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## Changes in the Czech agrarian foreign trade competitiveness – different groups of partners' specifics

LUBOS SMUTKA\*, MANSOOR MAITAH, MIROSLAV SVATOS

*Department of Economics, Faculty of Economics and Management, Czech University of Life Sciences Prague, Prague, Czech Republic*

\*Corresponding author: [smutka@pef.czu.cz](mailto:smutka@pef.czu.cz)

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**Abstract:** The territorial and commodity structure of the Czech agrarian foreign trade underwent significant changes over the last fifteen years. These changes affected not only the structure, but also the value, volume, unit prices and competitiveness. The presented paper provides the basic overview of the individual significant changes. The main goal of the paper is to specify changes in the area of the Czech agrarian foreign trade competitiveness. This competitiveness is analysed not only in relation to global markets, but it is also analysed in relation to different groups of countries. Differences in competitiveness are analysed in relation to the European Union (EU 28), the Commonwealth of Independent Countries, other European countries, the Organisation for Economic Co-operation and Development (OECD) members, and developing countries. In addition, competitiveness is also analysed in two specific dimensions. The agricultural market represents a very specific entity. However, the global merchandise trade is becoming more and more liberalized internationally and the regional agricultural markets are still being affected by a significant protectionism. The individual countries and certain clusters of countries are applying an intensive agricultural market protection. The result of these policies is a distortion of the agricultural trade. This distortion is also affecting the individual countries mutual competitiveness. While one country could be competitive in relation to one partner, in relation to other partner, the competitiveness could be limited. The paper clarifies and analyses the differences that exist in the competitiveness of the Czech agrarian trade in relation to the above mentioned groups of countries. The analysis is conducted utilizing the symmetric revealed comparative advantage index and the Lafay index, the Trade Balance Index and the product mapping. The Czech agrarian trade territorial structure has become more concentrated, the commodity structure became more diversified. Czech trade is quite competitive especially in relation to the European countries, the competitiveness in relation to other territories is limited. The significant weakness of the Czech agrarian trade is its low ability to generate added value.

**Keywords:** agricultural and foodstuff products, agri-food trade, competitiveness, changes, Czech Republic, partners, regional and inter-regional trade, structure, value

The Czech agrarian foreign trade experienced significant changes during the last several years. Only in the period from 2001 through 2015, its export value increased from 49 to 202 billion CZK. The growth of exports even exceeded the growth of imports (from 69 to 222 billion CZK). The share of the negative trade balance in relation to the total agrarian trade turnover value was significantly reduced from 17% to 4.7%. The level of the import by export coverage ratio

also significantly increased from 71% up to cc 91%. During the analysed period, the commodity structure in particular recorded significant changes. Finalized and especially semi-finalized food products increased their share both in the export and also import activities (Pohlová and Mezera 2014). The mentioned trend is related to two factors: the growth of the economic power and also the restructuralization of the Czech foodstuff market (the significant influence of the

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foreign direct investments) (Burianová 2011a). The territorial structure has become more specifically concentrated on the European countries (Burianová and Belová 2012). While in 2001 the share of those two groups of countries in the Czech export was about 83%, respectively 88%, and in 2015 it was more than 91%, respectively 95%. In the case of imports the trends were very similar (2001 – cc 74% respectively 77% and 2015 – cc 85% respectively 85%). The importance of the so-called non-European and especially the “third” countries is diminishing (Burianová 2011a).

The long term orientation especially on the European region is considered to be the weakness of the Czech agrarian trade. Many experts in this case have been speaking about the necessity to diversify the Czech agrarian trade territorial structure (Kancs and Ciaian 2010; Burianová 2011b; Pohlová and Mezera 2014). The effort of Czech exporters and also the government efforts have been in support of the Czech export activities and the Czech agrarian products competitiveness, especially towards developing countries (African and Asian region).

This article analyses the basic transformation trends related to the Czech agrarian foreign trade territorial and commodity structure in the period of 2001 to 2015. Within the mentioned time period, the Czech Republic and other Central European countries significantly changed their trade strategies and policies. In addition, Czech exporters significantly changed their activities (Jámbor 2014; Vožarova et al. 2015). In relation to the specific Czech agrarian foreign trade formation, it is necessary to emphasize several factors significantly affecting/influencing its development and the current state/performance.

When speaking about the importance of the Czech agrarian trade, it is necessary to mention its limited role within the national economy and the total trade performance. However, its value is constantly increasing, its share in the total commodity trade is less than six percent. The Czech agrarian trade represents an extremely specific part of the Czech economy performance (Burianová and Belová 2012). Its character, structure and value were affected in the past by the significant changes related to the Czech agrarian policy in the Czech economy transformation period – especially in the nineties. The character of agrarian trade was affected by the transformation process from the command/central planned economy to market economy. The significant role that was also affecting Czech agrarian trade was played by the collapse of The Council for Mutual Economic Assistance

(COMECON/RVHP). In the nineties, the character of the Czech agrarian trade was significantly influenced by the applied protectionist policy (Lukas 1998). On the other hand, it was also affected by the reduction of the agricultural production volume (because of the transformation processes) and the government effort to encourage cooperation especially in relation to other European countries (Smutka et al. 2015).

