

ENTRY INTO THE COMMON MARKET OF THE EUROPEAN UNION IN TERMS OF CZECH REPUBLIC'S FOREIGN TRADE WITH DAIRY PRODUCTS

Ivo Zdráhal¹, Věra Bečvářová¹

¹Department of Regional and Business Economics, Faculty of Regional development and International Studies, Mendel University in Brno, Zemědělská 1, 613 00 Brno, Czech Republic

Abstract

ZDRÁHAL IVO, BEČVÁŘOVÁ VĚRA. 2018. Entry Into the Common Market of the European Union in Terms of Czech Republic's Foreign Trade With Dairy Products. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 66(2): 605–616.

The aim of the paper is to evaluate the development of the Czech foreign trade in milk and milk products and specify the typical features and consequences within its territorial and commodity structure using a specific system of indicators intended to show a relevant image on the topic. The analysis covers the period between 1999 and 2015 and are interpreted in the context of changes of the business environment that have occurred in the last two decades, particularly in relation to the Czech Republic's entry into the European Union. Throughout the studied period, the Czech Republic revealed a positive balance of trade in milk and dairy products, as well as favourable values of TC index (value of coverage of import by export). The dynamics of the territorial structure of export and import is embodied in the overall trade dynamics between the Czech Republic and countries of EU-28. The Czech Republic's entry into the EU common market, however, led to a change in the trading milk product structure. As a negative is regarded the fact that the structure of Czech export to the EU countries has changed and that is mainly concentrated on basic raw milk or dairy products of the first phase of processing with relatively low added value.

Keywords: milk, dairy products, agri-food trade, EU enlargement, common market, competitiveness, Czech Republic, European Union

INTRODUCTION

Sectors of milk production and processing play an important role in the development of the agrarian sector and global agribusiness in general. Particularly within the European Union, this sector is in addition to basic production features highly valued for its role in the practical implementation of the philosophy of multifunctional agriculture, i.e. in terms of its contribution to environmental and social field (Bečvářová, 2011; Bečvářová and Zdráhal, 2013).

As research results show, (Bečvářová *et al.*, 2008; Náglová, *et al.*, 2016; Zdráhal, *et al.*, 2015) this is one

of the reasons why cow's milk belonged for a long time to supported and subsequently regulated commodities. In this context, a relatively wide range of policy forms and tools have been used within Common Agricultural Policy (CAP), both with direct and indirect effects on the volume of production and production-cost relations of this production.

Nonetheless, within the proclaimed single framework of the Common Agricultural Policy, size and level of production, and consequently also involvement in various stages of commodity chain, production and processing of milk vary considerably between individual EU member

states. Among the largest producers of milk and dairy products are Germany, France, Great Britain, and from the group of new member states Poland. Besides these major producers, important positions on the markets are also occupied by some smaller countries, particularly the Netherlands, Ireland and Denmark. These countries experience outstanding long-term performance and have the ability to finalize the basic raw material into products with higher added value and thus they can successfully compete in the context of a wider economic space. They actively respond to the fact that alongside with local factors, overall changes in the global agribusiness environment and the ability of adequate response to the development on the world market, became an increasingly important precondition for a successful development.

Milk and dairy products historically generate a significant proportion of the output of the agri-food sector of the Czech Republic. Over the last two decades, however, production and the entire milk commodity chain have undergone several changes (Čechura and Malá, 2014; Čechura *et al.*, 2015; Dudová and Bečvářová, 2015; Blažková, 2016; Špička, 2013, 2015; Špička *et al.*, 2015). Whereby said, just the development of foreign trade in these products across sectors of the commodity chain, played, is playing and undoubtedly will play an important role in its shaping in the future (Pawlak, 2014).

Only a relatively low number of studies exists that deal more in detail with the characteristics of the foreign trade of the Czech Republic with these products. Existing analysis (e.g. Burianová and Belová, 2012; Bielik *et al.*, 2013; Zdráhal *et al.*, 2015; Smutka, *et al.*, 2016) are usually part of comprehensive studies on the development of Czech agrarian foreign trade, whether before EU entry or in the context of studies providing findings about changes in the foreign trade, specifically in connection with Czech Republic's membership in the EU.

According to Smutka *et al.* (2012), assessing the Czech agrarian foreign trade in 2008–2011, totally and partially with six major trading partners – Germany, Austria, Italy, Netherlands, Poland and Slovakia, the product group CN 04 (milk, dairy products, eggs and honey) demonstrates a strong comparative advantage of the Czech Republic. Revealed comparative advantage index (RCA) of this group has the value of 2.2, which was the third highest value out of 24 studied groups of products. Value of Lafay Index (LFI) is then around 2.8, as the second highest value.

Studies on the level of product groups (3-digit SITC code) conducted by Smutka and Belová (2011) and Svatoš and Smutka (2012), assessing the development and the structure of agrarian trade of the EU with a focus on the Visegrad Group in the period 1993 to 2008, confirm that product groups SITC 024 (cheese and curd) and SITC 022 (milk and cream and milk products other than butter or cheese) are major items in the export

structure (but not in import), and that the EU as a whole maintains at the international level its comparative advantage. Product group SITC 022 belonged to the most important ones also within the structure of Czech agri-food export, since in 2008 Czech Republic demonstrated a comparative advantage (RCA 1.93). When using the modified BCG matrix concept, this group was categorized as Stars. Conversely, a product group SITC 023 (butter and other fats and oil derived from milk), showing a slight comparative advantage at the beginning of the studied period with an average RCA value of 1.26, has been with a decrease of the index moved from the category Cash cows to the category Dogs.

It is just a foreign trade in milk and dairy products (not only between EU member states, but also in relation to other localities outside the EU) that is now becoming a major transformation and potential growth factor that determines the development of the milk sector in particular member states (Bojnec and Fertő, 2014; Popescu, 2015). For this reason, a more detailed analysis of foreign trade in the commodity vertical of milk, including its structural characteristics, is one of the major indicators of the investigation of the causal link and the dynamics of this development.

Generally, it can be stated that milk and dairy products in the agrarian foreign trade of the Czech Republic:

- represent one of the most important items in terms of its intensity (turnover, share in total turnover of agrarian foreign trade).
- demonstrate features of the comparative advantage towards the countries of the EU, as well as towards third countries.

