EFFECTS OF EU ACCESSION ON INTRA-INDUSTRY AGRICULTURAL TRADE BETWEEN HUNGARY AND EU15

AZ EURÓPAI UNIÓS CSATLAKOZÁS HATÁSA A MEZŐGAZDASÁGI TERMÉKEK ÁGAZATON BELÜLI KERESKEDELMÉRE A MAGYAR-EU15 KERESKEDELEMBEN

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ABSTRACT

The evidence of intra-industry trade (IIT) is one of the most important empirical findings in international trade literature, though its empirical background is poorly developed. The article contributes to the empirical literature by analysing the effects of EU accession on intra-industry trade by using the Grubel-Lloyd index. Results show that agricultural trade between Hungary and EU15 in 2000-2007 was dominantly inter-industry in nature but it becomes more and more intra-industrial, meaning that trade of products created by different industries is replaced by that of created by the same industry. The article suggests three important effects of changes in Hungarian agricultural trade after EU accession: (a) increase in specialisation, (b) changing product quality and (c) changing product prices.

Keywords: EU accession, intra-industry trade, agricultural trade

ÖSSZEFOGLALÁS

Az ágazaton belüli kereskedelem léte és annak megjelenése az egyik legfontosabb eredmény a nemzetközi kereskedelem szakirodalmában, habár empirikus háttere még fejletlen. A cikk azzal kíván hozzájárulni a szakirodalom bővítéséhez, hogy az Európai Uniós csatlakozás hatásait vizsgálja a magyar mezőgazdasági termékek EU15-el folytatott ágazaton belüli kereskedelmére a Grubel-Lloyd index használatával. Az elvégzett számítási eredmények alapján elmondható, hogy a magyar-EU15 agrárkereskedelem 2000-2007 között alapvetően ágazatok között zajlott, de egyre inkább ágazaton belülivé vált, azaz a különböző ágazatok által előállított termékek kereskedelmét egyre inkább az azonos ágazatok termékeinek kereskedelme váltja fel. A cikk három fontos hatását azonosította a hazai agrárkereskedelem EU-csatlakozás utáni változásainak: (a) a növekvő specializációt, (b) a változó termékminőséget és (c) a változó árakat.

Kulcsszavak: EU-csatlakozás, ágazaton belüli kereskedelem, agrárkereskedelem

RÉSZLETES ÖSSZEFOGLALÁS

2004-ben Magyarország 9 közép-kelet európai országgal együtt csatlakozott az Európai Unióhoz, amely számos változást hozott a mezőgazdaság területén. A változások közül az egyik leginkább meghatározó a hazai agrárkereskedelem szerkezetének átalakulása, ahogyan azt már többen is kimutatták [1, 9]. A cikk célja a rendelkezésre álló legfrissebb adatokkal megvizsgálni az EU-csatlakozás mezőgazdasági kereskedelemre gyakorolt hatását, különös tekintettel az ágazaton belüli kereskedelemre. A új kereskedelem elméletek ugyanis hangsúlyozzák, hogy a gazdasági integráció növekedése különösen az ágazaton belüli kereskedelem növekedésében látható [7]. Az ágazaton belüli kereskedelem a komparatív előnyökre és ágazatok közötti kereskedelmet folytató iparágakra épülő hagyományos kereskedelem elméletekkel ellentétben a növekvő méretgazdaságosságon, a tökéletlen versenyen és az azonos iparágon belüli kereskedelmen alapul. Lényege, hogy két ország hasonló termékeket exportál és importál egyszerre. Az ágazaton belüli kereskedelem változásának megfigyelése azért hasznos, mert képes számszerűsíteni az integrációból származó esetleges kereskedelmi előnyöket és a kereskedelem szerkezetének változásait [2].