The result of the Czech economy restructuralization effort was a continuous liberalization process especially in relation to the European Union countries and the Central European Free Trade Agreement (CEFTA) members. The character of Czech trade was also affected by the Czech World Trade Organization (WTO) accession in 1995. That liberalization process, especially in relation to the EU was not a symmetric one. The Czech agrarian market was reducing its applied protection measures in relation to the EU faster than it was done by the EU countries in relation to the Czech Republic (Lukas 1998; Svatoš et al. 2013).

One of the most important events for the Czech agrarian market was the EU accession. Even before that, since 1993 the Czech Republic was preparing for the membership and the necessity to eliminate almost all barriers protecting the Czech agrarian market both in the relation to the “old” EU and “new” EU members (Clark et al. 2015). The transformation process, especially in the period before the Czech EU accession, was not really a positive one regarding the foreign trade (Presová et al. 2008). Czech agrarian imports recorded a much faster growth rate than the Czech exports. The result was a constantly increasing negative trade balance. The Czech Republic, the same as other Central European countries, also reduced the importance of the non-EU territories and began focusing its trade activities specifically on the EU partners (Kennedy and Sonnier 1997; Lukas 1998; Ferto 2008).

As mentioned above, the most significant event for the Czech agrarian trade was the Czech EU accession in May 2004. The Czech Republic and ten other countries became the EU members and the agrarian trade performance started to be immediately affected by not only the EU Common Trade Policy, but also the Common Agricultural Policy (Csaki and Nash 1999; Fuller et al. 2002; Bašek and Kraus 2009). The period immediately after the accession significantly encouraged not only the export, but also the import performance (Svatoš 2008). During the first years of the Czech EU membership the import value was growing still faster in comparison to the export value development. The

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result was a constantly growing negative trade balance performance until 2011 (the record negative trade balance was reached at about 36 billion CZK). However since then, the situation has significantly improved and the inter-annual growth rate of Czech agrarian exports even exceeded the inter-annual growth rate of imports. The current negative trade balance has reached only 20 billion CZK. The current Czech agrarian trade is standing at a very important crossroad. Even if the process of its territorial and commodity restructuralization has been running for more than two decades, its final character is still not specified. And more significant changes affecting the future value, volume and structure can be expected especially in relation to the possible liberalization processes, e.g. the Transatlantic Trade and Investment Partnership (TTIP), Comprehensive Economic and Trade Agreement (CETA) and Doha Development Agenda.

## DATA AND METHODS

This paper aims to identify the changes which have occurred during the analysed time period from 2001 to 2015. Besides the individual changes, also the individual factors responsible for them are specified. This paper is focused specifically on the period of the Czech EU membership (the monitored time period includes both several years before the accession and also the post- accession development). The territorial structure is analysed both in relation to the EU countries and also in relation to the “third countries” (e.g. the Commonwealth of Independent States (CIS), Economic Co-operation and Development (OECD), European countries without the EU 28, the world and the world without the EU, developing countries).

The commodity structure is analysed through the Harmonized System (HS system dividing the agri-food trade into 24 commodity groups<sup>1</sup>). The mentioned commodity structure system is applied because of the simplicity of interpretation of the results and also because of the data availability.

The paper also specifies the distribution of comparative advantages both in relation to the EU single market and also in relation to the rest of the world. To reach the above mentioned objectives, the paper applies the basic and competitiveness analyses (the Lafay index (LFI) and the Trade Balance Index (TBI)). The results coming from the individual analyses are highlighted through the modified “Product mapping method”, identifying the process of the Czech agrarian foreign trade commodity structure profiling. Data sources for the individual analyses are provided by the Czech Statistical Office.

As it was mentioned before, we applied several different types of indices to measure the level of the Czech agrarian trade competitiveness. The Balassa index (Balassa 1965) estimates the export flows of the Czech Republic and the world in general. Comparative advantage from observed data is named the “revealed” comparative advantage (RCA). In practice, this is a commonly accepted method for analysing the trade data. The Balassa index tries to identify whether a country has a RCA rather than to determine the underlying sources of the comparative advantage. The RCA is based on export performance and the observed trade patterns. It measures a country’s exports of a commodity relative to its total exports.

The index is calculated as follows:

$$RCA = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) = (X_{ij}/X_{nj})/(X_{it}/X_{nt}) \quad (1)$$

<sup>1</sup>HS01 Live animals, HS02 Meat and edible meat offal, HS03 Fish and crustaceans, molluscs and other aquatic invertebrates, HS04 Dairy produce birds’ eggs natural honey edible products of animal origin, not elsewhere specified or included, HS05 Products of animal origin, not elsewhere specified or included, HS06 Live trees and other plants bulbs, roots and the like cut flowers and ornamental foliage, HS07 Edible vegetables and certain roots and tubers, HS08 Edible fruit and nuts peel of citrus fruit or melons, HS09 Coffee, tea, mate and spices, HS10 Cereals, HS11 Products of the milling industry malt starches inulin wheat gluten, HS12 Oil seeds and oleaginous fruits miscellaneous grains, seeds and fruit industrial or medicinal plants and fodder, HS13 Lac gums, resins and other vegetable saps and extracts, HS14 Vegetable plaiting materials vegetable products not elsewhere specified or included, HS15 Animal or vegetable fats and oils and their cleavage products prepared edible fats animal or vegetable waxes, HS16 Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates, HS17 Sugars and sugar confectionery, HS18 Cocoa and cocoa preparations, HS19 Preparations of cereals, flour, starch or milk pastrycooks’ products, HS20 Preparations of vegetables, fruit, nuts or other parts of plants, HS21 Miscellaneous edible preparations, HS22 Beverages, spirits and vinegar, HS23 Residues and waste from the food industries prepared animal fodder, HS24 Tobacco and manufactured tobacco substitutes.