Taking into consideration that foreign trade with milk and dairy products represents one of the most significant segments of agrarian foreign trade of the Czech Republic, a deeper understanding of the context together with relevant economic interpretation becomes a necessary prerequisite for the objectification of the recourse for further strategic decisions in this area.

The aim of this paper can be formulated as follows: based on the evaluation of the development of Czech foreign trade in milk and milk products in its territorial and commodity structure assessing trends and specify the typical features and manifestations of the development. In this sense the typical signs in the formation of this commodity chain in horizontal/territorial/ and vertical/stage of product processing/ contexts are defined within the framework of the changes in the business environment over the last two decades, particularly in relation to the entry of the Czech Republic into the European Union.

Three fundamental research questions arise from the defined goal, namely:

1. has the opening of the EU Common Market positively influenced the growth of the total foreign trade in milk and dairy products in the Czech Republic?

2. has the territorial structure of foreign trade changed after joining the EU?
3. has the export structure of the Czech Republic improved in favour of dairy products with higher added value?

MATERIALS AND METHODS

The analysis is focused on the development of foreign trade in milk and dairy products between the Czech Republic and other EU member countries in the period from 1999 to 2015. The analysis is primarily based on data from the Eurostat database.

Chosen period allows to capture the development of Czech Republic's foreign trade with milk and dairy products both in the period before joining the EU in 2004 and in the period after the accession to the common market.

From a territorial point of view, the analysis concerns foreign trade in milk and dairy products between the Czech Republic and all its trading partners, thus between the Czech Republic and EU-28, between the Czech Republic and countries outside EU-28, between the Czech Republic and original member states (EU 15) and the Czech Republic and new member states (NMS). Aggregation of original member states includes Germany, Austria, Italy, France, the Netherlands, Belgium, Luxembourg, Denmark, Sweden, Finland, Portugal, Spain, Italy, Greece, Ireland and United Kingdom. Aggregation of new member states includes Cyprus, Poland, Slovakia, Slovenia, Hungary, Lithuania, Latvia, Estonia and Malta (accession in 2004), followed by Bulgaria and Romania (accession in 2007) and Croatia (accession in 2013). Methodically, although specific countries in the studied period were not yet EU members, they have been in a pursuit of a greater clarity already included in the appropriate unit. The analysis was also conducted on a bilateral level, i.e. between the Czech Republic and the individual countries of EU-28.

Foreign trade with milk in the studied period 1999–2015 is defined by the Standard International Trade Classification (SITC) Revision 3. Aggregated data include following product groups: SITC 022 (milk and cream and milk products other than the butter or cheese), SITC 023 (butter and other fats and oil derived from milk) and SITC 024 (cheese and curd). Trade flows are presented in current prices in euros. Here it should be noted that in the studied period, the exchange rate of Euro (EUR) against Czech Koruna (CZK) or other national currencies was fluctuating. However, identification of trends in the development of the foreign trade with milk and dairy products should not be substantially affected by this phenomenon.

Attention in the agri-food trade analysis is primarily paid to the trends in terms of trade turnover, export, import and trade balance. Basic statistical and mathematical methods were used. Similarly to Smutka *et al.* (2016), these methods were used to assess the development and structure

in time series of individual indicators. Analyses were completed by calculations of annual increases (annual growth rate) and the calculation of basic and chain index.

The growth index is usually presented as a percentage and represents the percent increase in value in the time series between two time periods. In the case of basic index, it is a deviation from basic (fixed) period, in the case of chain index it is a deviation from annual period. Index calculation is then based on the following relationship (%):

$$k_i = \frac{y_i}{y_{i-1}} \times 100 [\%], i = 2, 3, \dots, n \quad (1)$$

Average growth rate in the individual time series was calculated as a geometric mean of individual year on year growth indices. The advantage stems from the recognition of both positive and negative increases. This approach made it possible to summarize trends in certain time periods and compare the average increase/decline in turnover, export and import for the entire studied period, as well as its parts, and to compare between the two integration groupings.

The geometric mean is calculated as follows (%):

$$G = \sqrt[n]{X_1 \times X_2 \times \dots \times X_n} \quad (2)$$

To assess the development of the territorial focus of the trade with milk and dairy products between the Czech Republic and the EU countries, Herfindal-Hirschman index of concentration was used. This index allows the measurement of concentration in both territorial and product terms. HHI index calculation was carried out according to the following formula:

$$HHI = \frac{\sum_{i=1}^n s_i^2 - \frac{1}{n}}{1 - \frac{1}{n}} \quad (3)$$

where:

HHI – Herfindal-Hirschman index of concentration
 S_i – share of the value of i -country (product group) in the export (import) of a given country (product group)

n – number of countries (product groups) in the context of export (import) of a given country

Resulting values of index depend primarily on the degree of similarity or differences of the shares of individual countries (product groups) in total export (import). HHI index may reach values between 0 and 1, where 0 indicates high similarity of shares, while 1 signifies a trade with one country only (a product group). The next step was an assessment of the competitiveness of a mutual trade with milk and dairy products between the Czech Republic and EU countries, between the Czech

Republic and the original member states (EU15) and between the Czech Republic and new member states (NMS).

Generally speaking, the concept of competitiveness itself can be related to many aspects (new technologies, standards, products, business environment, etc.). Examples of concrete barriers that may prevent a country or region in the utilization of potential benefits of foreign trade for its economic growth are follows: poor factor conditions (cost and skills of labour, cost of capital), infrastructure and backbone services, and transport and logistics inefficiencies, information and coordination failures and the underprovision of public goods, macroeconomic policies that distort efficient market entry and competition and barriers to market access as tariffs and quotas (Reis and Farole, 2012).

Competitiveness in the international exchange will be in this paper assessed based on the extent to which the revenues from the export cover expenditures on imported goods – a demonstration of the ability of international trade actors from individual countries to assert themselves in competition with each other. Assessment of competitiveness in export on foreign markets is based on Trade Coverage Index (TC). A general formula for calculation of the index is as follows:

$$TC_{ij} = \frac{X_{ij}}{M_{ij}} \times 100 \quad (4)$$

where:

TC_{ij} – general trade coverage index of the trade with – i-product (product group) with j-country (country group),

X_{ij} – general export of i-product group (product groups) from the Czech Republic abroad

M_{ij} – import of i-product group (product groups) of the Czech Republic from abroad

If the index value is greater than 100%, a given country has relative internal trade advantage over other trading partners. The disadvantage of this indicator is that it ignores qualitative parameters of a foreign trade. A deformation caused by tariff and non-tariff barriers in trade with other countries may play a role in the analysed case. TC index values therefore have a character of exhibited competitive advantage within a given trade policy framework.