Habár az ágazaton belüli kereskedelem fontossága a mezőgazdasági termékek esetén egyre növekszik, az agrártermékek ágazaton belüli kereskedelmének mérésére és a kiváltó okok meghatározására relatíve kevés kísérlet történt [13]. A mezőgazdasági termékek ágazaton belüli kereskedelmét vizsgálta Iránban Rasekhi [12], aki rámutatott, hogy 1997-2003 között Irán kereskedelmének 3-6%-a volt ágazaton belüli, ám a tendenciák szerint ez az arány folyamatosan növekszik. Wang [14] Kína mezőgazdaságitermékeinekágazatonbelülikereskedelmét vizsgálva kimutatta, hogy annak számottevő növekedése 1996 és 2005 között döntően a vertikális ágazaton belüli kereskedelem növekedésének volt köszönhető. Bojnec és Hartmann [2] a GL és a marginális ágazaton belüli kereskedelem indexeit Szlovénia agrárkereskedelmére alkalmazták és rámutattak, hogy a kereskedelemi megállapodások ellenére Szlovénia agrárkereskedelme döntően ágazatok közötti, főleg az alacsony hozzáadott értékű tömegáruk esetén. Ezen felül a szlovén ágazaton belüli agrárkereskedelem növekedése a feldolgozott agrártermékek növekvő arányának köszönhető, amely alapvetően meghatározza az ország versenyképességét. Hasonló következtetésre jutottak Luka és Levkovych [10] is, akik Ukrajna agrárkereskedelmét találták döntően ágazatok közöttinek és így a komparatív előnyökön alapulónak.

Bojnec and Fertő [1] cikkükben az agrárkereskedelem integrációját vizsgálták Dél-Kelet-Európa és az EU15 között és megállapították, hogy noha az agrárkereskedelem a két térség viszonylatában döntően ágazatok közötti jelleggel bír, a vertikális ágazaton belüli kereskedelem aránya a teljes agrárkereskedelemben növekszik, amely a mezőgazdasági ágazatok közötti erőforrás elosztás változását idézi elő. Eredményeik szerint továbbá a különböző minőségű és árú agrártermékek kereskedelme a két térség között a kereskedelem-liberalizálás, a gazdasági növekedés és az agrárszektor átalakulásának a következménye.

A magyar agrártermékek Európai Unióval folytatott ágazaton belüli kereskedelemével foglalkozott számos munkájában Fertő [5, 6], valamint Fertő és Hubbard [4], amely munkák az 1992-1998 időszakra vonatkozóan 255 termékcsoport vonatkozásában végeztek empirikus vizsgálatot. Az összes munka világos eredménye, hogy a vizsgált időszakban Magyarország és az EU15 agrárkereskedelme alapvetően ágazatok közötti jelleggel bírt, habár az ágazaton belüli részt a vertikális kereskedelem dominálta. A részletes, ország- és termékcsoport szintű eredmények megtalálhatók a hivatkozott munkákban.

Habár a termékdifferenciálódás és az ágazaton belüli kereskedelem a mezőgazdasági termékek esetén egyre fontosabbá válik, az agrártermékek ágazaton belüli kereskedelmének mérésére és a kiváltó okok meghatározására relatíve kevés kísérlet történt [13]. A cikk célja tehát, hogy a téma eddig hiányos szakirodalmát bővítve megvizsgálja a magyar mezőgazdasági termékek ágazaton belüli kereskedelmének alakulását a csatlakozás után.

A cikkben szereplő adatok az OECD kereskedelmi adatbázisának SITC rendszer szerinti négy számjegyű bontásán alapulnak. Mezőgazdasági kereskedelem alatt az SITC kód szerinti 0-ás (mezőgazdasági termékek és élő állatok) besorolású termékeket értjük, amely a négy számjegyű bontásban 132 termékcsoportot fed le, mezőgazdasági ágazaton pedig a hasonló tulajdonságokkal rendelkező mezőgazdasági termékeket magában foglaló egységet értjük. A cikk 2000-2007-ig terjedő kereskedelmi adatokkal dolgozik, amely időszakot a csatlakozás hatásainak egyértelmű vizsgálatához két egyenlő periódusra bontottunk: 2000-2003-ra, illetve 2004-2007-re. Az Európai Unió megnevezés alatt a cikkben az EU15 tagországait értjük, Luxemburg adatai a kereskedelem hiánya és így a számított indexek értelmezhetetlensége miatt hiányoznak.