where  $X$  represents exports,  $i$  is a country,  $j$  is a commodity and  $n$  is a set of countries,  $t$  is a set of commodities. The Balassa index (Balassa 1977, 1991) varies between 0 and infinity, with the values between 0 and 1 indicating that the country does not have a comparative advantage and the values between 1 and +infinity signalling that the country has a comparative advantage in that sector.

The RCA has received criticism for its alleged incomparability and inconsistency. The shortcomings of the Balassa index are described by many economists. Here, we will not dwell on this issue. We will try to circumvent the shortcomings of the index by using two additional indices, each of which adequately offset the weaknesses of the RCA and allows us to conduct a comprehensive study of the above-mentioned issues.

One of these indices is the Vollrath index. Evaluating the shortcomings of the Balassa index, the Vollrath index (Vollrath 1991) allows us to assess the trade flows not only in the terms of export values, while also taking into account the values of imports.

Furthermore, in contrast to the Balassa index, the Vollrath index is symmetric, with positive values indicating a revealed comparative advantage and negative values revealed the comparative disadvantage (Vollrath 1991).

The revealed competitiveness is calculated as the difference between relative export advantage (RXA), which is the equivalent to the original Balassa index, and its counterpart, the relative import advantage (RMA).

$$RMA = (M_{ij}/M_{it})/(M_{nj}/M_{nt}) \quad (2)$$

$$RXA = RCA = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) \quad (3)$$

where  $M$  accounts for imports,  $X$  represents exports,  $i$  is a country,  $j$  is a commodity and  $n$  is a set of countries,  $t$  is a set of commodities.

The measure of the Vollrath index is the revealed competitiveness (RC), expressed as:

$$RC = \ln RXA - \ln RMA \quad (4)$$

The advantage of expressing these two latter indices in the logarithmic form is that they become symmetric through the origin. Positive values of the Vollrath's three measures, the RTA,  $\ln RXA$  and RC, reveal a comparative/competitive advantage (Ferto and Hubbard 2003).

The next index used in this paper is the Lafay index (Lafay 1992) (LFI). Using this index, we consider the difference between each item's normalized trade bal-

ance and the overall normalized trade balance. Unlike the above indexes, the LFI does not take into account the world variables. Using the LFI, we can focus on the bilateral trade relations among the countries and regions. Moreover, this index is a more reliable comparison of sectors within a country over time. The LFI helps us to understand how the comparative advantages develop over time and to compare the strength of comparative advantage of the individual products and product groups, for the individual regions and countries. For a given country  $i$ , and for any given product  $j$ , the LFI is defined as:

$$LFI_j^i = 100 \times \left( \frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^N (x_j^i - m_j^i)}{\sum_{j=1}^N (x_j^i + m_j^i)} \right) \times \frac{x_j^i + m_j^i}{\sum_{j=1}^N (x_j^i + m_j^i)} \quad (5)$$

where  $x_j^i$  and  $m_j^i$  are exports and imports of product  $j$  of country  $i$ , towards and from the particular region or the rest of the world, respectively, and  $N$  is the number of items.

Positive values of the LFI indicate the existence of comparative advantages for the given item; the larger the value, the higher the degree of specialization (Zaghini 2003).

The next part of the analysis presented in this paper was conducted using the analytical tool called the "products mapping". This tool enables the user to assess the leading exported products from two different points of view, i.e. the domestic trade-balance and the international competitiveness (Widodo 2009).

The Figure 1 represents a matrix for the distribution of the entire set of the exported products into 4 groups according to the two selected indicators as follows.

The revealed symmetric comparative advantage (RSCA) by Dalum et al. (1998) and Laursen (1998) is the indicator of comparative advantage and the TBI by Lafay (1992) is the indicator of export-import activities. The RSCA index is a simple decreasing monotonic transformation of the RCA or the Balassa index. The RSCA index is formulated as follows:

$$RSCA = (RCA_{it} - 1)/(RCA_{ij} + 1) \quad (6)$$

The values of the  $RSCA_{ij}$  index can vary from minus one to one. The  $RSCA_{ij}$  greater than zero implies that country  $i$  has a comparative advantage in a group of products  $j$ . In contrast,  $RSCA_{ij}$  less than zero implies that country  $i$  has a comparative disadvantage in a group of products  $j$  (Dalum et al. 1998).

