

Transition and foreign trade: the case of the Ukrainian agri-food sector

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ABSTRACT

The purpose of this paper is to assess the progress of the transformation process and to analyse which policy measures are necessary for further economic integration into world markets. In this study we concentrate on the Ukrainian agri-food sector. The development of foreign trade may serve as indicator of success of market reforms. Thus we analyse the changes in the trade structure of agri-food sector and compute indicators of inter- (RTA Index) and intra-industrial (Grubel-Lloyd Index, Brühlhart A-Index, characterising the marginal intra-industry trade) trade for the period 1996-2005. We discuss also which policy measures are necessary for further economic integration of Ukraine into world markets.

Keywords: agri-food sector, intra-industry trade, marginal intra-industry trade, Ukraine

1 INTRODUCTION

Since the beginning of the 1990s, Central and Eastern European countries (CEECs) have been in a process of transformation characterised by reforms in the administrative, political and economic spheres. An integral part of the transformation process is trade liberalisation, which has been accompanied by the restructuring of enterprises, as well as whole branches of the economy. On the one hand, trade liberalisation, particularly foreign trade, assists and guides the economic reforms of a country, but on the other hand it reflects the deficiencies of the reforms. With the liberalisation of exchange relations, enterprises and branches could take advantage of the positive effects of the market economy. Otherwise, the new conditions introduce enhanced competition on the factor and product markets. Enterprises and branches are going to be successful only if they meet the challenges of a complex environment, define their competencies and develop sustainability. This includes a certain degree of specialisation in spheres where comparative advantages exist. Thus, it can be concluded that the transformation process might be thought of as a successful one, particularly in businesses and branches which have succeeded in integrating themselves into inputs markets, as well as in product markets. This means integration not only into national, but also international markets, and the ability of domestic producers to reach, keep and even to enhance positions in the international market under these new circumstances.

In this paper we concentrate on the Ukrainian agri-food sector. The objective is to assess the progress of the transformation process as revealed by trade data, and to analyse which policy measures are necessary for further economic integration into world markets. In particular, we would like to explore the extent to which the lack of specialisation on the international market is caused by improper trade policy, and the extent to which it is caused by obstacles in the transformation process. The development of Ukraine's foreign trade may thereby serve as an indicator of success for its economic reforms. Thus, the primary alterations in the trade structure of the Ukrainian agricultural and food sector during the transformation period are examined. The analysis covers the years 1996 to 2005. Statements of traditional and new trade theories are verified through empirical analysis. Various trade-political indicators enable the analysis of trade patterns and their changes. This study concentrates on the analysis of inter- (RTA Index) and intra-industrial (Grubel-Lloyd Index, Brühlhart A-Index, characterising the marginal intra-industry trade) trade indicators. In the discussion of the results, the trade-political regulations which are responsible for the present situation, as well as the opportunities for further international integration are addressed.

This paper is structured as follows. The second chapter contains a theoretical background of the development of international trade. Chapter 3 presents the methodological framework for analysing Ukrainian agro-food trade. In Chapter 4, the current situation and structure of agro-food trade in Ukraine are described. The main results of the empirical estimations are discussed in Chapter 5. The conclusions of this study and policy recommendations are presented in Chapter 6.

2 THEORETICAL BACKGROUND

A prerequisite for international trade is that procurement from the world market be less costly than domestic production. Thus, the price of goods produced abroad, including transaction and transport costs, must be lower than the price of domestically-produced goods. The reasons for the price differentials may result from differences in demand (preferences, income, population) and supply (factor endowment, technology).

SMITH (1776) referred to absolute cost advantages as the reason for international price differentials. However, RICARDO (1817) showed that not absolute, but rather relative cost advantages are a sufficient condition for international trade. According to RICARDO, relative cost advantages and free trade lead to production specialisation. Each country concentrates on the production of those goods that can be produced with relatively less resources than others. These are then exported, while products for which relative cost disadvantages exist are imported. Within this framework, the exchange rate transfers relative cost advantages in absolute price differentials.

Although Ricardo identified relative cost advantages as the reason for specialisation and trade, the causes of these advantages, such as technology and factor endowment, were not analysed in detail. A significant extension of Ricardo's analysis was provided by HECKSCHER (1919) and OHLIN (1933), who investigated the impact of country-specific factor endowments (labour, capital) on international trade relations. They presumed two outputs that have different demands on factor intensity but not differences in demand. In addition, technologies do not differ among countries¹. Without trade, the domestic prices of those goods which use the abundant factor intensively would be lower than the prices of goods which require a relatively high input of the scarce factor. Thus, countries have a comparative advantage in those production activities that make intense use of the abundant factor. Moreover, HECKSCHER and OHLIN show that trade induces a restructuring of production insofar as countries specialise on the production of those goods which require an intensive use of the relative abundant factor. Thus, when capital is scarce in relation to labour, domestic production specialises on the production activities that require relatively high labour intensities (factor proportion theorem).

