well designed development plan. In fact, the mere existence of comparative advantage helps to smooth the ongoing negotiation processes and initiatives for further integration and cooperation within the enlarged EU.

This study focused on the agricultural dimension of economic and trade integration on the occasion of the EU accession. Although the estimation of RCA indices indicated that NMS has comparative advantage in production and trade of more diversified agricultural crop products than the OMS (and at times, the comparative advantage has been more intense compared to their OMS

counterpart[1]), the opportunity for trade of many agricultural crop products within enlarged EU does not hold to be significant at present.

Moreover, by the accession of NMS to the EU, and the enforcement of stringent EU rules and regulations upon NMS agricultural sector, the comparative advantage of these countries in trading crop products seems to be at jeopardy. To prevent the comparative advantage from being legislated out of existence, the followings are recommended:

1) The EU support for agricultural sector of the NMS should be pursued in areas where every NMS has comparative advantage in production and trade of particular agricultural crop products. This, facilitate specialization and more efficient use of agricultural resources of those countries and add to the attempts for a long and sustainable growth in the NMS.

2) After accession, the NMS should pursue a strategy that seeks to introduce economic dynamism to the region by working to reform the damaging aspects of CAP.

3) The gradual introduction of direct payments for farmers in the NMS after their accession from the year 2004 should be maintained.

4) Increased and continued EU support through the rural development programs after the enlargement is a necessity, where supporting investments on farms is a priority. This is because the NMS farmers are faced with pressure to adjust to consumer preferences and to meet EU requirements, largely relying on their own resources.

5) Measures should be taken to ensure that farm productivity is sustained or enhanced over the long term and alternative employment in rural areas is created. This is due to the effect of some of the outcomes of the liberalization process, such as high levels of unemployment, inadequate safety nets and rising consumer prices in all countries, together with a fall in agricultural profitability,

6) It is recommended that due to high unemployment and enforcement of the CAP rules, the NMS pursue agri-environmental programs to support organic agriculture and other environmentally friendly farming systems which use little

---

1- This is evidenced by the fact that the NMS countries are more endowed with heterogeneous natural resources and more diversified agricultural products.

or no agro-chemicals. Though, organic agriculture is much less developed in the NMS than in the OMS, but has a great potential given the low use of agro-chemical inputs and abundant labor force. The lower use of agro-chemicals in the NMS gives them an advantage before many West European countries, which are now striving to reduce their dependence on chemicals. In fact, organic agriculture and other environmentally friendly farming systems result in productivity increases.

Analyzing the effects of agricultural trade deregulations and the removal of farm subsidies upon the RCA indices is promising and recommended in further studies. Since data on organic farming in the NMS is limited, the development of such information warrants more detailed studies of comparative advantage in production and trade in such farming practices. Moreover, provision of a potential trade matrix to show the future direct of exports and imports of agricultural crops between EU states can be of particular interest to practitioners and policy makers in the EU and also recommended in future studies.

Appendix

Table 4: The Bowen's RCA Indices for Individual Agricultural Crops- OMS (Ave. 1992-2001)