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Revealed symmetric comparative advantage (RSCA)	RSCA > 0	Group B: Comparative advantage net-importer (RSCA > 0 and TBI < 0)	Group A: Comparative advantage net-exporter (RSCA > 0 and TBI > 0)
	RSCA < 0	Group D: Comparative disadvantage net-importer (RSCA < 0 and TBI < 0)	Group C: Comparative disadvantage net-exporter (RSCA < 0 and TBI > 0)
		TBI < 0	TBI > 0
Trade Balance Index (TBI)			

Figure 1. Product mapping

Source: Widodo (2009)

The TBI is employed to analyse whether a country has specialization in export (as net-exporter) or in import (as net-importer) for a specific group of products. The TBI is simply formulated as follows:

$$TBI_{ij} = (x_{ij} - m_{ij}) / (x_{ij} + m_{ij}) \tag{7}$$

where  $TBI_{ij}$  denotes the Trade Balance Index of country  $i$  for product  $j$ ;  $x_{ij}$  and  $m_{ij}$  represent exports and imports of group of products  $j$  by country  $i$ , respectively (Lafay 1992).

A country is referred to as a “net-importer” in a specific group of products if the value of the TBI is negative, and as a “net-exporter”, if the value of the TBI is positive (Widodo 2009)(Figure 1).

Because the original approach does not take into consideration the real intensity/influence of imports (see the RCA structure), we decided to slightly modify the original “product mapping approach” and we replaced the RSCA index with the LFI index to get more precise data about the real competitiveness of the Czech agrarian trade commodity structure. Figure 2 represents the modified matrix for the distribution of the entire set of exported products into 4 groups according to the two selected indicators.

The original RSCA index is replaced by the Lafay index (LFI). The advantage of that index is its ability to take into consideration only those transactions which are really related to the individual countries’ trade performance (in this case, to the Czech Republic

trade performance). The TBI index is applied in a non-changed form. The advantage of the above applied modification is its ability to more accurately divide the products according to their real trade performance into the above specified four quadrants. While the first approach provides a possibility to identify the comparative advantage on a general level, the second approach provides the possibility to specify the comparative advantages on the base of the real bilateral trade performance (in relation to the selected group of partners).

## RESULTS AND DISCUSSION

When looking at the territorial structure of the Czech agricultural trade, it is apparent that it is more and more focused specifically on the EU-countries. The EU share in the Czech agricultural trade reaches about 90% in the long-term. The Czech agricultural exports and also imports are based on a relatively small number of commodity aggregations, which represent a substantial part of the realized trade. However, even if the value of imports is constantly increasing, the level of self-sufficiency is not decreasing. Czech exports are able to compensate for the growth of imports – especially through their increasing added value. The key aspect of the Czech agrarian trade is its competitiveness. The Czech agrarian sector still has not finished the process of

Lafay index (LFI)	LFI > 0	Group B: Comparative advantage net-importer (LFI > 0 and TBI < 0)	Group A: Comparative advantage net-exporter (LFI > 0 and TBI > 0)
	LFI < 0	Group D: Comparative disadvantage net-importer (LFI < 0 and TBI < 0)	Group C: Comparative disadvantage net-exporter (LFI < 0 and TBI > 0)
Czech agrarian foreign trade commodity structure		TBI < 0	TBI > 0
Trade Balance Index (TBI)			

Figure 2. Modified product mapping scheme

Source: Own modification and processing (2016)

Table 1. Czech agrarian foreign trade value development between 2001 and 2015 (thousand CZK)

2001	EU 28	European countries without EU	OECD	CIS	World without EU 28	Developing economies	World total
Export	41 116 307	2 609 998	39 951 650	1 578 945	8 295 196	9 459 853	49 411 503
Import	51 181 539	1 789 837	55 267 004	281 304	18 043 402	13 957 937	69 224 941
Balance	-10 065 232	820 161	-15 315 354	1 297 641	-9 748 206	-4 498 084	-19 813 438
Balance/export (%)	-24.48	31.42	-38.33	82.18	-117.52	-47.55	-40.10
2015	EU 28	European countries without EU 28	OECD	CIS	World without EU 28	Developing economies	World total
Export	185 235 908	7 023 111	181 291 061	3 746 814	16 831 159	20 776 006	202 067 067
Import	188 674 925	7 011 153	195 918 421	2 005 897	32 536 791	25 293 295	221 211 716
Balance	-3 439 017	11 958	-14 627 360	1 740 917	-15 705 632	-4 517 289	-19 144 649
Balance/export (%)	-1.86	0.17	-8.07	46.46	-93.31	-21.74	-9.47
Export basic index 2015/2001	4.51	2.69	4.54	2.37	2.03	2.20	4.09
Import basic index 2015/2001	3.69	3.92	3.54	7.13	1.80	1.81	3.20

CIS – Commonwealth of Independent States; OECD – Organisation for Economic Co-operation and Development

Source: CZSO, own calculations (2016)

its restructuring and its commodity structure profile is constantly changing.

The value of the Czech agrarian trade is typical especially by its specific character in relation to the individual partners/partner territories. As it has been already mentioned, the Czech agrarian trade is heavily focused on the European territory.

If we compare the period between 2001 and 2015, it is possible to see a significant growth of the export and import value in relation to all main territories representing the main Czech agrarian trade partners (Table 1).

In addition, the Czech agrarian export growth rate exceeded the import growth rate especially in relation to the EU 28, the OECD members and also in relation to the non-European countries. The only regions increasing their imports to the Czech Republic faster than the Czech Republic exported to them are the European countries without the EU and the CIS members.

The Czech Republic also significantly reduced its negative trade balance share both in relation to the total agrarian trade turnover and the export value. In this case, the situation improved especially in relation to the EU 28, other European countries and the OECD members.