The HECKSCHER and OHLIN model assert that trade relations, and thus comparative cost advantages, are governed by the differences in factor intensities. However, empirical analysis found only limited support for the factor endowment hypothesis. These findings led to an extension of the traditional HECKSCHER and OHLIN approach. LEONTIEF (1956) calculated not only for quantitative but also qualitative differences in factor input. With this extension, he could show that, for instance, the US trade structure is consistent with the factor proportion theorem. Beyond that, extensions were made regarding the definition of factor intensity. In general, the inputs do not consist of labour and capital only, but also include human capital, technology, management capabilities and other informal factors. With more than two factors, the availability of factors cannot be defined in terms of factor intensities. VANEK (1968) proposed using a country's share in world production and its share in world factor endowment. A factor is relatively scarce in a country when the share on world endowment is smaller than the share in world production. With a functioning market, this implies that a factor is relatively scarce in a country when its share of world endowment is smaller than that of other factors. LEAMER (1980) combined both statements to define scarcity as the relation of factor content in consumption and production. Thus, a factor is relatively scarce in a country where its consumption is higher than its production. Again, a country exports goods that have a high content of the relatively abundant factor. Contrary to the original HECKSCHER and

¹ The technologies are goods-specific, but not country-specific.

OHLIN approach, empirical testing is conducted not with regard to trade patterns, but with regard to consumption and production patterns.

The theoretical approaches presented so far predict a production specialisation and explain inter-industry trade; a country exports or imports and both trade flows are mutually exclusive. However, real trade flows show a significantly different pattern. Intra-industry trade (IIT) as observed is very pronounced and determines, in some branches, the structure of trade flows between countries. Central to this evaluation is the definition of an industry or a sector. Ideally, these terms comprise enterprises that produce homogeneous products, where homogeneity is required with respect to objective characteristics (product attributes, consumer preferences), temporal characteristics (seasonality), and spatial characteristics (transport costs, border trade) (GRUBEL AND LLOYD, 1975). Complete homogeneity within product groups can be guaranteed at the lowest aggregation level only. Generally, at higher aggregation levels, products are grouped together which are imperfect substitutes, from both the producer and consumer perspectives. Because of this classification problem, product differentiation is pivotal for analysing intra-industry trade. In addition, since the number of enterprises in a group decreases with increasing differentiation of trade flows, market power may be a significant issue for intra-industry trade.

Products can be differentiated both vertically and horizontally. Vertical differentiation refers to goods for which all consumers have similar preferences in terms of quality. Thus, a unique ordering of products regarding the willingness to pay (from high to low quality products) is possible. The choice among product varieties depends on consumer income. With horizontal differentiation, various consumers assess the product characteristics (colour, design, taste etc.) differently. In this case, no ordering from higher to lower quality is possible for all consumers and the choice among varieties is governed by preferences (TIROLE 1988).

Several models that account for the impact of product differentiation on trade have been developed. A common feature of these approaches is that they consider scale and market power effects (TURSS O., 1999). Trade of vertically-differentiated products can be regarded as the result of scale effects and differences in per capita income. According to theory, demand for high quality products is higher in high income than in low income countries. Under autarky, these differences in demand provide a corresponding specialisation of production. Because of scale effects, the high income country will have a comparative advantage in the production of high quality goods, while the low income country concentrates on the production of low quality goods. Thus, facilitating trade will lead to corresponding trade flows, and a further specialisation on those products for which comparative advantages exists. In sum, income differentials and scale effects result in trade flows that correspond to income differentials. Thus, vertically differentiated trade flows are expected between countries with different levels of economic development²

However, horizontally differentiated trade can be expected between countries with similar levels of economic development. In order to circumvent the negative impacts of severe competition, enterprises have an incentive to provide different product qualities (Neo-Chamberlin model, Neo-Hotelling model)³ which serve the preferences of the various consumers more adequately, and allow them to extract part of the consumer's rents. However, the increase of product variety permits scale effects to be fully exploited. External trade provides an increase in sales, and consequently, because of economies of scale, a reduction of per unit production costs. Simultaneously, enterprises may focus their production on specific qualities, which results in additional reductions of production costs.

² See model of vertical IIT from FALVEY, R., KIERZKOWSKI, H.(1984)

³ See DIXIT AND STIGLITZ (1977), LANCASTER (1979)

BRANDER und KRUGMAN (1983) argue that product differentiation is not a necessary condition for intra-industry trade. They assume two countries where domestic monopolists produce one homogeneous good. The enterprises have two strategies: (a) no export and (b) export. When both enterprises choose strategy (a) both can enjoy their monopoly profits in their home countries. However, this equilibrium is not stable since a switch to strategy (b) is rational for every monopolist; in this way, they would receive monopoly profits in the home country and duopoly profits in the foreign country. Thus, both countries choose strategy (b) and enterprises obtain duopoly profits in both countries. Corresponding results also hold for oligopolistic competition. Intra-industry trade in this setup is caused by a „Prisoners’ Dilemma“, and is the consequence of the enterprises’ equilibrium strategies. Moreover, trade is independent of the countries’ factor endowment.