RESULTS AND DISCUSSION

Foreign trade in milk and dairy products – basic tendencies (see Question 1)

In the last two decades, the Czech Republic is characterized by high growth rates of the total merchandise and agrarian foreign trade. Moreover, the growth rate of the value of agrarian trade (export and import) also exceeds the average growth rate of agrarian trade of several European countries and worldwide. In the analysed period 1999–2015, a significant increase in foreign trade with milk and dairy products was recorded. With a share of 10% to 15% in the total value of agrarian export of the Czech Republic, it belongs to the most important items of the agrarian export.

Undoubtedly, the Czech Republic's entry into the European Union in 2004 together with further liberalization of trade in milk and dairy products within the EU single market have brought new opportunities for the market development. On the other hand, Czech producers have been exposed to greater competition from the side of other EU producers. Furthermore, it meant even more significant transformation of the business environment in the milk value chain that has been transformed since the early 90s of last century. To what extent is this development reflected in the foreign trade of the Czech Republic in milk and dairy products with all trading partners (CZ-world) can be seen in Tab. I.

In 1999, the value of turnover (export + import) of the Czech Republic's foreign trade in milk and dairy products reached 215 million EUR, of which the export value was 146 million EUR and the import value was 69 million EUR. Between 1999 and 2015 export and import of milk and dairy products between the Czech Republic and other countries of the world increased on average of about 10% per year, 13% respectively. The value of trade turnover in the studied period increased 5.5 times, export value 4.6 times and import value 7.6 times. As a part of this development we can identify three periods with different dynamics of the increase in foreign trade.

I: Development of Czech foreign trade with milk and dairy products

	CZ – world	1999	2003	2004	2005	2007	2009	2011	2013	2015	total 04–15
turnover	mil. EUR	215	312	419	581	912	827	1,113	1,238	1,191	11,339
export	mil. EUR	146	183	246	339	543	459	627	708	671	6,495
import	mil. EUR	69	129	173	241	368	368	486	530	521	4,844
balance	mil. EUR	77	54	73	98	175	91	141	178	150	1,651
TC	100%	212	142	142	141	147	125	129	134	129	

Source: EUROSTAT, elaborated by authors

Note: Table presents an aggregated data for SITC 022 product groups (milk and cream and milk products other than butter or cheese), SITC 023 (butter and other fats and oils derived from milk) and SITC 024 (cheese and curd).

In the pre-accession period (1999–2000) the increase in import values was higher (average of 16.8% per year) than in export values (5.6%). The turnover value, hence, grew on average by 9.6% per year. Between 2004 and 2007 (the period between joining the EU and the economic crisis, crisis in the milk sector respectively), the growth rate increased in all these indicators identically around 30% per year. Since 2008, the average turnover of the trade with milk and dairy products has been rising by 3.4% per year, with import having slightly higher growth (4.4% per year) than export (2.7% per year).

Throughout the studied period, the Czech Republic exhibited a positive balance of trade. It increased from 77 million EUR in 1999 to 150 million EUR in 2015. The development of the absolute value of the balance can be regarded as positive, as well as TC index (value of coverage of import by export), which during the studied period was above 100%, suggesting the competitive position of the Czech Republic. Gradually, however, TC index values were decreasing, suggesting a deterioration of this position.

The analysis carried out at this level of aggregation and with no distinction of partial trends, coincides with conclusions of aforementioned studies that regard this product group as the one in which the Czech Republic has a comparative advantage. This group is also considered as a significant segment in terms of further development of the Czech agrarian foreign trade.

Development of the value and territorial structure of the Czech Republic's foreign trade with dairy products within the EU single market (see Question 2)

The following section analyses more in detail the development of the value of Czech foreign trade with milk and dairy products in terms of the territory and identification of product groups and major commercial ties with countries of EU-28. In the studied period, the foreign trade with milk and dairy products between the Czech Republic and countries of EU-28 increased significantly. An overview is presented in Tab. II.

The value of turnover of the foreign trade with these products between the Czech Republic and the countries of EU-28 increased 8.26 times. Export increased 8.84 times, while import increased 7.53 times. The share of trade with countries outside the EU 28 in the total value of turnover of trade with milk and dairy products declined significantly, from 38% in 1999 to 7% in 2015. It follows that the average annual growth of all three indicators was approximately the same, around 14% per year. However, the rate of growth during the studied period varied.

In the pre-accession period, import to the Czech Republic from the EU-28 increased faster (average of 16.8% per year) compared to the increase in export to these countries (9.2% per year). The value of turnover grew on average by 12.9% per year.

II: Development of the foreign trade with milk and dairy products between the Czech Republic and countries of EU-28.

CZ – EU 28		1999	2003	2004	2005	2007	2009	2011	2013	2015	total 04–15
turnover	mil. EUR	134	218	346	503	835	786	1,042	1,138	1,109	10,451
	1000 tons	140	219	348	691	1,087	1,108	1,072	1,141	1,315	12,234
export	mil. EUR	67	95	177	261	467	419	557	609	589	5,614
	1000 tons	78	82	185	443	749	820	804	865	1,020	8,942
	EUR/kg	0.85	1.15	0.96	0.59	0.62	0.51	0.69	0.70	0.58	0.65 ¹
import	mil. EUR	69	129	173	241	368	368	486	530	521	4,844
	1000 tons	62	136	163	248	338	289	268	276	295	3,291
	EUR/kg	1.10	0.91	1.04	0.97	1.09	1.27	1.81	1.92	1.76	1.45 ¹
balance	mil. EUR	–3	–34	3	20	98	51	71	79	68	770
TC	100%	98	77	104	108	127	114	115	115	113	116 ¹
P _{ex} /P _{im}	index	0.78	1.27	0.92	0.61	0.57	0.40	0.38	0.37	0.33	0.47 ¹
Average annual growth rate ²											
Chain index											
		99–15	99–03	03–15	03–07	07–15	03/99	07/99	15/99	07/03	15/03
turnover	value	1.141	1.129	1.145	1.398	1.036	1.63	6.21	8.26	3.82	5.08
	volume	1.150	1.118	1.161	1.493	1.024	1.56	7.76	9.39	4.97	6.01
export	value	1.146	1.092	1.164	1.490	1.029	1.42	7.01	8.84	4.92	6.21
	volume	1.174	1.013	1.233	1.736	1.039	1.05	9.56	13.03	9.08	12.37
import	value	1.134	1.168	1.123	1.300	1.044	1.86	5.33	7.53	2.86	4.04
	volume	1.103	1.219	1.067	1.255	0.983	2.21	5.47	4.78	2.48	2.17