During the last 15 years, the Czech agrarian trade became extremely concentrated. The concentration

is not related only to territorial structure (focused especially on the European region), but it is also related to its commodity structure.

The specific feature of the Czech agrarian foreign trade performance is its competitiveness. The Czech Republic is an industrial country and its comparative advantages in particular, exist outside its agricultural sector. The missing comparative advantages related to the Czech agrarian trade are illustrated in Table 2.

All indices proved the existence of the Czech agrarian trade comparative disadvantages both in relation to the EU 28 and also in relation to the third countries. As the total, the Czech agrarian trade does not keep any significant comparative advantages in relation to almost any territory. However, on the other hand, the Czech agrarian trade is probably able to be competitive, especially because of its constantly improving trade performance.

The existence of comparative advantages is proved through the application of the LFI and RSCA indices taking into consideration only the agricultural trade. (Other sectors are not included into the comparative advantages calculation. Comparative advantages are analysed at the level of the individual trade items only in relation to the total agricultural trade). The Figure 3 provides an overview of the individual Czech agrarian trade items competitiveness. Figure 3 a,b provides

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Table 2. Czech agrarian trade comparative advantages as a part of the total Czech commodity trade performance in relation to the selected partners

	CR versus world		CR versus EU		CR versus third countries	
	2001	2015	2001	2015	2001	2015
RCA	0.506113398	0.62702	0.37633	0.477677	0.785143	0.329047
RMA	0.669959559	0.790354	0.530638	0.695084	0.738524	0.382834
RC	-0.16384616	-0.16333	-0.15431	-0.21741	0.046619	-0.05379

RCA – revealed comparative advantage; RMA – relative import advantage; RC – revealed competitiveness; CR – Czech Republic

Source: Own processing (2016)

an overview of utilizing a classical product mapping approach, and Figure 3 c,d shows a different overview through the modified product mapping approach.

The results provided by the modified approach offer a more accurate overview of the Czech agrarian exports comparative advantages distribution (comparative advantages are analysed only at the bilateral level e.g. between the Czech Republic and each of its individual trade partner realizing trade activity in relation to the Czech Republic (Tables 3–4). The number of items located in groups B and C is significantly reduced and the whole commodity structure is divided into

two groups: A (having comparative advantages) and D (without comparative advantages). The modified approach is able to specify in more detail, the current level of the Czech agrarian trade competitiveness and competitiveness development.

On the base of both applied approaches, it is evident that the Czech agrarian trade commodity structure has been significantly changing its character. The commodity structure is still looking for its optimal form. It is also possible to see that comparative advantages are especially influenced by the bilateral relations. The Czech Republic is not competitive at the general

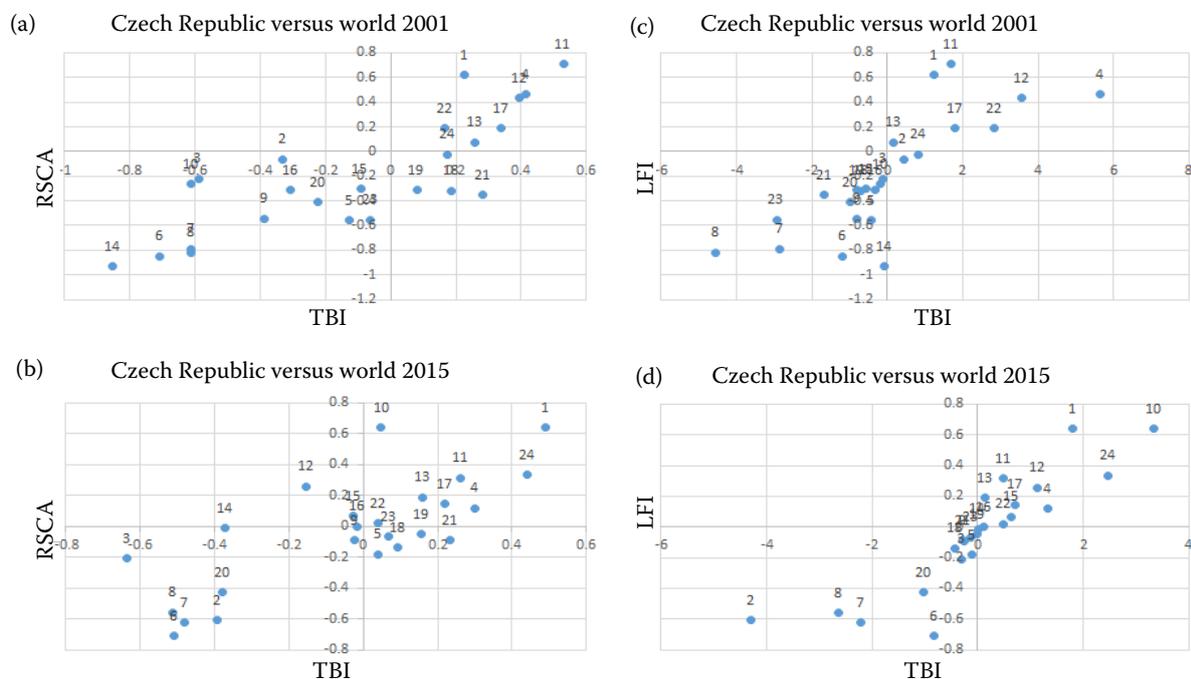


Figure 3. Czech agrarian exports' comparative advantages distribution – traditional and modified product mapping approach

RSCA – Revealed symmetric comparative advantage; TBI – Trade Balance Index

Source: Own processing (2016)

level, but it is able to get comparative advantages at least at the bilateral levels, especially because of its EU membership and also because of the existence of special agreements between the EU and selected partners. On the other hand, there is also a negative feature related to that development. The Czech territorial structure is becoming more and more concentrated – even the share of developing countries in Czech foreign trade is consistently decreasing because of the re-exports from other European countries and the Czech export profile is becoming more and more concentrated.