EU	Austria	Belg -Lux	Denmark	Finland	France	Germany	Greece
Wheat	-1.86	-13.18	1.79	-7.95	6.09	9.19	-0.25
Barley	-1.74	-113.24	5.53	4.38	17.06	3.08	-5.37
Bran	-13.43	-94.80	-208.89	-28.66	19.86	-22.99	-0.09
Cereals, Other	-0.27	-0.64	0.34	-0.10	0.30	0.40	-250.09
Beans	*	-7309.99	*	*	-7294.18	*	-226.69
Cotton Lint	*	*	*	*	*	*	229.81
Cottonseed	*	*	*	*	*	*	282.09
Ground Nuts	*	*	*	*	*	*	-36490.23
Maize	-1.02	-56.78	*	*	7.12	-3.80	-2.40
Millet	*	*	*	*	*	*	*
Molasses	-782.99	-314.72	-827.03	-23.93	-92.55	-55.20	46.17
Oats	-27.73	-76.02	-22.87	41.78	13.49	-3.08	-24.87
Onions	-13.24	-333.89	-17.66	-55.51	-3.44	-150.32	1.40
Peas	-5.01	-3108.32	32.77	-9.85	29.16	-129.71	-217.75
Pimento	*	*	*	*	*	*	-1004.3
Pineapples	*	*	*	*	*	*	*
Potatoes	-2.49	-1.58	3.51	-1.40	-1.52	-0.42	-3.71
Pulses	-3.51	-1611.94	20.16	-5.02	19.08	-17.07	-35.22
Pulses, Other,	-35.76	-1022.72	13.23	*	-77.83	-341.17	-405.34
Rape & Mustard Cake	24.81	41.07	-95.26	-0.19	-61.48	31.19	*
Rice (Milled Equl.)	*	*	*	*	-864.81	*	-42.98
Rice (Paddy Equl.)	*	*	*	*	-529.60	*	13.57
Roots, Other	*	*	*	*	*	*	*
Rye	-869.12	-390.76	9.10	-675.09	-11.78	45.99	-29.89
Sesame Seed	*	*	*	*	*	*	-47146952.6
Sorghum	*	*	*	*	427.06	*	-27.71
Soya Beans	-259.17	*	*	*	-1085.04	-1380100.68	-24175.83
Spices, Other	*	*	-20444.99	*	*	*	1388.44
Sugar Beet	0	-0.02	-0.001	-0.002	0	0.001	0.15
Sunflower Seed	-40.42	*	*	*	14.75	-191.67	-121.94
Sweet Potatoes	*	*	*	*	*	*	-19673.28
Tobacco	742.69	524.68	*	*	-933.43	647.12	54.28
Tomatoes	-63.03	-0.55	-42.55	-55.80	-9.21	-439.90	3.00
Vegetables	-3.28	-0.22	-0.69	-1.90	0.33	-4.55	0.56
Vegetables, Other	-7.77	-66.70	-146.56	-94.13	-33.38	-221.39	-1.32
Yams	*	*	*	*	*	*	*

Source: See text

* refers to no production and thus no RCA estimate.

Table 4: The Bowen's RCA Indices for Individual Agricultural Crops- OMS Continued)

EU	Ireland	Italy	Netherlands	Portugal	Spain	Sweden	UK
Wheat	-10.03	-8.88	-51.53	-43.01	-8.91		
Barley	-3.69	-17.22	-173.21	-94.48			
Bran	-738.76	-13.20	-467.36	-31.28	-25.34	-67.11	-36.35
Cereals, Other	*	-35.41	-241.80	-0.47	-2.91		
Beans	-117.26	-3492.86	-3363.60	-2692.08	-1526.98	-2574.82	*
Cotton Lint	*	*	*	*	-235.10	*	*
Cottonseed	*	*	*	*	-3053.06	*	*
Ground Nuts	*	-26061809.0	*	*	-3283463.3	*	*
Maize	*	*	*	*	-7.19	*	*
Millet	*	*	*	*	-398896. 5	*	*
Molasses	-1825.76	-260.10	-880.27	-4093.77	-155.04	-214.81	-1680.5
Oats	-17.86	-9.69	-202.93	-31.04	-89.20		
Onions	-332.46	-11.30	-94.44	-8.45		-107.31	-47.77
Peas	-204.59	-412.09	-4483.45	*	-3471.99	-14.21	
Pimento	*	*	*	*		*	*
Pineapples	*	*	*	-188974696.6	*	*	*
Potatoes	-2.79	-3.01	-6.64	-2.48	-0.79	-4.81	-2.80
Pulses	-7.14	-57.78	-495.83	-61.88	-132.22	-8.29	
Pulses, Other,	*	-230.24	-545.70	-17.88	-467.19	-55.20	
Rape & Mustard Cake	-4441.36	-158.83	-240.89	-336.85	-253.80	-80.69	
Rice (Milled Equi.)	*	111.13	*	-70.02		*	*
Rice (Paddy Equi.)	*	90.68	*	-160.89		*	*
Roots, Other	*	+	*	*	-91883.06	*	*
Rye	-1807.85	-42.86	-7.17	-52.31	-164.26	-63.62	-31.75
Sesame Seed	*	-3025512162.7	*	*	*	*	*
Sorghum	*	-115.49	*	*	-4107.45	*	*
Soya Beans	*	-506.86	*	*	-51939.44	*	*
Spices, Other	*	*	-63715.95	*	-9328.25	*	*
Sugar Beet	0.00	0.00	-0.01	0.01	0.00	0.00	0.00
Sunflwr Seed	*	-5.79	*	-29.96	-4.46	*	*
Tobacco	*	-678.53	*	-279.36	-45.72	*	*
Sweet Potatoes	*	-3648.50	*	-59.25	-94.46	*	*
Tomatoes	-46.00	5.26	8.17	5.22		-79.57	-106.36
Vegetables	-2.71	0.64	2.42	-0.04		-18.31	-3.40
Vegetables Other	-88.58	-8.00	-24.84	-18.60		-237.87	-103.99
Yams	*	*	*	-142403.06	*	*	*