Thus, intra-industry trade enhances gains from trade by better exploiting economies of scale – rather than through comparative advantage – as trade leads countries to concentrate on a limited number of products within any particular industry. Specialisation within industrial categories may also stimulate innovation. Intra-industry trade reduces the demand for protection because in any industry there are both exports and imports, which makes it difficult to achieve unanimity among those demanding protection (RUFFIN, 1999).

3 METHODOLOGICAL FRAMEWORK

Several indicators for measuring inter- and intra-industry trade relations have been developed. Among the most popular are the Balassa Index (revealed comparative advantage), revealed trade advantage (RTA), the Grubel Lloyd Index and the Brülhart A-Index. These indicators are complementary to each other insofar as they measure different aspects of trade relations.

Inter-industry trade. VOLLRATH (1991) and SCOTT and VOLLRATH (1992) build on the work of BALASSA (XXX) AND developed an indicator of inter-industry trade, the relative trade advantage (RTA). This index considers exports as well as imports, and thus shows the net trade advantages. The RTA is defined as the difference between Relative Export Advantage (RXA) and the Relative Import Penetration Index (RMP):

$$(1) \quad RTA_{ij} = RXA_{ij} - RMP_{ij}, \text{ where}$$

$$(2) \quad RXA_{ij} = \frac{\left[\frac{x_{ij}}{\sum_{l, l \neq j} x_{ij}} \right]}{\left[\frac{\sum_{k, k \neq i} x_{kj}}{\sum_{k, k \neq i} \sum_{l \neq j} x_{kl}} \right]} \quad \text{and} \quad RMP_{ij} = \frac{\left[\frac{m_{ij}}{\sum_{l, l \neq j} m_{ij}} \right]}{\left[\frac{\sum_{k, k \neq i} m_{kj}}{\sum_{k, k \neq i} \sum_{l \neq j} m_{kl}} \right]} .$$

An RTA larger than 0 denotes competitive advantages, while values less than 0 indicate disadvantages.

PITTS and LAGNEVIK (1998) argue that because the results of the calculations depend on the size of country i, the Balassa Index is primarily suitable for comparing the competitiveness of different domestic sectors, but not of the same sector, among different countries. Thus, the RTA is mainly suitable for comparing competitiveness among sectors in one country and can be regarded as an indicator of international competitiveness in the interpretation of VANEK (1968) and LEAMER (1980). A further problem results from the fact that the Balassa Index is affected by trade and other policy measures and thus provides a biased view of international competitiveness. The RTA is not only more comprehensive than the original Balassa Index, it also has higher consistency with trade theories (FROBERG and HARTMANN 1997). The RTA is superior to the Balassa Index because it considers transit trade appropriately. In addition, the

adjustments made in the summation account for the scale effect, thus reducing bias induced by country size.

Intra-industry trade. The most popular indicator of intra-industry trade is the Grubel-Lloyd Index (GL) (GRUBEL AND LLOYD, 1975) defined as:

$$(3) \quad GL_i(n) = \frac{(x_i + m_i) - |x_i - m_i|}{(x_i + m_i)} \quad \text{or} \quad GL_i(n) = 1 - \frac{|x_i - m_i|}{(x_i + m_i)} .$$

The GL relates the difference between total trade (x and m) and net trade to total trade for sectors differentiated at the n digit level. Thus, the GL measures the overall importance of intra-industry trade in total trade. The values of the GL are between zero and one, where $GL = 0$ indicates that there is no intra-industry trade. The GL index is static in the sense that only one year is considered in its construction.

It is generally argued that industries with high level of IIT undergo less structural change- less adjustment costs – in response to trade liberalisation than industries with low levels of IIT (KANDOGAN, 2003). The adjustment process should be analysed using indicators based on marginal trade flows, because adjustment is a strictly dynamic process; knowledge of changes in trade flows is required in order to infer reliable conclusions. By way of contrast, it would be inappropriate to compare static measures at different points in time. For instance, an increase in the IIT measures by the GL index at two points in time might suggest an intra-industry adjustment, although this could be due to an increase in the export of an import-oriented industry.

The first attempt to construct an index of marginal intra-industry trade was made by HAMILTON and KNIEST (1991), who argued that for the purpose of evaluating the adjustment consequences of trade expansion, it was important to focus on how IIT changes at the margin. Some simple and now widely-used measures of MIIT were developed by BRÜLHART (1994). The Brühlhart A index is a transposition of the GL index to trade changes:

$$(4) \quad MIIT = A = 1 - \frac{|(X_t - X_{t-n}) - (M_t - M_{t-n})|}{|X_t - X_{t-n}| + |M_t - M_{t-n}|} ,$$

where n stands for the number of years constituting the relevant adjustment period⁴.

The A index, like the GL index, varies between 0 and 1, where 0 indicates marginal trade in the given industry to be completely of the inter-industry type, and 1 represents marginal trade to be entirely of the intra-industry type. The A index shares most of the statistical properties of the GL index, a comprehensive description of which is provided in GREENAWAY and MILNER (1983).