### Distribution of comparative advantages in relation to the individual groups of countries

The above mentioned analysis provides interesting results related to the Czech agrarian trade comparative advantages distribution in relation to all trade

partners. Even though this analysis seems to have been conducted very accurately, it is necessary to mention one very important weakness of the above mentioned analysis. The main weakness is the fact that the above mentioned calculations do not take in consideration the significant differences existing among the individual regions or groups of countries in relation to their agrarian trade activities. Some countries have been applying a very strict trade policy, protecting their markets, and on the other hand, some countries are very liberal. The Czech Republic as the EU member has been realizing its agrarian trade in different regimes and different conditions in relation to the individual groups of countries. As the EU member, we can operate within the EU market without any restriction, on the other hand, in relation to some other territories, as e.g. the CIS, the Czech agrarian trade is influenced by multilateral agreements signed under the WTO and also signed at the bilateral

Table 3. Czech agrarian trade commodity structure in 2001 (modified product mapping approach) (thousand CZK)

Bilateral trade 2001									
B* – 2001	export	share in export (%)	import	share in import (%)	A* – 2001	export	share in export (%)	import	share in import (%)
					HS04	7 794 864	15.78	2 865 064	4.14
					HS12	5 068 122	10.26	2 010 447	2.90
					HS22	5 659 678	11.45	3 880 835	5.61
					HS17	3 580 745	7.25	2 446 516	3.53
					HS11	1 946 892	3.94	334 032	0.48
					HS01	1 515 211	3.07	357 419	0.52
					HS13	390 892	0.79	334 916	0.48
					Total	25 956 404	52.53	12 229 229	17.67
D* – 2001	export	share in export (%)	import	share in import (%)	C* – 2001	export	share in export (%)	import	share in import (%)
HS14	3 573	0.01	98 220	0.14	HS24	3 261 999	6.60	3 412 720	4.93
HS03	1 128 174	2.28	1 763 713	2.55	HS02	2 252 145	4.56	2 552 128	3.69
HS10	883 010	1.79	1 511 870	2.18	Total	5 514 144	11.16	5 964 848	8.62
HS16	908 119	1.84	1 730 194	2.50					
HS05	280 746	0.57	991 026	1.43					
HS15	1 709 204	3.46	3 206 392	4.63					
HS18	1 894 667	3.83	3 659 625	5.29					
HS19	2 215 190	4.48	4 246 759	6.13					
HS09	583 028	1.18	1 981 835	2.86					
HS20	1 390 608	2.81	3 326 390	4.81					
HS06	157 586	0.32	1 924 638	2.78					
HS21	3 444 528	6.97	7 189 005	10.38					
HS07	570 434	1.15	4 849 316	7.01					
HS23	2 019 321	4.09	7 019 661	10.14					
HS08	752 767	1.52	7 532 220	10.88					
Total	17 940 955	36.31	51 030 864	73.72					

\*For explanation see Figure 2; HS01–HS24 – commodity groups listed in Data and Methods

Source: Own processing (2016)

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level between the individual CIS members and the EU. If we want to understand the real comparative advantages distribution, it is necessary to analyse them in relation to several groups of countries – the EU 28, the EU 15, the EU 13, European countries without the EU and the CIS members, the CIS members, the OECD members and the world without the EU 28, the CIS and the OECD countries.

The Table 5 provides the overview of the Czech agrarian trade commodity structure distribution according to the LFI and TBI index value in relation to the above mentioned groups of countries. The analysis provides not only a comparison of different commodity structures for the individual groups of countries. It also provides a possibility to compare the commodity structure between 2001 and 2015.

The results coming from the individual analyses provide a very interesting overview of the current

and past situation. The significant dynamics of the commodity structure development can be seen both in relation to the LFI and the TBI index. The structure of agrarian trade is still not fully stabilized and the agricultural trade is still looking for its ideal state. The significant changes in the Czech agrarian trade competitiveness between 2001 and 2015 can be seen especially in relation to the EU 28 and other European countries. The share of A group products in the total agrarian exports significantly increased between the years 2001 and 2015. On the other hand, the share of commodities located in group D has significantly reduced. Developing countries did not change their role in Czech agrarian export and import activities according to the TBI and LFI values distribution.