INTRODUCTION

In 2004, Hungary joined the European Union (EU) along with nine other Central and Eastern European Countries,

causing several changes in the field of agriculture. One of the major changes was the transformation of national agricultural trade, as indicated by several authors [1, 9]. The aim of the paper is to analyse the effects of EU accession on agricultural trade, especially considering intra-industry trade, by using recent data. New trade theories stress that an increase in economic integration can be particularly seen in the increase of intra-industry trade [7]. In contrast with traditional trade theories focusing on comparative advantages and trade flows between different industries, intra-industry trade is based on economies of scale and imperfect competition and trade flows between products belonging to the same industry. Its essence is that two countries export and import similar products simultaneously. Observing changes in intra-intra-industry trade is useful since they provide numerical expressions of probable trade advantages arising from integration and changes in trade structure [2].

Although the importance of intra-industry trade in agricultural products is increasing, relatively little research has been made on the measurement and determination of its root causes [13]. Intra-industry trade of agricultural products in Iran was analysed by Rasekhi [12] and showed that in 1997-2003 3-6% of Iran's trade was intra-industry in its nature but that this rate is increasing. By analysing intra-industry trade in agricultural products of China, Wang [14] pointed out that its significant growth between 1996 and 2005 was mainly due to the increase of vertical intra-industry trade. Bojnec and Hartmann [2] applied Grubel-Lloyd (GL) and marginal intra-industry trade indices to Slovenian agricultural trade and found that in spite of trade agreements, Slovenia's agricultural trade is still inter-industrial, especially in cases of bulk goods with low value added. Furthermore, the increase of Slovenian agricultural intra-industry trade is due to the increasing rate of processed agricultural products, basically determining the competitiveness of the country. Similar conclusions were drawn by Luka and Levkovych [10], who found Ukrainian agricultural trade to be predominantly inter-industrial and thereby based on comparative advantages.

Bojnec and Fertő [1] analysed the integration of agricultural trade between South-East Europe and EU15 and found that in spite of the predominantly inter-industry nature of trade in this respect, the proportion of vertical intra-industry trade in total agricultural trade is increasing, generating a change in resource allocations between agricultural sectors. Moreover, the authors showed that agricultural trade of different quality and price products between the two regions is a consequence of trade liberalisation, economic growth and the transition in agricultural sectors. Fertő [5, 6] and Fertő

and Hubbard [4] have dealt with intra-industry trade of Hungarian agricultural products traded with the EU and calculations were made for 255 product groups during the period 1992-1998. The clear result is that agricultural trade between Hungary and EU15 in the period analysed was mainly inter-industry in nature, though the intra-industrial part was dominated by vertical trade.

Although product differentiation and intra-industry trade have become important in the field of agriculture, research on its measurement and determination of influencing factors has been relatively poor [13]. Therefore, the aim of this article is to contribute to the empirical literature by analysing the effects of EU accession on intra-industry trade of Hungarian agricultural products traded with the European Union.

Data used in the article are based on the OECD trade database using SITC system, four digit breakdown. Agricultural trade is defined as trade in SITC 0 (food and live animals), resulting in 132 product groups using the four digit breakdown. As to agricultural industry, a unit of agricultural products with similar characteristics is meant. The article works with trade data between 2000-2007, which period is divided into two sub-periods (2000-2003, 2004-2007) in order to assess effects of EU accession clearly. In this context, the EU is defined as the member states of the EU15. Data for Luxemburg are missing due to lack of trade and thereby interpretation of indices.

MATERIALS AND METHODS

The classical method of Grubel-Lloyd [8] is used in order to measure intra-industry trade. This most widely used indicator is calculated as follows:

$$G_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \tag{1}$$

where Xi and Mi are the value of exports and imports of product category i in a particular country. The GL index varies between 0 (complete inter-industry trade) and 1 (complete intra-industry trade). The value of the index is considered to be the extent of IIT trade, while 1-GL index is the extent of inter-industry trade. The index can be aggregated to level of countries and industries as follows:

$$G = \sum_{i=1}^{n} G_i w_i \quad \text{where}$$

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$$w_i = \frac{(X_i + M_i)}{\sum_{i=1}^{n}(X_i + M_i)}$$

(2)

where wi comes from the share of industry i in total trade.

After 1975, several authors criticised the GL-index, for five main reasons [3]: (1) aggregate or sectoral bias, (2) trade imbalance problem, (3) geographical bias, (4) inappropriateness to separate horizontal and vertical intra-industry trade (HIIT and VIIT) and (5) inappropriateness for treating dynamics.