Source: See text

*refers to no production and thus no RCA estimate.

Table 5: The Bowen's RCA Indices for Individual Agricultural Rops- NMS (Ave. 1992-2001)

NMS	Cyprus	Czech Rep.	Estonia	Hungary	Latvia
Wheat	-78.21		-2.04		-0.57
Barley	-47.59				-1.84
Bran	-1.54		-265.51		-63.98
Cereals, Other	*		-0.67		-1.05
Beans	-1780.73	-9036.49	-11.08	-452.13	-209.15
Cotton Lint	*	*	*	*	*
Cottonseed	*	*	*	*	*
Grand Nuts	-1106.62	*	*	*	*
Maize	*	-7.61	*		*
Millet	*		*		*
Molasses	*	-51.56	*	-30.69	
Oats	-333.28		-65.76		-1.49
Onions	-3.76	-25.33	-584.74		-4.19
Peas	*		-0.15		-26.14
Pimento	*	-669.19	*		*
Pineapples	*	*	*	*	*
Potatoes		-1.00	-0.30	-1.26	-0.09
Pulses	-74.07				-9.00
Pulses, Other,	*				
Rape & Mustard Cake	-125.28	-317.83	*	-51.59	-1.67
Rice (Milled Equi.)	*	*	*	-681.36	*
Rice (Paddy Equi.)	*	*	*	-43.85	*
Roots, Other		*	*	-14262.62	*
Rye	*	-110.99	-5.00	-1.63	-18.94
Sesame Seed	-363253734.08	*	*	*	*
Sorghum	*	*	*		*
Soya Beans	*	-5384.92	*		-304.73
Spices, Other	*	*	*	-11522.48	*
Sugar Beet	*			-0.05	-0.04
Sunflower Seed	*	-112.92	*		*
Sweet Potatoes	*	*	*	*	*
Tobacco	*	*	*	*	*
Tomatoes		*	*	-50.18	*
Vegetables		-15.29	-43.07		-110.56
Vegetables, Other		-4.11	-3.57		-0.94
Yams	-4.73	-111.67	-56.74		-26.23

Source: See text

* refers to no production and thus no RCA estimate.

Table 5: The Bowen's RCA Indices for Individual Agricultural Crops- NMS (Continued)