4 ROLE OF AGRICULTURE IN THE NATIONAL ECONOMY AND AGRI-FOOD TRADE

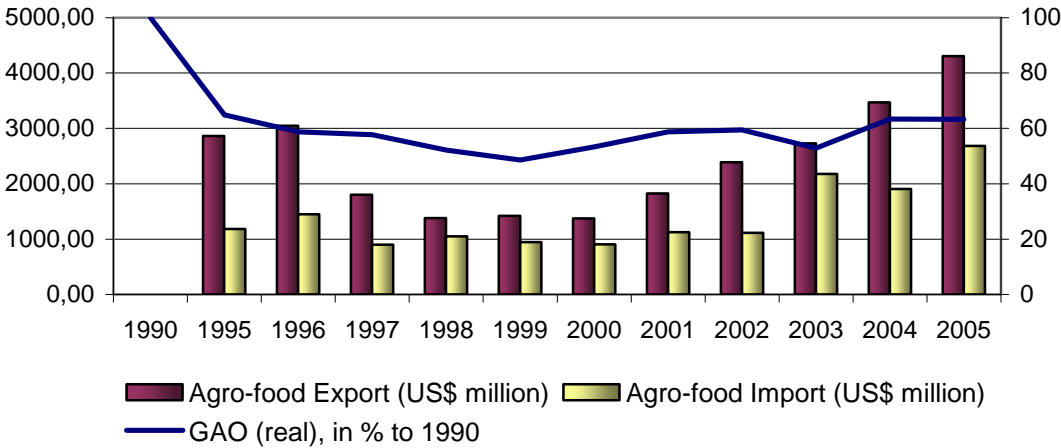
Importance of agriculture for Ukrainian economy. Agricultural is an important sector of the Ukrainian economy. This sector makes up a significant proportion of the GDP (in 2005 was 11% of the GDP) and is a major employer. According to official statistics, almost 20% of the economically active population is employed in agriculture. During transition, it also served an important role as a social safety net by absorbing surplus labour in subsistence farming, and preventing a major social upheaval by slowing the pace of urban-rural migration seen in similar collapses (OECD, WORLD BANK, 2004). The agri-food sector plays an

⁴ There exist_s no consensus on the appropriate choice of n . OLIVERAS and TERRA (1997) have shown that there is no general relationship between the A index in a certain period and the corresponding indices of the constituent sub-periods. An intuitive case could be made for a medium-term interval of, say, two to five years, which is likely to be a realistic timespan for inter- and intra-sectoral re-employment of redundant workers.

important role in determining the trade balance and the current account. From 1994-2005, the share of agri-food in total merchandise exports was 13.6%, behind only metal, chemical and machinery exports. The share of agri-food imports equalled 7% for this period, and net agro-food exports amounted to USD 1.7 billion in 2005. These were a major factor in reducing an overall negative balance in 2005.

The economic transition process has been difficult for the agricultural sector; between 1990 and 1999, output declined by 51% (Figure 1)⁵ The share of the GDP produced in agriculture

Figure 1: Output, export and import of agro-food products during transition



Source: State Statistics Committee of Ukraine, COMTRADE

also decreased from 18.6% at the beginning of transformation to 13.6 % in 1999; indeed, it declined faster than the overall economy. The years 2000-2002 saw the output slightly recover. The Ukrainian agricultural sector output grew by 10% per year for two years in row. With the agricultural output recovering, its share of GDP increased to 15.3 % in 2002. During the 1990s, the importance of the agricultural sector as an export revenue earner for Ukraine declined in both absolute and relative terms. The export of agro-food products have decreased by 51% from 1996 to 1999. The share of agricultural goods (foodstuffs) of total exports shrank from 23% in 1996, to 7.5% in 2005.

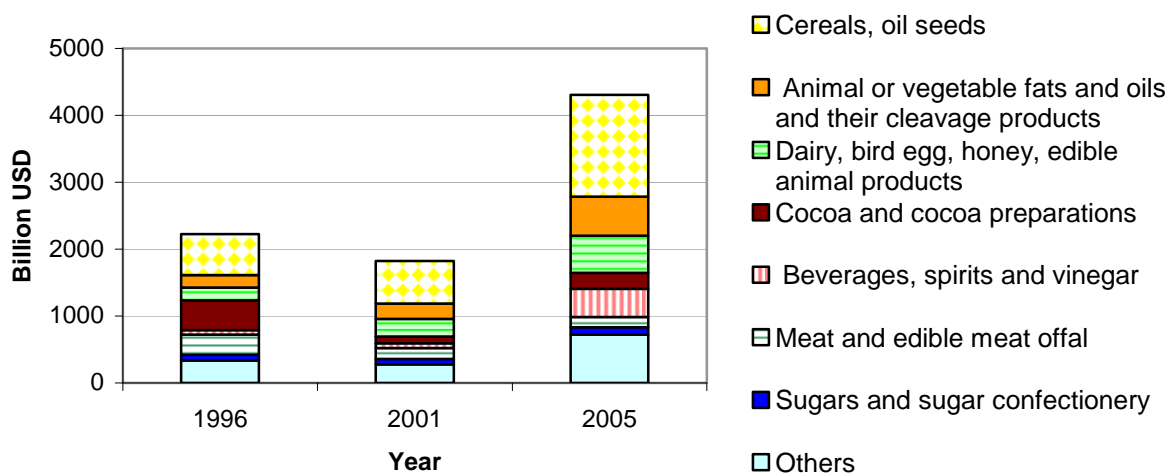
Before discussion of Ukrainian foreign trade with agri-food products point out, that agriculture occupies 69% (41.9 mln ha) of country’s land resources. 55% of Ukraine’s agricultural land is arable, 1/3 of which is black chernozem soils. The land endowment accounts for 0.66 ha arable land per person. Among the most important agricultural exporters of the world, Ukraine has one of the highest amount of land resources. From this follows that Ukraine should export agricultural goods which utilise much agricultural land. This concerns crops in plant production and milk in livestock production.