Source: EUROSTAT, elaborated by authors

Note: ¹ arithmetic mean 2004–2015

² geometric mean for a given period

This development was largely influenced by the asymmetric nature of the trade liberalization between the Czech Republic and EU-15, since the market of the Czech Republic was open to import from EU-15 more than markets of EU-15 were open to the export from the Czech Republic.

Subsequently, between the years 2004 to 2007, the growth in the value of trade turnover became more dynamic, with an average increase of 39.8% per year. During this period, the value of import grew by 30.0% per year, while the export value grew by 49.0% per year.

Since 2008, however, the overall dynamics started to slow down. The value of import was growing slightly faster (4.4% per year) than the value of export (2.9% per year). Time slots correspond to the identified changes in the dynamics of the total foreign trade with milk and dairy products. This clearly demonstrates an evident impact of the market development of other EU countries (and the dynamics of trade with these countries) on the overall development of Czech foreign trade with these products.

Overall, the export value of milk and dairy products from the Czech Republic to EU-28 countries exceeded the import value from these countries to the Czech Republic (with the exception of the years 1999, 2002 and 2003). Development of trade balance was fluctuating, however, it had an upward trend. In 2015, the value of trade balance reached 68 million EUR.

Within Czech Republic's membership in the EU, the value of total export of milk and dairy products reached 5,614 million EUR, while the value of import amounted 4,844 million EUR. The total cumulative balance for this period had a value of 770 million EUR. Since 2004, the TC index passed 100%, which is positive for Czech Republic's competitiveness. Coverage of import by export reached its highest value in 2009 (130%), in the following year, however, the value declined and the index oscillated around the value of 115%.

Between 1999–2015, the Czech Republic was exporting milk and dairy products to all countries of EU-28. Although the export before 2004 to countries that today make up the EU was strongly geographically diversified, today's territorial structure of export is already significantly concentrated. This is evidenced by the average value 0.133 of HHI over this period.

Main export markets for Czech producers between the years 1999 and 2003 were primarily Slovakia (average share in the export was 23.9%), the Netherlands (16.1%), Germany (12.3%), Poland (11.7%), Croatia (6.0%), France (5.5%) and others.

Since 2004, export was geographically concentrated principally towards three specific countries, it made for 75% of the total export in the last decade. Following countries are involved: Germany (average share between 2011–2015 was 33.7%), Slovakia (24.9%) and Italy (14.6%). While Slovakia's share in the total export structure remains roughly the same, Germany and Italy form nearly half of the export of the Czech

Republic within the EU single market. In recent years, export to Poland began to increase again (7%). Czech Republic's export is, thus, within the EU currently focused primarily to these four countries, which is evidenced also by HHI, since its value increased in 2015 on the level of 0.217. The Czech Republic exports also to Hungary, the Netherlands, Romania, Croatia, Bulgaria, Austria, France or Sweden. These countries are, however, rather in a minority in comparison with aforementioned states.

Similarly, during 1999 and 2015, the number of importers from EU-28 increased – from 16 countries in 1999 to 25 countries in 2015. The biggest importers of milk and dairy products to the Czech Republic are Germany, Poland and Slovakia. In 1999, EU-28 countries made for 70% of Czech Republic's import. This proportion was gradually increasing to the level of 85% in 2004. Currently, the level has reached almost 80% (38.4% from Germany, 25.9% from Poland, 13.9% from Slovakia).

Producers and processors from these countries have been operating on the Czech market already for a long time. Import from Germany and Poland is even gradually increasing. Since 2008, import from Slovakia has been stagnating and thus the share of the country in the import structure falls. Other major countries importing to the Czech Republic include Netherlands, Italy, France and Belgium. Although in their case it is mainly about percent unit change in the import share, its value during the studied period increased identically, from 8.0% in 2004 to 16.9% in 2015. Other countries of EU-28 create only about 5% share. Characteristics of the territorial structure of import and its dynamics is further supported by the value of HHI that during the studied period increased from 0.198 in 1999 to the currently fluctuating value of 0.250.

The dynamics of the territorial structure of export and import is reflected in the overall trade dynamics between the Czech Republic and countries of EU-28. Main trading partners of the Czech Republic are Germany, Slovakia and Poland. During the studied period, the proportion of these three states in total trade turnover increased from 57.7% to 73.0%.

Since 2004, Italy has become Czech Republic's important trade (export) partner. Italy's share increased from 1% in 1999 to current 10%. Share of other countries of EU-28 in the total turnover value of trade with milk and dairy products between the Czech Republic and the EU is smaller than 20%. These concentration tendencies are supported by the development of HHI values, of which calculation is based on the values of the international trade turnover. In 1999, HHI reached 0.142, while in 2015 the value was 0.212.

Territorial structure of international trade with milk and dairy products between the Czech Republic and EU-28 is, hence, significantly concentrated and territorially oriented primarily towards Germany, Slovakia, Poland and Italy. This approximately corresponds with the nature and territorial focus of the overall agrarian foreign trade of the Czech Republic.

