Bulgarian Journal of Agricultural Science, 24 (No 1) 2018, 1–7
Agricultural Academy

ON THE DURATION OF COMPARATIVE ADVANTAGES: THE CASE OF EUROPEAN CHEESE INDUSTRY

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Abstract

Balogh; J. M. and A. Jámbor, 2018. On the duration of comparative advantages: the case of European cheese industry. *Bulg. J. Agric. Sci.*, 24 (1): 1-7

The EU produces and exports various types of cheese to all over the world. French, Dutch and Italian cheeses are very special and famous worldwide. By contrast, to date, the analysis of the competitiveness of EU cheese trade is understudied in the literature. Therefore, our paper is focusing on the evaluation of trade competitiveness in European cheese sector. First, our study analyses the revealed comparative advantages among the major European cheese producers by Balassa indices between 1990 and 2013. Second, we aim to explore the duration and stability of indices by the help of lagged indices and calculating Kaplan-Meier survival functions. Our results suggest that European cheese export is mainly internal in nature and highly concentrated. Regarding comparative advantages, indicators suggest that the Netherlands, Denmark, and Cyprus were the most competitive cheese traders in the EU. However, the survivor analysis revealed that the comparative advantages were very stable for the countries selected the overall stability of EU cheese trade had a declining tendency.

Key words: comparative advantage; cheese industry; European Union; duration analysis

Introduction

Cheese is the common name for fermented milk-based food products, produced in a wide range of flavours and forms throughout the world (Fox and McSweeney, 2004 p. 1). According to Sandine and Elliker (1970), there are more than 1000 varieties of cheese. The raw milk for cheese can be produced by cows, sheep, and goats. Cheeses come in various forms; hard or soft, herbed or smoked, aged or fresh (Worldatlas, 2016). The majority of the top cheese producers and exporters are the countries from the European Union. However, according to World Bank (2014) COMETRADE database, the majority of European cheese is sold to the European Common Market; the export share of EU cheese shipped to third countries is also relatively high. Within the EU, the Netherlands, France and Germany can be considered as the biggest cheese exporters. They are accounting formore than 60% of European cheese export in value, with high market concentration (World Bank, 2014).

The most common types of Dutch cheeses are Edam, Gouda, and Maasdam. Bavarian blue cheese, Limburger, and Munster are considered as the most popular German cheese brands. France is known for their rich cuisine and for their popular cheeses such as Brie and Camembert. Italy also makes the top of the cheese producer list. With such famous cheeses as Mozzarella, Parmesan, and Gorgonzola, it makes perfect sense that demand for Italian cheeses is also high. Finally, Denmark is also a relevant player on world cheese market (Worldatlas, 2016).

In the last decades, a vast amount of literature is dedicated to the analyses of revealed comparative advantages of international trade. Fertő and Hubbard (2003) conducted research on the analysis of revealed comparative advantages in Hungary and identified eleven competitive product groups. Fertő

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(2008) analysed the evolution of agri-food trade patterns in Central European countries and found trade specialisation to be mixed. Serin and Civan (2008) found that Turkish fruit juices and olive oils to be highly competitive in European markets. Qineti et al. (2009) compared the competitiveness of Slovakian and EU agri-food trade in relation with Russia and Ukraine. Bojnec and Fertő (2009) researched for agri-food trade competitiveness of Central European and Balkan countries. Bojnec and Fertő (2012) also investigated the impact of EU enlargement on the agri-food export performance of New Member States over 1999–2007. They found longer duration for exporting higher value-added, specialised consumer-ready food and more competitive niche agri-food products. Bojnec and Fertő (2014) analysed the agri-food competitiveness of European countries and showed that most of the old EU-15 member states experienced a greater number of agri-food products having a longer duration of revealed comparative export advantages than most of the new EU-12 member states have. Jámbor (2013) assessed the comparative advantages and specialisation of the Visegrád Countries' agri-food trade and concluded that comparative advantages decreased after EU accession suggesting a weakening stability of competitive positions.

However, several agri-food products (grain, meat, rice fruit, fish etc.) and countries (EU, Visegrád countries, Hungary, Slovakia, Turkey, Pakistan, Iran, Thailand etc.) have been investigated, though comparative advantages of EU cheese trade have somehow been neglected so far despite their obvious importance. For this reason, the paper aims to analyse revealed comparative advantages in European cheese industry by using panel data from 1990 to 2013. Such research, at least to our knowledge, is currently missing from the trade literature.

This paper expands the existing literature in three ways. First, it applies the theory of revealed comparative advantages on cheese products. Second, it tests the stability of these trade advantages. Third, it assesses the duration of comparative advantage indices for EU cheese industry.

The article is structured as follows. Section 2 presents an overview of the empirical literature, followed by the methodology and the data used. Section 4 outlines the basic patterns of European cheese trade. Section 5 presents the results of stability tests and duration analysis, while the final section concludes.