The basis for the first bias is the question which products pertain to which industries, that is in what detail product nomenclature is used? Fewer the number of industries are (larger the number of products aggregated into one industry), larger the amount of IIT trade in total trade will be. In other words, the less detailed the nomenclature is, the more we talk about intra-industrial trade. Sceptics of IIT literature suggested that almost all measured IIT is coming from bad categorical aggregation of international databases [5].

The trade imbalance problem arises as GL index does not allow any imbalances of total trade, though majority of countries have a surplus or deficit of trade flows. In this case, GL index will be biased downwards and the true extent of IIT will be underestimated [5]

Geographical bias arises when different countries are treated together as a basis for IIT analyzes. The problem is that by closing up two or more countries into one, original trade flows will be distorted and false conclusions can be drawn [3].

The fourth problem of the GL index is given by the joint treatment of horizontal and vertical trade. Literature suggests several possibilities for solving this problem. Among these solutions, the most widespread one is based on unit values developed by Abd-el Rahman [5].

The fifth problem is the inappropriateness of treating dynamics, which the concept of marginal intra-industry trade seeks to solve. According to the new approach, there is a need to create and apply such an index, which is able to measure, contrary to static GL-type indices, changes in intra-industry trade between two time periods [3].

Detailed discussion of these problems would distract from the basic aim of this paper; a comprehensive review can be found in [5].

RESULTS AND DISCUSSION

Before starting to analyse our results, the first problem of the GL-index should be kept in mind: the size of the GL index depends on the level of data disaggregation. In other words, had we downloaded less disaggregated data, the GL index would have been higher. That is why four digit breakdown data were selected as ones available at the greatest disaggregation for all products analysed and then aggregated by the author for presentation purposes.

Results are presented first by country (Table 1) then by product group (Table 2). GL indices showed ordinary values with some exceptions for the whole period, though in the majority of cases it was below 0.5, indicating that Hungarian-EU15 agricultural trade runs basically between industries (Table 1). The highest values pertain to France and the lowest to Greece. Moreover, in most cases, GL-index shows higher values at the EU15 level than at country level, which is in line with previous expectations.

The value of the GL-index is decreasing in time at the EU15 level, though country level results vary significantly. An obvious decline in values of the GL-index is observable in a group of countries (Belgium, France, Germany, Greece, Italy, the Netherlands and Spain) in the period analysed, while in other countries (Austria, Denmark, Finland, Ireland, Portugal, Sweden and United Kingdom) a clear increase can be seen. Agricultural trade has become more and more intra-industry in nature in these latter countries, while in the former, the balance shifted towards inter-industry trade. In other words, this means that for the first group of countries trade in agricultural products created by different industries gave place to that created by a single industry, referring to the increase in specialisation (for the other group of countries, exactly the opposite is true). The largest increase is observable in Austria, while the biggest decrease was in Italy from 2000-2003 to 2004-2007. The values of standard deviations are low for all countries (<0.2), indicating that the structure of intra-industry trade was stable in the period. Huge differences between countries indicate that the EU15 should not be treated as homogenous with respect to agricultural trade with Hungary, as previous research has already shown [4].

GL-indices were also calculated by product group and the results are summarised in Table 2. The values of GL-indices by product groups are somewhat lower than by country but show bigger changes. The values of meat (01), fruits-vegetables (05) and other products (09) almost doubled, while that of milk products (02), fish (03) and animal feed (08) significantly decreased from 2000-2003 to 2004-2007. Increasing GL values mean that the trade of specific product groups became more intra-industrial, while decreasing values mean that it became more inter-industrial in nature. In most cases, growth in intra-industry trade occurred in traditional export products, while decline occurred in traditional import products.

Table 1: Grubel-Lloyd indices of Hungarian agricultural trade with EU15 before and after EU accession, by countries, 2000-2007

1. táblázat

Grubel-Lloyd indexek az EU15-el folytatott magyar agrárkereskedelemben az Európai Uniós csatlakozás előtt és után, országonként, 2000-2007