Development of the product structure of Czech Republic's foreign trade with dairy products within the EU single market (see Question 3)

Czech Republic's entry into the EU common market has also affected the product structure of foreign trade with dairy products. Following analysis identifies the principal product groups of dairy products traded between the Czech Republic and other EU countries and analyses the development of their representation in the structure of the trade turnover, export and import. Individual product groups are in the context of SITC defined as four-digit code, namely:

- S0221 (milk, including skimmed milk and cream, not concentrated or sweetened),
- S0222 (milk and cream, concentrated or sweetened),
- S0223 (yogurt, buttermilk, acidified milk and cream, ice-cream),
- S0224 (whey, products consisting of natural milk constituents),
- S0230 (butter and other fats and oils derived from milk),
- S0241 (grated or powdered cheese, of all kinds),
- S0242 (processed cheese, not grated or powdered),
- S0243 (blue-veined cheese),
- S0249 (other cheese, curd).

During the studied period 1999–2015, the value of trade turnover increased – totally for the turnover value of trade with milk and dairy products, as well partially for the turnover value of trade with each of the studied product groups. The highest increase of the turnover value had following product groups: S0224 (4.2 times), S0221 (4.7 times) and S0223 (3.0 times).

Also other groups experienced in this period an increase in the trade, with an exception of the product group S0222 (0.9 times less). In addition, this dynamics led to the formation of the current structure of foreign trade with milk and dairy products. In 2015, the structure of the foreign trade turnover was dominated by product groups S0249 (33.4%), S0221 (30.2%) and S0223 (15.0%). Share

of these three product groups in the structure of the trade turnover constituted 78.6%. More detailed information about the development of turnover of individual product groups provides Tab. III.

During the studied period, all analysed product groups also show an increase in import, both in the pre-accession period (1999–2003), and after the year 2004.

Based on the data aggregated for these two periods and according to the development of the share of individual product groups in these aggregates, several conclusions can be drawn with regard to changes in the structure of import of dairy products to the Czech Republic from EU countries. Data concerning import of individual product groups and related changes are presented in the following Tab. IV.

The most important product group in the import structure is S0249 (other cheese, curd). The value of import increased from 31 million EUR in 2003 to 242 million EUR in 2015 (7.74 times), and its share in the import structure increased from 25.3% in 2003 to 46.5% in 2015. It is followed by the product group S0223 (yogurt, buttermilk, acidified milk and cream, ice-cream), where the value of import increased from 33 million EUR in 2003 to 85 million EUR in 2015 (2.54 times). In 1999, the share of this group accounted for nearly half of the value of dairy products imported from the EU countries to the Czech Republic.

A significant change occurred in the product group S0230 (butter and other fats and oils derived from milk), where the value of import grew from 7.9 million EUR in 2003 to 74.2 million EUR in 2015 (9.36 times). Despite the fact that import of butter and fats derived from milk was in 2000 rather marginal (the share in the import structure was only about 2%), in 2015 the share accounted for 14.3% of the total import of dairy products from EU countries. The share of these three groups of products in the value of import of dairy products increased from 58.6% in 2003 to 77.0% in 2015.

Concentration tendencies in the structure of import values were quantified using the HHI index.

III: Development of trade turnover of individual product groups between the Czech Republic and countries of EU-28

CZ – EU 28		1999	2003	2004	2005	2007	2009	2011	2013	2015	total 04–15
0221	mil. EUR	7	27	72	163	269	234	310	338	335	3,196
0222	mil. EUR	31	38	61	50	81	52	62	73	53	738
0223	mil. EUR	41	42	57	81	135	157	174	163	167	1,686
0224	mil. EUR	3	7	8	9	37	12	35	44	39	333
0230	mil. EUR	13	24	31	42	90	82	84	86	85	894
0241	mil. EUR	0	1	1	1	2	5	4	3	5	37
0242	mil. EUR	12	23	25	28	32	34	38	50	44	436
0243	mil. EUR	1	2	3	5	5	7	9	11	11	91
0249	mil. EUR	26	56	89	125	183	203	326	370	370	3,038
total	mil. EUR	134	218	346	503	835	786	1,042	1,138	1,109	10,448

Source: EUROSTAT, elaborated by authors

In 1999, the index accounted for 0.16 and the value was gradually falling, indicating diversification in the structure of imported dairy products. In 2003, HHI value reached 0.12, while in 2015 it increased to 0.17.

During studied period, export of analysed product groups was also increasing, both in the pre-accession period (1999–2003), and in the period after accession to the EU after 2004. Product group S0230 represents an exception to this general trend.

Data concerning export of individual product groups and related changes are presented in the following table Tab. V.

Based on the data aggregated for the period before and after accession to the EU and according to the share of individual product groups in these aggregates, several conclusions can be drawn with regard to changes in the structure of export of dairy products. Clearly, structure of export is dominated by the product group S0221 (condensed and unsweetened milk and cream) with a share of 47.1 %, followed by S0249 (16.6 %), S02230 (15.3 %) and S0222 (10.8 %).

In 1999, the value of the HHI index, quantifying the development of specialization (concentration) in the structure of export, accounted for 0.16. The value remains approximately the same until 2003. In the following years, however, the value of the index increased to 0.23 in 2015. The structure of Czech export is generally more concentrated

compared to the concentration tendencies in the structure of import. Similarly to the structure of import, this specialization is currently related to different product groups (especially S0221), when compared the structure of export in the pre-accession period (S0222 and S0230).

Strong concentration on the product group S0221 suggests negative development with regards to the Czech export to EU countries. This particular product group represents the export of raw milk or products of the first stage of the milk processing with relatively low added value.

Dynamics of import and export values for each commodity group is then reflected in the trade balance with these products, as well as in the overall trade balance of dairy products of the Czech Republic with EU countries. Data concerning the development of trade balance and coverage of import by export for individual product groups are presented in the following table Tab. VI.

Assessing the period between 2004 and 2015 as a whole, the Czech Republic reached positive trade balance in following product groups: milk, cream and milk products (without butter and cheese), i.e. the groups S0221, S0222 and S0224. Situation of the product group S0223 can be considered as balanced. In other product groups (butter and cheese) the Czech Republic in general reached negative balance.