The Czech Republic is heavily focused on trade activities realized in relation to the developed and especially European countries. The majority of Czech

Table 4. Czech agrarian trade commodity structure in 2015 (modified product mapping approach) (thousand CZK)

Bilateral trade 2015									
B* – 2015	export	share in export (%)	import	share in import (%)	A* – 2015	export	share in export (%)	import	share in import (%)
					HS01	9 065 959	4.49	1 994 175	0.90
					HS04	19 165 187	9.48	15 120 135	6.84
					HS10	16 849 631	8.34	3 677 325	1.66
					HS11	3 730 080	1.85	1 942 842	0.88
					HS12	9 931 362	4.91	5 858 834	2.65
					HS13	1 452 177	0.72	989 364	0.45
					HS15	12 623 314	6.25	10 997 655	4.97
					HS17	8 899 942	4.40	6 649 917	3.01
					HS22	16 080 645	7.96	15 496 438	7.01
					HS24	18 401 326	9.11	9 161 899	4.14
					Total	116 199 623	57.51	71 888 584	32.50
D* – 2015	export	share in export (%)	import	share in import (%)	C* – 2015	export	share in export (%)	import	share in import (%)
HS02	6 323 092	3.13	26 018 254	11.76	HS14	97 969	0.05	100 446	0.05
HS03	3 127 611	1.55	4 771 668	2.16	HS16	5 599 773	2.77	5 608 231	2.54
HS05	1 452 582	0.72	2 093 060	0.95					
HS06	758 430	0.38	4 455 031	2.01					
HS07	3 032 620	1.50	13 141 856	5.94					
HS08	4 790 506	2.37	16 939 155	7.66					
HS09	11 325 160	5.60	13 600 247	6.15					
HS18	8 512 470	4.21	11 267 243	5.09					
HS19	12 202 108	6.04	13 454 994	6.08					
HS20	3 300 184	1.63	8 202 001	3.71					
HS21	13 170 766	6.52	15 719 072	7.11					
HS23	12 174 173	6.02	13 951 874	6.31					
Total	80 169 702	39.67	143 614 455	64.92	Total	5 697 742	2.82	5 708 677	2.58

\*For explanation see Figure 2; HS01–HS24 – commodity groups listed in Data and Methods

Source: Own processing (2016)

Table 5. Czech agrarian trade value commodity structure – modified product mapping approach (2001)

	A*		B*		C*		D*		Total	
	export	import	export	import	export	import	export	import	export	import
<b>Value 2001 (thousand CZK)</b>										
EU 28	22 939 661	12 642 461			2 141 003	2 231 194	16 035 643	36 307 884	41 116 307	51 181 539
Europe without EU 28 and CIS	1 946 351	285 595	353 362	326 330			310 285	1 177 912	2 609 998	1 789 837
CIS	1 365 934	94 368	78 159	19 257			134 852	167 679	1 578 945	281 304
OECD	23 054 906	14 723 659			2 763 870	3 480 586	14 132 874	37 062 759	39 951 650	55 267 004
Developing countries	7 349 411	1 134 133					2 110 442	12 823 804	9 459 853	13 957 937
World without EU 28	6 381 223	831 293			877 089	1 237 548	1 036 884	15 974 561	8 295 196	18 043 402
World	25 956 404	12 229 229			5 514 144	5 964 848	17 940 955	51 030 864	49 411 503	69 224 941
<b>Value 2015 (thousand CZK)</b>										
EU 28	123 993 915	82 431 076					61 241 993	106 243 849	185 235 908	188 674 925
Europe without EU 28 and CIS	5 932 935	1 680 098					1 090 176	5 331 055	7 023 111	7 011 153
CIS	3 167 901	482 564	502 201	350 037			76 712	1 173 296	3 746 814	2 005 897
OECD	109 293 301	69 817 397			10 326 779	10 941 609	61 670 981	115 159 415	181 291 061	195 918 421
Developing countries	15 613 345	6 946 664			498 328	509 617	4 664 333	17 837 014	20 776 006	25 293 295
World without EU 28	10 892 496	3 648 871			3 781 490	4 438 886	2 157 173	24 449 034	16 831 159	32 536 791
World	116 199 623	71 888 584	5 697 742	5 708 677			80 169 702	143 614 455	202 067 067	221 211 716

\*For explanation see Figure 2; CIS – Commonwealth of Independent States; EU – European Union; OECD – Organisation for Economic Co-operation and Development

Source: Own processing (2016)

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agrarian trade value is realized on the base of a proved comparative advantage in relation to the individual groups of partners (almost 58% of the total exports). On the other hand, a significant part of exports is realized under the group D. Those exports do not have comparative advantages (approx. 40% of the total agrarian exports). The explanation of this trend can be explained through a deeper territorial structure analyses and also through the traded products added value and unit prices. A deeper territorial structure analysis realized country by country could specifically identify the Czech agrarian trade competitiveness in relation to the individual trade partners. The analysis based on the whole set of countries is only able to identify the prevalence of trends (the existence of comparative advantages or the absence of comparative advantages), but it does not provide an exact overview for every single partner. The other reason of Czech competitiveness is a much lower unit price (2015) of Czech exports (the average value of export unit price reached 10.3 CZK/kg) in comparison to imports (the average value of import unit price reached 28.5 CZK/kg). This situation presents a long-term weakness of the Czech agrarian trade, e.g. in 2001, the average export, respectively import unit price reached 16 CZK/kg, respectively 22 CZK/kg. The competitiveness of Czech exports is based on a constantly decreasing unit price value and the export price/import price unit ratio. Another important stimulus supporting the Czech agrarian trade, especially during the last couple of years, is the significant effort of the Czech Central Bank to keep the exchange rate at a low level (approx. 27 CZK/EUR).