Trade structure. Ukraine is a consistent net exporter of agricultural and food products. Since lows at the end of the 1990s, exports have increased to the record level of USD 4 billion in 2005. Ukrainian agri-food exports are characterised by the high degree of concentration on three major commodity groups (at HS 2 digit tariff lines) accounting for almost 60% of the total agri-food exports in 2005 (Figure 2). Cereals occupy the leading position, accounting for 31%, followed by fats, animal and vegetable oils at 13%, and dairy products at 12% of the total export of agricultural and food products. Because crop production is strongly dependent on climatic conditions, considerable yield fluctuations are observed. These variations are,

⁵ Data for Ukrainian agri-food export und import for 1990 are not available

accordingly, reflected in exports. Overall, 70% of the exported goods are primary (chapter 01 – 15, HS 1992 Trade Nomenclature) or agricultural goods and 30% are foodstuffs. In this context, one of the challenges for improving the Ukrainian food industry’s international competitive position can be found.

Figure 2: Export structure of agro-food products



Source: Own calculations based on COMTRADE database

The largest export markets for Ukrainian agro-food products are countries that belong to the Commonwealth of Independent States (CIS); they accounted for 44% of total exports in 2005. Russia is also a main trade partner, possessing an export share of 32% and an import share of 16.5% (2005). In 2005, the export of agricultural goods and foodstuffs amounted to USD 1907.5 million, and in comparison with 2002, doubled its value. Before the January 2006 import ban, Russia was a key market for milk and meat products. Such regional concentration makes exporters to the country extremely dependent on changes in the economic and political conditions in the partner country. The financial crisis in Russia (1998 – 1999) has had a considerable influence on the bilateral trade between the two countries, and on the volume of Ukrainian trade as a whole.

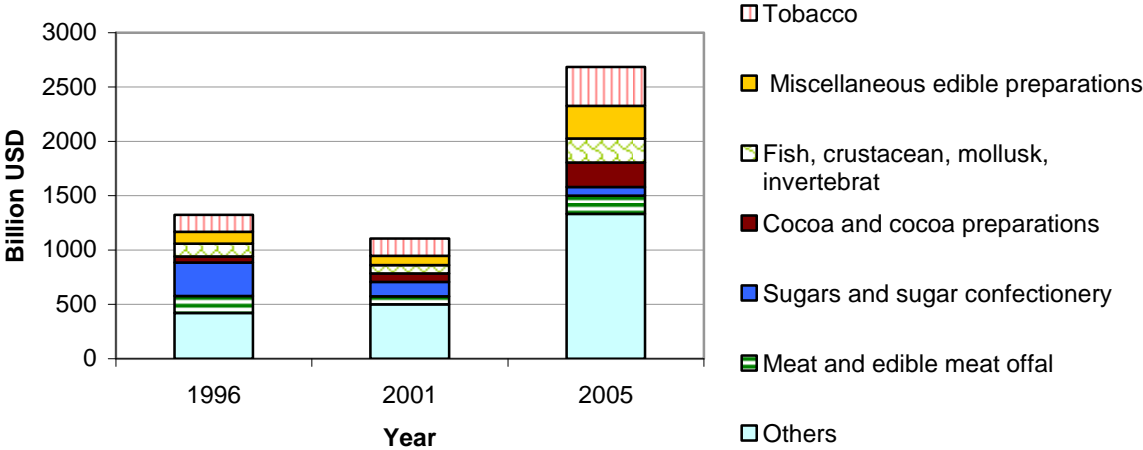
The second largest market for Ukrainian agro-food exports is the EU-25⁶ (22%) and the third largest are Asian countries (21%). Indeed, Asian countries, whose importance has increased in the last five years, absorb half of Ukrainian cereal exports, with Saudi Arabia being a major importer of barley. The EU countries, Spain in particular, represent an important wheat market. Other products exported to the EU include vegetable oil and sunflower seeds. Export of livestock products to the EU is negligible, as only a few food processors comply with the EU food safety and packaging standards (OECD, 2007). An important feature of this trade is that 90% of the exports in the EU-countries are agricultural goods, while processed goods make up the remaining 10%. Scrutinising this ratio, it can be stated that goods from the Ukrainian processing industry are not competitive on the European market. In addition to high taxes, strict non-tariff regulations hinder Ukrainian export. It is for this reason that Ukrainian standards and norms have to be adapted to EU standards, and product quality has to be increased. These are the two necessary conditions for an improved Ukrainian position on the EU market.