Country (Ország)	2000-2003	2004-2007
Austria (Ausztria)	0.36	0.48
Belgium	0.34	0.38
Denmark (Dánia)	0.41	0.50
Finland (Finnország)	0.04	0.06
France (Franciaország)	0.65	0.55
Germany (Németország)	0.53	0.47
Greece (Görögország)	0.04	0.02
Ireland (Írország)	0.36	0.21
Italy (Olaszország)	0.39	0.26
Netherlands (Hollandia)	0.29	0.24
Portugal (Portugália)	0.15	0.24
Spain (Spanyolország)	0.48	0.37
Sweden (Svédország)	0.40	0.37
United Kingdom (Egyesült Királyság)	0.42	0.48
EU15	0.54	0.49

Source: Own calculations based on SITC3 four digit level data of OECD ([11])
Forrás: Saját számítások SITC3 szerinti negyedik szintű bontásban ([11])

Table 2: Grubel-Lloyd indices of Hungarian agricultural trade with EU15 before and after EU accession, by product groups, 2000-2007

2. táblázat Grubel-Lloyd indexek az EU15-el folytatott magyar agrárkereskedelemben az Európai Uniós csatlakozás előtt és után, termékcsoportonként, 2000-2007

Product (Termék)	2000-2003	2004-2007
00: Live animals (Élő állat)	0.10	0.15
01: Meat and meat preparations (Hús és húskészítmény)	0.23	0.43
02: Dairy products and birds' eggs (Tejtermék és tojás)	0.58	0.49
03: Fish, crustaceans, molluscs (Hal, rák, puhatestű állat)	0.29	0.14
04: Cereals and cereal preparations (Gabona és gabonakészítmény)	0.23	0.19
05: Vegetables and fruits (Zöldség és gyümölcs)	0.28	0.45
06: Sugar, sugar preparations and honey (Cukor, cukorkészítmény és méz)	0.33	0.36
07: Coffee, tea, cocoa, spices (Kávé, tea, kakaó, fűszerek)	0.41	0.33
08: Feedstuff for animals (Állati takarmány)	0.62	0.43
09: Miscellaneous edible products (Egyéb, táplálkozásra alkalmas termék és készítmény)	0.17	0.34

Source: Own calculations based on SITC3 four digit level data of OECD ([11])
Forrás: Saját számítások SITC3 szerinti negyedik szintű bontásban ([11])

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This refers to the increase in specialisation of products devoted to export. The values of standard deviations are even lower compared to those by country, suggesting that results are stable for the whole period.

Results presented above indicate some important changes in Hungarian agricultural trade after EU accession. First, it turns out that trade of products created by different industries is replaced by that of created by the same industry, referring to the increase in specialisation. Second, trade of products created by a single industry increased after accession, implying the change in product quality. The latter statement comes from the fact that a single product of an industry is exchanged to another single product of the same industry (e.g. export and import of different meat products at the same time), which is only possible if products are of different quality. Third, different product quality implies different prices as higher (lower) prices are associated with higher (lower) quality in most cases [5]. In other words, Hungarian agricultural trade after accession became composed of products with different prices and quality created by the same industry.

The main reason for these changes is that EU membership has made Hungary part of a large, rather competitive market. On the one hand, this market offers tremendous opportunities for agricultural sectors; on the other hand, Hungary is faced with significantly increased competition in her domestic markets. This situation is due to the rapid emergence of vertically coordinated food chains including hypermarkets, supermarkets and multinational agro-processing companies with regional procurement systems, thus creating new and much more competitive conditions both for producers and consumers; the market share of foreign-origin products has increased significantly. The concentrated and Europe-wide procurement systems of the major chains create high requirements for suppliers and impose strong price pressures as well.

CONCLUSIONS

The article analysed the effects of EU accession on intra-industry trade in agricultural products between Hungary and EU15. By using the Grubel-Lloyd index, our results show that agricultural trade between Hungary and EU15 in 2000-2007 was dominantly inter-industry in nature but it becomes more and more intra-industrial. This means that trade of products created by different industries is replaced by that created by the same industry, referring to the increase in specialisation. Differences between countries indicate that EU15 should not be treated as homogenous with respect to agricultural trade with Hungary. Values of GL-indices by product groups are lower than by countries, though showing bigger

changes.

On the whole, results suggest three important effects of changes in Hungarian agricultural trade after EU accession: (a) increase in specialisation, (b) changing product quality and (c) changing product prices. The main reason for these changes is that EU membership has made Hungary part of a large, rather competitive market where Hungary is faced with a significantly increased competition not experienced before.

ACKNOWLEDGEMENTS

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