The majority of Czech agrarian trade activities is realized in relation to the developed countries (the OECD members). The specific role within that group of countries is kept by the EU 28 members. Czech agrarian exports and imports to these countries increased during the analysed time by 353%, respectively 254%. The commodity structure of the Czech agrarian trade with them recorded significant changes during the analysed time period. The share of the individual groups of agrarian trade items recorded the following changes: Group A increased from approx. 40% to approx. 48%, groups B and C experienced only a fractional change (from 6.6% to 5.6%) and the share of group D in the total agrarian trade performance was reduced from approx. 54% to 47%.

Regarding the EU 28 countries, they are the main trade partners of the Czech Republic (their share in the total Czech agrarian trade within the analysed time

period was approx. 78%, respectively 88%). During the analysed time period, the EU trade experienced a significant restructuring. The value of exports and imports increased by approx. 350%, respectively approx. 268%. The share of group A transactions in the total agrarian trade with these countries increased from 38.55% to 55.21%. The share of groups B and C was reduced from approx. 4.74% to 0%, and the share of group D was reduced from 56.7% to 44.8%. The Czech exports to the EU 28 became, during the analysed period, more focused on the competitive items.

Developing countries (also transitional or emerging economies) represent only a minor share of the Czech agrarian trade – approx. 11%. During the analysed time period, the share of those countries was significantly reduced (in 2001, it was cc 20%). Despite a significant share reduction, the Czech agrarian exports and imports realized in relation to developing countries a significant absolute growth by approx. 120%, respectively approx. 80%. The growth rate was significantly lower in comparison to the OECD, respectively the EU 28 members. The commodity structure (according to the TBI and LFI) recorded the following changes during the analysed time period: The share of group A increased from 36% to 49%, the share of groups B and C are extremely low at only approx. 2.2% and the share of group D recorded a significant reduction from 64% to 49%.

## CONCLUSION

On the base of the results coming from the applied approaches, it is possible to see that the development during the last fifteen years has affected the level of Czech agrarian trade concentration. While the territorial structure has become even more concentrated, the commodity structure has become more diversified. While in 2001 the share of the TOP5 and TOP10 commodity items in the total agrarian exports reached 52%, respectively 76%, in 2015 it was 41%, respectively 70%. The export commodity structure was especially based on the set of commodities that have comparative advantages – especially at the bilateral level. While the Czech trade is quite competitive in relation to the European countries (the EU 28, the CIS and the rest of Europe), the competitiveness in relation to other territories (especially the developing countries and the non-European OECD members) is limited. The modified product mapping approach proved that the process of the Czech agrarian trade re-structuralization

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in relation to the traditional partners (especially the European ones) is still running and it is close to its final state. In relation to other partners, the trade profile is still developing and the Czech Republic is very far from the final state of forming the commodity structure. There are still too many items exported under group D.

A significant weakness of the Czech agrarian trade is its insufficient ability to generate added value. Czech agrarian trade is still growing, especially through the constant volume growth and through the export unit price. While the value of the agrarian exports and imports increased 4.1 times, the respectively 3.2 times, the volume of Czech agrarian trade, especially exports, increased more than 6.35 times. The export volume is growing much faster in comparison to the import volume (2.5 times). During the monitored time period (2001–2015), the volume of Czech exports increased by 16.5 million tonnes, while the import volume increased by 4.6 million tonnes. The result was the significant disproportion between the Czech agrarian trade export and import unit price. While in 2001 the export and import unit prices reached 16.01 CZK/kg, respectively 22.25 CZK/kg, in 2015 it was about 10.31 CZK/kg, respectively 28.55 CZK/kg. The negative results are especially influenced by the high portion of unprocessed water and wheat in the Czech agrarian export. If we exclude those two groups of items from Czech trade performance, the difference between the Czech export and import prices is marginal – 28.5 CZK/kg vs. 30.3 CZK/kg. The Czech agrarian exports realized under the group A (positive values of the LFI and TBI) are suffering because of the constantly increasing imports. While the share in 2001 under the group A realised only 17% of the total imports, in 2015 it was already approx. 33%. On the other hand, the share of the export values realized under the group A within the same period increased only from approx. 52.5% to 57.5%.

An important question related to the current situation and especially the future of Czech agrarian trade profile is its competitiveness. The combination of especially the RCA, TBI and LFI analyses proved the existence of comparative advantages in relation to the following of aggregations: (at the level of bilateral agreements): Cereals, Live animals, Oil seeds, Tobacco products, Dairy products, Sugar, Vegetable oils, saps and plaiting materials, Milling products, Beverages and alcohol. In relation to the rest of the world (without the EU 28 internal trade), the Czech agrarian trade is competitive especially in relation

to the following commodity groups: Live animals, Dairy products, Sugar, Beverages and alcohol, Oil seeds, Preparation of cereals, Milling products, Cocoa preparations, Vegetable saps and Tobacco products.

The Czech agrarian trade profile is still not fixed. It is possible to expect significant changes in the commodity structure profile and also in its volume and value performance. The EU market is rapidly changing not only because of the internal factors, but also because of the changes in the external environment. Those changes represent not only threats, but also opportunities for Czech farmers and food producers to realize their production, especially in relation to the fast growing developing regions.

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