NMS	Lithuania	Malta	Poland	Slovakia	Slovenia
Wheat	[illegible]	-77.60	-1.05	[illegible]	-10.40
Barley	-1.81	-517.85	-5.24	[illegible]	-165.40
Bran	-44.48	-1.57	-60.15	[illegible]	-100.11
Cereals, Other	-0.11	*	0.00	[illegible]	-38.44
Beans	-109.84	-458.43	[illegible]	-1691.20	-211.56
Cotton Lint	*	*	*	*	*
Cottonseed	*	*	*	*	*
Ground Nuts	*	*	-22735494.78	*	*
Maize	*	*	-13.52	[illegible]	-6.65
Millet	*	*	*	[illegible]	-17385.29
Molasses	-5.61	*	[illegible]	[illegible]	[illegible]
Oats	-7.30	*	[illegible]	[illegible]	-94.37
Onions	-30.38	-5.23	[illegible]	-4.22	-129.76
Peas	-58.27		-4.37	[illegible]	-2.69
Pimento	*	*	*	*	-146.86
Pineapples	*	*	*	*	*
Potatoes	-0.74	-1.27	[illegible]	-3.60	-2.10
Pulses	-10.44	-39.73	[illegible]	[illegible]	-31.02
Pulses, Other,	[illegible]	*	[illegible]	[illegible]	-13.34
Rape & Mustard Cake	-1.42	-93.04	[illegible]	[illegible]	-481.06
Rice (Milled Equ.)	*	*	*	*	*
Rice (Paddy Equ.)	*	*	*	*	*
Roots, Other	*	*	*	*	*
Rye	[illegible]	*	-4.57	-10.20	-370.20
Sesame Seed	*	*	*	*	*
Sorghum	*	*	*	[illegible]	*
Soya Beans	*	*	*	-37.67	-16039.78
Spices, Other	*	*	*	*	*
Sugar Beet	[illegible]	*	0.00	0.00	-0.09
Sunflower Seed	*	*	*	[illegible]	-623.35
Sweet Potatoes	*	*	*	*	*
Tobacco	*	*	*	*	*
Tomatoes	*	*	-70.29	[illegible]	*
Vegetables	-42.57	-1.27	-2.67	-1.80	-34.92
Vegetables, Other	-1.23	-1.21	[illegible]	-0.13	-8.63
Yams	*	*	*	*	*

Source: See text

Refers to no production and thus no RCA estimate.

Table 6: The impact of Agricultural Crops- RCA on Export Intensity The OMS

Dependent Variable: LX1
Method: Least Squares
Date: 08/24/04 Time: 14:53
Sample: 167
Included observations: 67

Variable	Coefficient	Std. Error	-Statistic	Prob.
C	-2.390362	0.162388	-14.72008	0.0000
LRCA1	0.484556	0.047242	10.25691	0.0000
R-squared	0.618106	Mean dependent var		-1.262343
Adjusted R-squared	0.612231	S.D. dependent var		1.570501
S.E. of regression	0.977969	Akaike info criterion		2.822718
Sum squared resid	62.16748	Schwarz criterion		2.888530
Log likelihood	-92.56105	F-statistic		105.2042
Durbin-Watson stat	2.048846	Prob (F-statistic)		0.000000

Table 7: The impact of agricultural crops- RCA on export intensity

The NMS

Dependent Variable: LX
Method: Least Squares
Date: 08/24/04 Time: 15:01
Sample(adjusted): 166
Included observations: 66 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.374599	0.175787	-13.5084	0.0000
LRCA	0.191893	0.046912	4.090457	0.0001
R-squared	0.207252	Mean dependent var		-1.905815
Adjusted R-squared	0.194865	S.D. dependent var		1.206822
S.E. of regression	1.082873	Akaike info criterion		3.026946
Sum squared resid	75.04726	Schwarz criterion		3.093300
Log likelihood	-97.88923	F-statistic		16.73184
Durbin-Watson stat	1.694056	Prob(F-statistic)		0.000123

References

1- Ballance, R., Forstner, H. and Murray, T. 1987, Consistency Tests of Alternative Measures of Comparative Advantage, *Review of Economics and Statistics,* 69, pp. 157-61.

2- ----------. 1985, On Measuring Comparative Advantage: A Note on Bowen's Indices, *Weltwirtschaftliches Archiv*, 121, pp. 346-50.

3- Bowen, H. P. 1983, On the Theoretical Interpretation of Indices of Trade Intensity and Revealed Comparative Advantage, *Weltwirtschaftliches Archiv,* 119, pp. 464-72.

4- Carter Colin A. and Fu-Ning Zhong 1991, Will Market Prices Enhance Chinese Agriculture?: A Test of Regional Comparative Advantage, *Western journal of Agricultural Economics*, 16(2): 417-426.

5- Commission of the European Communities 2002, *Towards the Enlarged Union, Strategy Paper,* Report of the European Commission on the Progress Towards Accession by Each of the Candidate Countries, Brussels. Pp. 1-98.

6- Deardorff, A. V. 1980, the General Validity of the Law of Comparative Advantage', *Journal of Political Economy,* 88, pp. 941-57.

7- Drabicki, J. and Takayama, A. 1979, Antimony in the Theory of Comparative Advantage, *Journal of International Economics*, 9, pp. 211-23.