IV: Development of import values of individual product groups from countries of EU-28 to the Czech Republic

CZ – EU 28		1999	2003	2004	2005	2007	2009	2011	2013	2015	total 04–15
S0221	mil. EUR	5	23	28	40	51	45	46	47	48	552
S0222	mil. EUR	1	2	5	7	15	10	11	18	11	133
S0223	mil. EUR	32	33	39	50	63	64	82	82	85	826
S0224	mil. EUR	0	2	3	3	14	5	15	20	20	148
S0230	mil. EUR	1	8	9	22	49	53	70	74	74	634
S0241	mil. EUR	0	1	1	1	2	2	3	3	4	29
S0242	mil. EUR	12	22	23	24	27	28	31	34	30	344
S0243	mil. EUR	1	2	2	4	4	5	7	8	7	65
S0249	mil. EUR	15	31	59	89	142	155	222	244	242	2,104
total	mil. EUR	68	124	169	241	368	367	486	530	520	4,836
Average annual growth rate ²											
Chain index											
		99-15	99-03	03-15	03-07	07-15	03/99	07/99	15/99	07/03	15/03
S0221		1.157	1.498	1.062	1.216	0.993	5.03	11.00	10.37	2.19	2.06
S0222		1.148	1.109	1.161	1.684	0.964	1.51	12.16	9.06	8.04	5.99
S0223		1.063	1.009	1.081	1.174	1.037	1.04	1.97	2.64	1.90	2.54
S0224		1.280	1.457	1.226	1.698	1.042	4.50	37.43	52.17	8.31	11.58
S0230		1.287	1.566	1.205	1.573	1.055	6.02	36.84	56.33	6.12	9.36
S0241		1.145	1.096	1.162	1.335	1.084	1.44	4.58	8.75	3.18	6.07
S0242		1.059	1.170	1.025	1.057	1.009	1.87	2.34	2.52	1.25	1.35
S0243		1.114	1.085	1.124	1.272	1.057	1.38	3.62	5.66	2.62	4.08
S0249		1.191	1.206	1.156	1.460	1.069	2.11	9.61	16.37	4.54	7.74

Source: EUROSTAT, elaborated by authors

V: Development of export values of individual product groups from the Czech Republic to countries of EU-28

CZ – EU 28		1999	2003	2004	2005	2007	2009	2011	2013	2015	total 04–15
S0221	mil. EUR	2	3	44	123	218	189	264	291	287	2,644
S0222	mil. EUR	29	36	56	43	66	42	51	55	42	604
S0223	mil. EUR	9	9	17	30	72	93	93	81	82	860
S0224	mil. EUR	3	5	5	5	22	7	20	24	19	185
S0230	mil. EUR	11	16	22	20	42	29	15	12	11	260
S0241	mil. EUR	0	0	0	0	0	3	1	0	2	8
S0242	mil. EUR	0	1	2	4	4	5	7	16	14	92
S0243	mil. EUR	0	0	1	1	1	1	2	3	4	26
S0249	mil. EUR	11	25	30	35	41	49	105	125	128	934
total	mil. EUR	67	95	177	261	467	419	556	608	589	5,612
		Average annual growth rate ²					Chain index				
		99-15	99-03	03-15	03-07	07-15	03/99	07/99	15/99	07/03	15/03
S0221		1.360	1.127	1.448	2.831	1.035	1.61	103.67	136.69	64.22	84.68
S0222		1.022	1.049	1.013	1.167	0.944	1.21	2.25	1.42	1.86	1.17
S0223		1.149	0.988	1.208	1.704	1.017	0.95	8.04	9.20	8.43	9.65
S0224		1.124	1.141	1.119	1.455	0.981	1.69	7.59	6.52	4.48	3.85
S0230		0.996	1.088	0.967	1.272	0.843	1.40	3.67	0.94	2.62	0.67
S0241		1.297	0.212	1.508	2.128	1.270	3.19	65.43	442.13	20.49	138.46
S0242		1.298	1.471	1.245	1.439	1.158	4.68	20.09	65.05	4.29	13.90
S0243		1.412	2.279	1.204	1.292	1.163	26.97	75.10	250.97	2.78	9.31
S0249		1.163	1.212	1.147	1.135	1.153	2.15	3.57	11.13	1.66	5.17

Source: EUROSTAT, elaborated by authors

VI: Development of trade balance of individual product group

CZ–EU 28		1999	2003	2004	2005	2007	2009	2011	2013	2015	total 04–15
S0221	mil. EUR	–3	–20	16	83	166	144	217	244	239	2,092
	TC 100%	45.1	14.5	158.7	305.6	425.0	420.8	571.5	619.9	594.4	466.4 ¹
S0222	mil. EUR	28	34	50	36	51	33	41	37	30	471
	TC 100%	2364.0	1890.0	1026.7	614.3	436.4	446.0	478.2	312.5	369.2	496.1 ¹
S0223	mil. EUR	–23	–25	–22	–20	9	30	11	–2	–2	34
	TC 100%	28.0	25.7	44.2	60.2	114.2	146.7	113.5	97.8	97.4	101.7 ¹
S0224	mil. EUR	3	3	3	2	8	2	5	5	–1	36
	TC 100%	760.7	286.1	197.9	151.4	154.3	128.5	133.3	123.1	95.1	138.3 ¹
S0230	mil. EUR	10	8	13	–2	–7	–25	–55	–62	–63	–375
	TC 100%	868.1	202.3	244.3	90.6	86.4	53.8	20.9	16.0	14.5	63.2 ¹
S0241	mil. EUR	0	–1	–1	–1	–2	1	–2	–3	–2	–22
	TC 100%	0.9	1.9	1.5	1.6	12.3	128.9	25.0	6.0	43.5	24.6 ¹
S0242	mil. EUR	–12	–21	–22	–20	–23	–23	–24	–18	–15	–252
	TC 100%	1.9	4.6	7.0	14.7	16.0	18.4	22.8	47.3	48.0	25.6 ¹
S0243	mil. EUR	–1	–1	–1	–2	–3	–4	–5	–4	–3	–39
	TC 100%	1.4	26.5	36.8	41.1	28.3	26.3	26.5	44.9	60.5	39.4 ¹
S0249	mil. EUR	–3	–7	–29	–54	–101	–106	–117	–119	–114	–1,169
	TC 100%	77.7	79.2	51.0	39.5	28.9	31.6	47.4	51.3	52.9	43.0 ¹
total	mil. EUR	–1	–29	8	20	99	51	71	79	68	777
	TC 100%	98.4	76.7	104.4	108.4	126.9	114.0	114.6	114.9	113.1	115.9 ¹

Source: EUROSTAT, elaborated by authors

Note: ¹ arithmetic mean 2004–2015

Product group S0221 (milk, including skimmed milk and cream, not concentrated or sweetened) contributes significantly to positive values of overall trade balance. Although the trade balance of this product group reached in 2003 a negative value (-20 million EUR), significant increase in the export of raw milk after 2004 led to an increase in the positive values of trade balance. In 2015, trade balance accounted for 239 million EUR, with 594.4% level of coverage of import by export. Total cumulative value of the balance for the years 2004-2015 was 2,092 million EUR.