During the 1990s on average import of agri-food commodities decreased at lower rates than export (Figure 1). The devaluation of Ukrainian currency, together with several restrictions on

⁶ In further analyse we separate EU-25 into three groups: EU-15, CEE countries and Baltic countries

the purchase of foreign currency (which, for instance, made the prepayment of imports almost impossible) were the causes of reduced imports. There are two main features of Ukrainian agri-food import. First, foodstuffs account for 46% of total agri-food imports. Second, compared to exports, import of agricultural and food commodities are more diversified. In 2005, tobacco accounted for 13% of the total agri-food imports, miscellaneous edible preparations (including coffee extracts, essences, concentrates and preparations) made up 11%, and cacao and cacao preparations accounted for 8% (Figure 3).

Figure 3: Import structure of agro-food products



Source: Own calculations based on COMTRADE database

The EU-25 is the main supplier of agro-food products to the Ukrainian market, accounting for 36% of the total in 2005, followed by the CIS countries at 24%. Though EU countries imported Ukrainian agri-food commodities at a relatively stable rate, the share in CIS countries in recent years rose from 9.9% in 1999 to 30.2% in 2005. Further, OECD countries have lost their positions on the Ukrainian market; their share has almost halved from 1996 – 2005.

Major products imported from the EU countries include miscellaneous edible preparations, tobacco, meat and meat by-products. From CIS countries, Ukraine imports meat, fish, dairy products, alcohol and non-alcohol drinks, and confectionery. Asian countries lead in supplying fats, animal and vegetable oils, as well as fruits and vegetables, while South African countries are important providers of meat and sugar. From the USA, Ukraine imports poultry, tobacco and fish products.

5 ANALYSIS OF TRADE INDICATORS

Export and import statistics from the COMTRADE databank were used for analysing Ukrainian trade with agricultural commodities and foodstuffs. In this study, we focus on trade from 1996-2005. The data includes 60 partner countries of Ukraine and 24 product groups. Agricultural commodities are included in section 01-15, and foodstuffs are under section 16-24 of HS 1992 Trade Classification.

Inter-industry trade. We have evaluated the relative trade advantage of Ukrainian agricultural commodities and foodstuffs at bilateral and world levels. First of all, the CIS countries were used as the base region in the calculation of RTAs in order to show regional competitiveness. Secondly, RTAs were calculated in a world context, as a measure of global competitiveness of Ukrainian agriculture. We calculated RTA indices at a two-digit level, according to HS 1992.

Ukraine has relative trade advantages for most products on a regional level (CIS countries). These are all agricultural products, excluding fish and sea products (group HS 03), coffee, tea (HS 09) and vegetable planting materials (HS14) and all processed goods, excluding meat and fish preparations (HS16). The competitive position of Ukraine on the CIS markets is, however, fragile. Currently, the greatest CIS Market - Russia is open to Ukrainian goods, which simultaneously constricts the access of other countries. But competition on the market will rise when Russia succeeds in becoming a WTO member state. Also per capita income in CIS countries will rise, which increases the demand of high quality and differentiated products. With respect to technology and factor endowment, the CIS countries are very similar to each other, which means that competition based on low wages will become even stronger. The rise of western markets (EU-25) and the fact that the eastern trade area is inferior in terms of technology transfer should also be taken into account (QUAISSER W., VINCENTZ V., 2001). All this suggests that Ukraine might lose their market position and trade growth if efficiency and quality of products are not enhanced and if it would favour one-sided trade with the CIS countries.

If the world market is considered, Ukraine loses relative trade advantages in 8 products compared to the CIS market. These are live animals, meat, meat and fish preparations, edible fruits, live trees and plants, lac, gum and vegetable extracts, miscellaneous edible preparations and tobacco. Ukraine has a positive RTA - index in 15 of 24 agricultural commodities and foodstuffs at the world level. Of these, 8 products belong to the group of 'Primary Agricultural Goods'. The highest values of RTA in 2005 were observed in cereals (9.6) and milk and dairy products (3.2). While RTA values for milk products were relatively stable during the examined period, the RTA values for cereals fluctuated considerably and reflected the high atmospheric influence on the plant production. Comparative trade disadvantages in 2005 were identified in the following commodity groups: tobacco (-2.9), miscellaneous edible preparations (-2.4), coffee and tee (-1.6), live animals (-1.0), fish, crustacean, mollusc (-0.9).

When searching for levels and tendencies of changes in RTA indexes by product, we can observe three groups: 1) commodities that had a positive RTA index from 1996-2005, 2) commodities with a negative index over the analysed period and 3) commodities with intense changes in relative trade advantages.

The commodity groups HS 16 (meat, fish and seafood preparations) and HS 11 (milling products, malt, starches) lose their trade advantages on the world market (Table 1). For milling products, for example, the level of RTA has decreased from 10.2 in 1996 to -0.1 in 2004. The level of RTA for preparations of cereals, flour has changed from -0.6 in 1996 to 0.4 in 2005. The same tendency was observed for cacao preparations and vegetable planting materials, they became competitive on the world market.