8- Enlargement Weekly 2004, *Agriculture in the Enlarged EU*, May 10.

9- European Commission, Directorate-General for Agriculture, 2001, *Prospects for Agricultural Markets: 2001 – 2008*, pp. 1-7, July.

10- European Commission, Directorate-General for Agriculture, *EU Enlargement*

11- European Commission, Directorate-General for Agriculture, 2002, *EU Agriculture and Enlargement*, pp. 1-10.

12- European Commission, 2004, Network of Independent Agricultural Experts in the CEE Candidate Countries, *The future of rural areas in the CEE New Member States*, Halle, p. 158

13- Feenstra R.C. and Rose A.K. 1997, Putting Things in Order: Patterns of Trade Dynamics and Growth, *NBER Working Paper*, 5975.

14- Friends of the Earth Europe: *EU Enlargement and Agriculture*,

15- Häring, A. M., S. Dabbert, J. Aurbacher, B. Bichler, C. Eichert, D. Gambelli, N. Lampkin, F. Offermann, S. Olmos, J. Tuson und R. Zanoli 2004, Organic farming and measures of European agricultural policy.

Organic Farming in Europe: Economics and Policy, Vol. 11, Universität Hohenheim, Stuttgart (Hohenheim).

16- Heathcoat-Amory, David, 2003, the Proposed EU Constitution Fundamentally Changes the Union," *Daily Telegraph*, June 18.

17- Hillman, A.L. 1980, Observations on the Relation Between 'Revealed Comparative Advantage' and Comparative Advantage as Indicated by Pre-trade Relative Prices', *Weltwirtschaftliches Archiv,* 121, pp. 315-21.

18- Hirsch, S. I. Ayal, N. Hashai and R. Khesin, 1996, *Arab-Israeli Potential Trade: the Role of Input Sharing*, The Israel Institute of Business Research and the Armand Hammer Fund for Economic Cooperation in the Middle East,.

19- Hirsch, S., I. Ayal and G. Fishelson, 1995, *The Arab Israeli Trade Potential: Methodological Considerations and Examples*, The Israel Institute of Business Research.

20- Hirsch, S. and S. Donnenfeld, 1994, Marketing Cost Differentials, Economies of Scale and the Competitiveness of Small-Country Producers, *The International Trade Journal*, Vol. 3 No. 5.

21- Hunter, L. and J. Markusen 1988, Per-Capita Income as a Determinant of Trade, in *R. Feenstra (ed.), Empirical Methods for International Trade*, MIT Press.

22- International Trade Center 2000, *TradeSim*, the ITC Simulation Model of Bilateral Trade Potentials, ITC Market Analysis Section, Final Draft

23- Lejour, A.M., R.A. de Mooij and R. Nahuis 2001, *EU Enlargement: The Economic Implications for Countries and Industries*, CPB Document 11, The Hague.

24- Oxana, Koukhartchouk and Mathilde Maurel 2003, *Accession to the WTO and EU Enlargement: What Potential for Trade Increase?*, Centre for Economic Policy Research, CEPR Discussion Paper No. 3944.

25- Pappaioannou, Dimitris 2001, *the Consequences of Enlargement for EU Agriculture*, European Parliament, Directorate General for Research, the STOA Program.

26- Pouliquen, Alain 2001, *Competitiveness and farm incomes in the CEEC agri-food sectors: Implications before and after accession for EU markets and policies*, a study contracted by the European Commission.

27- Szamuely, Helen and Bill Jamieson, A 1998, *Coming Home or Poisoned Chalice?* London: St Edmundsbury.

28- Tupy, Marian L. (2003), *EU Enlargement: Costs, Benefits, and Strategies for Central and Eastern European Countries*, Policy Analysis, No.489, September.

29- UNCTAD 1999, UNCTAD's *Contribution to the Implementation of the United Nations New Agenda for the Development of Africa in the 1990s: African Transport Infrastructure, Trade and Competitiveness*, Technical Report, UNCTAD, TD/B/46/10.

30- Webster, A. 1991, Some Issues in the Measurement of Comparative Advantage, *Applied Economics*, 23, pp. 937-48.