Product group S0222 (milk and cream, concentrated or sweetened) represented in the pre-accession period an important export article of the Czech Republic. After 2004, the Czech Republic achieves a positive trade balance, however, the value of coverage of import by export decreases.

Product group S0223 (yogurt, buttermilk, acidified milk and cream, ice-cream) belongs to the third most represented group in the structure of the trade turnover. Development of the trade balance of these products had a positive trend between 1999 and 2009, since the Czech Republic achieved a positive trade balance. However, in the following years, the trade balance deteriorated, and thus export and import values currently reach similar level. The total cumulative balance of trade between the years 2004

and 2015 only reached a value of 34 million EUR. A similar development and contribution to the overall trade balance of dairy products also applies to the product group S0224 (whey, products consisting of natural milk constituents).

Trade with butter (S0230) shows negative development of the trade balance. Although in the pre-accession period the Czech Republic experienced a positive trade balance, since 2005 values have become negative, reaching -63 million EUR in 2015 and 14.5% for coverage of import by export. The total cumulative balance for the years 2004 to 2015 amounts to -375 million EUR.

In addition, as problematic appears also trade balance for cheeses, in the period 2004-2015 the cumulative trade balance reached -1,481 million EUR. All studied product groups of cheeses contribute to this negative balance, especially product groups S0249 (1169 million EUR) and S0242 (-252 million EUR). In the period 2004-2015, coverage of import by export in all groups reached low levels, on average between 25% and 45%. A development in recent years, however, sends a positive signal. In 2015, for example, product group S0249 reached 52.9% and product group S0242 had 48.0%. Moderate improvement in the coverage of import by export can be seen also in the product group S0243.

CONCLUSION

Following conclusions can be drawn based on the conducted research and analysis of trends and changes in the dynamics of Czech foreign trade with milk and dairy products in its territorial and commodity structure within the changes of environment that have occurred in the last two decades, especially in connection with joining the EU common market.

Generally speaking, the development of Czech agrarian foreign trade has been in the last 25 years shaped by the restructuring of trade ties undertaken already since 1990, and by the formation of strong economic relations towards European countries. This is associated with the expansion of the original EU member states towards Central and Eastern Europe and with a need for adaptation of economic actors to these new conditions. Formation of strong ties towards EU countries is evidenced even by the development and changes in the dynamics of foreign trade with milk and dairy products. The analysis carried out on the overall level of aggregation, with no distinction of partial trends for the period 1999-2015, confirmed a typical assessment of this product group. This product group is regarded as the one, in which the Czech Republic has a comparative advantage, and which represents an important segment with regards to the further development of the Czech agrarian foreign trade.

In the analysed period, Czech Republic's foreign trade with milk and dairy products increased, primarily with countries of EU-28. This increase had prior to 2004 rather asymmetric character - Czech market was more open to import from the countries of EU-15, than they were open to export from the Czech Republic. After 2004, access of Czech exporters to markets of both old and new EU member states has improved. Since 2005, however, growth dynamics of values of import and export has slowed down. In general, the degree of openness of the market as well as of the sector of milk commodity chain has increased, especially towards EU countries. Of a particular importance are Germany, Slovak Republic, Poland and Italy. The territorially-based openness ultimately results in the interdependence with regards to the development on these markets. As an important source of potential growth of the dairy sector of the Czech Republic, which remains relatively underdeveloped, can be considered export of dairy products to markets outside the European Union.

Czech Republic's entry into the EU common market led to a change in the product structure of foreign trade with dairy products and to the creation of the current structure of foreign trade with milk and dairy products. Structure of foreign trade turnover is dominated mainly by product groups S0249, S0221 and S0223. Structure of import shows concentration tendencies towards product groups S0249, S0223 and S0230. The structure of Czech export is generally more concentrated compared to the concentration tendencies in the structure of import. Specialization of export is related primarily

to product groups S0221, S0249, S0222 and S02230. As a negative development is regarded the fact that the structure of Czech export to the EU countries is mainly concentrated around S0221 product group, which signifies export of basic raw milk or dairy products of the first phase of processing with relatively low added value. Development of trade balance with cheese and butter also appears to be problematic.

Aforementioned tendencies in territorial development and in development of commodity structure of Czech foreign trade with milk and dairy products contribute to the creation of new qualitative and quantitative criteria for the development of labour division and conditions of economic integration among actors in both horizontal and vertical links within the milk value chain in the Czech Republic. This brings some positives; however, in case of an inadequate response to the changing environment it may potentially pose significant risks with regards to the further development of this segment of the agrarian sector and food industry in the Czech Republic.

Specialization of individual enterprises (industry) on specific export markets can bring the advantage of building a knowledge base about the needs of these markets and thus offer on these markets those products that specifically meet the needs of purchasers or end customers. On the other hand, what can be regarded as useful is the high degree of diversification of trade, since it allows minimizing the potential risks arising from the dynamics of the development on individual markets.

Significant export specialization, not complemented by the ability and possibility to react flexibly, can cause problems especially in situations when export markets are determined by factors such as shocks. As an example could serve recent imposition of sanctions on food export from the EU to Russia. High proportion of the export of raw materials and semi-processed products of Czech milk value chain in the structure of trade with Germany, Poland or Italy – important exporters of finalized products to the Russian market – ultimately leads to the transmission of these shocks to the domestic industry, not only on the level of manufacturing industry but also directly on the primary sector.

Development of competencies that enable flexible reaction in such situations is nowadays considered as an important prerequisite for the success of agricultural and food enterprises of the milk commodity chain of the Czech Republic on complex and dynamic markets within the EU as well as outside. In this regard, a question arises to what extent and in which way are Czech agricultural producers and processors integrated into the parts/segments of production networks (mainly localized in aforementioned four countries) as another potential determinant of their possible development, as well as a risk in the period of shocks. This issue should be subject to further research.