Table 1: Relative trade advantage of Ukraine by products

RTA > 0	RTA < 0	Switching RTA *
Cereals-10	Tobacco-24	Preparations of meat, fish or crustaceans, molluscs -16
Milk products-04	Miscellaneous edible preparations -21	Products of the milling industry; malt; starches; wheat gluten -11
Animal or vegetable fats and oils -15	Coffee, Tea-09	Vegetable plaiting materials; others vegetable products-14
Beverages, spirits and vinegar -22	Live animals-01	Cocoa and cocoa preparations-18

Oil seeds, miscellaneous grains, seeds -12	Fish, crustacean, mollusc, invertebrate – 03	Preparations of cereals, flour, starch or milk-19
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* Products whose level of RTA has particularly changed during 1996 and 2005 from positive to negative and visa verse

Source: Own calculations based on COMTRADE data (HS code data at two-digit level)

Intra-industry trade. The analysis of Ukrainian intra-industry trade in agri-food products is based on unadjusted Grubel-Lloyd (GL) indices. In order to diminish the heterogeneity problem, the GL index was calculated at the 6-digit levels of HS-1992 classification. GL indices of IIT for Ukrainian agri-food trade were calculated a) by commodity groups, b) by all trading partners (the world) and according to the following regional specifications (CIS, Baltic states, CEE countries, EU-15, OECD countries⁷ and the rest of the world) and commodity specifications (agricultural products and foodstuffs).

The level of intra-industry trade varies considerably between product groups and countries, and exhibits great temporal fluctuations. An increase in intensity is observed in the case of processing goods (foodstuffs). On average, foodstuff trade had a higher intensity of IIT, for period 2000-2005 – 24.2%, in comparison to the agricultural goods trade – 7.6% (Table 2). This corresponds to the developments in world agricultural trade and supports the theoretical statement that IIT is more representative of the sectors with higher product differentiation. The IIT level for primary products is insignificant, exhibiting strong fluctuations: from 4.8% in 2002 to 12% in 2000. These variations refer to the Ukrainian export structure, particularly to a high share of cereals and to a high fluctuation of cereals production during the analyzed period. In 2002 high crop production and therefore high exports have resulted in few imports and therefore a low level of intra-industry trade. Visa verse, a low crop yield and the associated export decrease led to an increase of the IIT. From 1996-2005, the level of IIT, on average, amounted to only 13.7% of total agri-food trade. These results show that inter-industry trade, induced by comparative advantages, prevails.

Table 2: Level of IIT by commodity group between Ukraine and all trading partners (the world), %

Commodity groups	Ø 1996-99	Ø 2000-05
02-Meat and edible meat offal	4.3	7.4
03-Fish, crustacean, mollusc, invertebrates	25.5	15.0
05-Product of animal origin, not elsewhere included	39.6	11.6
07-Edible vegetables and certain roots and tubers	7.9	11.5
10-Cereals	3.0	11.7
11-Products of the milling industry	6.2	14.7
12-Oil seeds; miscellaneous grains; seeds; industrial plants	13.4	13.5
Total agricultural products 01-15	9.3	7.6
16-Preparations of meat, of fish or of crustaceans, molluscs	18.4	41.4
19-Preparations of cereals, flour, starch or milk	38.4	31.2
20-Preparations of vegetables, fruit, nuts	32.0	28.4
21-Miscellaneous edible preparations	13.7	31.8

⁷ This group includes OECD countries, excluding EU-15 members and CEE countries.

22-Beverages, spirits and vinegar	27.6	29.5
24-Tobacco and manufactured tobacco substitutes	32.9	28.8
Total food products 16-24	22.3	24.2
Total agro-food products 01-24	14.4	13.9

Source: Own calculations based on COMTRADE Data (HS code data at six-digit level).

Looking at the agri-food trade from 1996 to 2005 by trading partners, the highest level of IIT is observed for CIS and CEE countries. On average, intensity of IIT for these countries amounts for 8.6 and 12.4 % respectively, though it shows various trends: while the IIT index with CIS countries goes up during the analysed period, the index goes down for CEE countries (Hungary, Bulgaria). Considering the CIS countries, a high level of IIT for Moldova and Russia is observed. The cause of the increase of IIT between the CIS countries is their concomitant free trade zone; while communication problems and orientation of CEE countries

Table 3: Grubel-Lloyd indices of Ukrainian agri-food trade by country groups

Country groups	Year					
	1996	1998	1999	2000	2002	2005
CIS countries	0,240	0,070	0,057	0,118	0,148	0,112
Baltic countries	0,262	0,298	0,036	0,032	0,036	0,015
CEEC	0,112	0,090	0,129	0,084	0,051	0,053
EU-15	0,055	0,047	0,051	0,072	0,033	0,012
OECD countries	0,022	0,016	0,013	0,024	0,023	0,023
World total	0,153	0,148	0,122	0,149	0,101	0,149

Source: Own calculations based on COMTRADE Data (HS code data at six-digit level)

on European markets provides another explanation for the deterioration of this trade ('one-sided trade'). Moreover, in accordance with the theory, a high IIT level is rooted in factors specific to individual countries, such as: geographical closeness, shared border, same level of development, similar preferences, language, culture, institutional conditions and construction of transportation routes. This is particularly applicable in the case of trade with Russia and Moldova, where the level of IIT in 1996-2005 was 8.9% and 11.6%, respectively. Trade with OECD and EU countries takes inter-industry specialisation as a basis and reflects considerable differences in the economic structure between Ukraine these countries. Furthermore, the liberalisation process in agri-food has not been as strong as in other sectors (high import duties, as well as non-tariff obstructions). Also, Ukrainian agricultural products experience a lack of competitiveness with OECD and EU markets.