When assessing the orientation of specific links and trade flows, analysis of risks and benefits will remain necessary. This type of analysis, which to some extent exceeds the analytical and predictive possibilities of theoretical frameworks of the theory of international trade, requires more comprehensive approach, the synthesis of the resulting findings with findings that can be derived from analysis based on the theoretical and analytical frameworks of the theories of global commodity chains, global value chains and the theory of global production networks.

Acknowledgements

The authors appreciate IGA FRRMS MENDELU [2016/013]: 'The Dynamics of EU's Economic Relations' for the financial assistance during this research.

REFERENCES

- BEČVÁŘOVÁ, V., SADÍLEK, T., VINOHRADSKÝ, K. et al. 2008. *Development of Czech agriculture in the European context* [in Czech: *Vývoj českého zemědělství v evropském kontextu*]. 1st Edition. Brno: MZLU v Brně.
- BEČVÁŘOVÁ, V. 2011 The European Model of Agricultural Policy in the Global Context. In: PACHURA, P. (Ed.). *New Knowledge in a New Era of Globalization*. 1st Edition. Rijeka, Croatia: InTech Open.
- BEČVÁŘOVÁ, V. and ZDRÁHAL, I. 2013. *Agriculture and Rural Development in the European Model of Agricultural Policy - Shaping Strategy in the Context of Environmental Changes*. 1st Edition. Brno: Mendel University in Brno.
- BIELIK, P., SMUTKA, L., SVATOŠ, M. and HUPKOVÁ, D. 2013. Czech and Slovak agricultural foreign trade – two decades after the dissolution. *Agricultural Economics – Czech*, 59(10): 441–453.
- BLAŽKOVÁ, I. 2016 Convergence of Market Concentration: Evidence from Czech Food Processing Sectors. *AGRIS, on-line Papers in Economics and Informatics*, 8(4): 25–36.
- BOJNEC, Š. and FERTÓ, I. 2014 Export competitiveness of dairy products on global markets: The case of the European Union countries. *Journal of Dairy Science*, 97(10): 6151–6163.
- BURIANOVÁ, J. and BELOVÁ, A. 2012. The Competitiveness of Agricultural Foreign Trade Commodities of the CR Assessed by Way of the Lafay Index. *AGRIS, on-line Papers in Economics and Informatics*, 4(4): 27–36.
- ČECHURA, L. and MALÁ, Z. 2014. Technology and efficiency comparison of Czech and Slovak processing companies. *Procedia Economics and Finance*, 12: 93–102.

- ČECHURA, L., ŽÁKOVÁ KROUPOVÁ, Z. and HOCKMANN, H. 2015. Market Power in the European Dairy Industry. *AGRIS on-line Papers in Economics and Informatics*, 7(4): 39–47.
- DUDOVÁ, B. and BEČVÁŘOVÁ, V. 2015 The Character of Price Transmission Within Milk Commodity Chain in the Czech Republic. *Acta Universitatis agriculturae et silviculturae Mendelianae Brunensis*, 63(3): 887–892.
- EUROSTAT. 2016. International trade in goods in a nutshell. *Eurostat*. Statistic Illustrated. [Online]. Available at: <http://ec.europa.eu/eurostat/web/international-trade-in-goods/statistics-illustrated> [Accesed: 2016, August 1].
- NÁGLOVÁ, Z., ŠPIČKA, J. and GÜRTLER, M. 2016. Evaluation of Effects of Investment Support in the Czech Dairy Industry. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 64(4): 1345–1351.
- PAWLAK, K. 2014. Changes in the EU and global milk and dairy products market in view of multilateral trade liberalisation. *Scientific Journal Warsaw University of Life Sciences, Problems of World Agriculture*, 14(4): 123–131.
- POPESCU, A. 2015. Research on the trends in Romania's milk and dairy products foreign trade. *Scientific Papers, Series Management, Economic Engineering in Agriculture and Rural Development*, 15(1): 387–392.
- REIS, J. G. and FAROLE, T. 2012. *Trade Competitiveness Diagnostic Toolkit*. Washington, DC: World Bank. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/2248/673620PUB0EPI007869B009780821389379.pdf> [Accesed: 2016, May 15].
- SMUTKA, L., BURIANOVÁ, J. and BELOVÁ, A. 2012. The Comparative advantage of Czech Agricultural Trade in relation to the most important trade partners countries in the perion of 2008–2011. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 60(7): 273–288.
- SVATOŠ, M. and SMUTKA, L. 2012. Development of agricultural trade and competitiveness if the commodity structures of individual countries of the Visegrad Group. *Agriculture Economics – Czech*, 58(5): 222–238.
- SMUTKA, L. and BURIANOVÁ, J. 2013. The competitiveness of Czech agrarian trade within the context of the global crisis. *Agriculture Economics – Czech*, 59(4): 183–193.
- SMUTKA, L., SVATOŠ, M., TOMŠÍK, K. and SERGIENKO, O. I. 2016. Foreign trade in agricultural products in the Czech Republic. *Agriculture Economics – Czech*, 62(1): 9–25.
- ŠPIČKA, J. 2013. The Competitive Environment in the Dairy Industry and its Impact on the Food Industry. *AGRIS on-line Papers in Economics and Informatics*, 5(2): 89–102.
- ŠPIČKA, J. 2015. The Efficiency Improvement of Central European Corporate Milk Processors in 2008–2013. *AGRIS on-line Papers in Economics and Informatics*, 7(4): 175–188.
- ŠPIČKA, J., SMUTKA, L. and SELBY, R. 2015. Recent areas of innovation activities in the Czech dairy industry. *Agriculture Economics – Czech*, 61(6): 249–264.
- ZDRÁHAL, I., DUDOVÁ, B. and BEČVÁŘOVÁ, V. 2015. Development of the Czech dairy industry after entrance into the European Union. In: *Proceedings from 9th International Conference on Applied Business Research ICABR*. 1st Edition. Brno: Mendel University in Brno, pp. 50–57.

Contact information

Ivo Zdráhal: ivo.zdrahal@mendelu.cz

Věra Bečvářová: vera.becvarova@mendelu.cz