Marginal intra-industry trade. The analysis has so far been based on indices which measure the extent of IIT as a proportion of total trade at a given point in time. But changes in the GL index may not capture potential adjustment costs, and measures of marginal intra-industry trade (MIIT) can, therefore, be used to complement traditional IIT analysis. MIIT was quantified in this study according to BRÜLHART's (1994) A indices.

Table 4: Marginal intra-industry trade in agro-food products in Ukraine, by trade partners, 1996-2005 (A indices)

Countries' group	1996-2000	2000-2005
CIS countries	0,019	0,186

Baltic countries	0.138	0,013
CEEC	0,069	0,024
EU-15	0,036	0,013
OECD countries	0,015	0,008
ROW	0,000	0,000
World total	0,066	0,105

Source: Own calculations based on COMTRADE Data (HS code data at six-digit level).

We have calculated *A* indices for agro-food products from HS 6-digit trade figures from 1996-2000 and 2000-2005 based on multilateral trade flows at the specified groups' level (Table 4). The highest share of marginal IIT for CIS countries occurred from 2000-2005. For other trade partners the level of marginal IIT was less relevant over both periods (except CEE countries from 1996-2000). The generally low level of *A* indices (close to zero) indicates that most of the changes, which occurred in trade flows, have been inter-industry by nature and, therefore, have very likely induced high adjustment costs.

If we look at average *A* indices across HS 2-digit sectors, we find that MIIT patterns resemble those of IIT insofar as food-processing industries exhibit consistently higher average index values than primary sectors. The highest levels of MIIT from 1996-2000 are found in HS sections 3 (fish and sea products), 20 (preparations of vegetables, fruits and nuts) and 19 (preparations of cereals, flour, starch or milk). From 2000-2005, the highest *A* levels are for HS 17 (sugars and sugars confectionery), HS 24 (tobacco) and HS 19 (preparations of cereals, flour, starch or milk).

6 CONCLUSIONS

In this paper we have analysed the international trade of agricultural products and foodstuffs to assess the transformation process in the agro-food sector. We discussed the changes in export and import structure of agro-food products and calculated indicators of inter- and intra-industrial trade (RTA, Grubel-Lloyd Index and Brühlhart A-Index). The results show, that factor endowment (arable land) appoints the Ukrainian agro-food trade. Ukraine strongly specializes in cereals, oilseeds and milk products. The many political changes which took place during the transition period had no great impact on the agri-food trade specialisation.

Looking at RTA Index calculated for regional (CIS countries), and global level (world) Ukraine has a comparative advantage on the regional level with 20 of 24 agro-food products, but on the world level – only with 12 of 24. The CIS countries are the main importer of Ukrainian agro-food products. Taking into account economic growth of CIS countries (first of all Russia, Kazakhstan) and future changes associated with WTO membership of these countries Ukraine would likely experience a loss in trade growth if it were to one-sided favour trade with the CIS countries. Moreover to starch the position on the regional as well as on the world market Ukraine has to increase quality of products and efficiency of agri-food sector.

We have also calculated the GL-Index and Brühlhart A-index to indicate the level of intra-industry specialisation and to characterize trade changes as they occurred from 1999-2005. The positive tendency shows increasing intra-industry trade by foodstuff products from 1996-2005. From a geographical perspective, intra-industry trade between Ukraine and CIS countries is higher than with the EU, OECD countries and increased over the analysed period. But the IIT with EU-countries is low and is not on the rise regarding Ukraine-EU relations. Furthermore, we can assume that the IIT between Ukraine and the EU is vertical, with Ukraine delivering goods of lower quality in exchange for similar goods of higher quality. The low level of Brühlhart A Index indicates that most of the changes occurring in the trade flows in 1996-2005 have an inter-industrial character.

The transition process of the Ukrainian agro-food sector is slow and cumbersome. Some positive tendencies were asserted only in the second period of transition from 2000-2005. Further trade liberalisation associated with Ukrainian WTO access introduces enhanced competition and in this context demands more transparent, precise and consistency sectoral as well as macroeconomic regulations from governance. In order to increase the competitiveness of the Ukrainian agri-food sector and integration into the world economy it is important to increase quality, stability and efficiency of agricultural production. Modernisation of the processing industry, improvement of the investment climate, governmental programs to support innovative projects, development of an information network and access to market information and political stability are further factors for successful integration into the world economy.

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