Methodology

Balassa (1965) in his article 'Trade Liberalisation and Revealed Comparative Advantage' developed a method for calculating the relative advantage or disadvantage of a certain country in a certain class of products as evidenced by trade flows. Balassa (1965) defined the revealed comparative advantages as follows:

$$B_{ij} = \left(\frac{X_{ij}}{X_{it}}\right) / \left(\frac{X_{nj}}{X_{nt}}\right), \quad (1)$$

where X means export, i indicates a given country, j is a given product, t is a group of products and n is a group of countries. It follows that a revealed comparative advantage (or disadvantage) index of exports can be calculated by comparing a given country's export share of its total exports with the export share in total exports of a reference group of countries. If $B > 1$, a given country has a comparative advantage compared to the reference countries or, in contrast, a revealed comparative disadvantage if $B < 1$.

Balassa-index is criticised because it neglects the different effects of agricultural policies and exhibits asymmetric values. Trade structure is distorted by different state interventions and trade limitations, while the asymmetric value of the B index reveals that it extends from one to infinity if a country enjoys a comparative advantage, but in the case of comparative disadvantage, it varies between zero and one, which overestimates a sector's relative weight.

In order to handle the asymmetric problem of the Balassa-index, Dalum et al. (1998) transformed B index as follows, thereby creating the Revealed Symmetric Comparative Advantage (RSCA) index:

$$RSCA = (B - 1)/(B + 1) \quad (2)$$

The RSCA ranges between –1 and 1, with values between 0 and 1 indicating a comparative export advantage and values between –1 and 0 a comparative export disadvantage. Since the RSCA distribution is symmetric around zero, a potential bias is avoided (Dalum et al., 1998).

Yu et al. (2009, 2010) adopted an alternative measure to assess the dynamics of comparative advantages called Normalised Revealed Comparative Advantage (NRCA) index, defined as follows:

$$NRCA_{ij} = \frac{X_{ij}}{E_i E_j X_{ij}} - \frac{(E_i X_{ij})(E_j X_{ij})}{(E_i E_j X_{ij})^2}, \quad (3)$$

where X_{ij} represents actual exports and $(E_i X_{ij})(E_j X_{ij})$ stands for the comparative-average-neutral level in exports of commodity j for country i. If NRCA > 0, a country's comparative advantage on the world market is revealed. The distribution of NRCA values is symmetrical, ranging from -1/4 to +1/4 with 0 being the comparative-advantage-neutral point.

Besides calculating revealed comparative advantages, their stability and duration can be measured as well. In analysing the stability of the RSCA indices, a regression can be

run on the dependent variable of RSCA index (4) at previous year (t2) for sector i in country j, which is tested against the independent variable of the RSCA index in the first year (t1):

$$RSCA_{ij}^{t2} = \alpha_i + \beta_i RSCA_{ij}^{t1} + \varepsilon_{ij}, \quad (4)$$

where α and β are standard linear regression parameters and ε is a residual term. If β = 1, then this suggests an unchanged pattern of RSCA between periods t1 and t2, meaning there is no change in the overall degree of specialisation in European cheese trade. On one hand, if β > 1, the existing specialisation is strengthened, meaning that a low level of specialisation in the initial period leads to less specialisation in the future, which is called β divergence (Bojnec and Fertő, 2008). On the other hand, if 0 < β < 1, commodity groups with low initial B indices grow over time, which is called β convergence (Bojnec and Fertő, 2008). However, if β < 0 change in the sign of the index is shown.

However, as Dalum et al. (1998) point out, the β > 1 is not a necessary condition for growth in the overall specialisation pattern. They argue that sufficient conditions need further analyses. If R is the correlation coefficient of the regression, then the pattern of a given distribution is unchanged whenβ = R. If β >R, then the degree of specialisation has grown (divergence). If β < R, then the degree of specialisation has fallen (convergence).

Following Bojnec and Fertő (2008), a survival function for indices S(t) can also be estimated by the using the non-parametric Kaplan–Meier product limit estimator, which pertains to the product level distribution analysis of the RSCA index. Following Bojnec and Fertő (2008), a sample contains n independent observations denoted (ti; ci), where i = 1, 2 , . . . , n, and ti is the survival time, while ci is the censoring indicator variable C (taking on a value of 1 if a failure occurred, and 0 otherwise) of observation i. Moreover, it is assumed that there are m < n recorded times of failure. Then, we denote the rank-ordered survival times as t(1) < t(2) < … < t(m). Let nj indicate the number of subjects at risk of failing at t(j) and let dj denote the number of observed failures. The Kaplan–Meier estimator of the survival function is then (with the convention that $\hat{S}(t) = 1$ if t < t(1)):

$$\hat{S}(t) = \prod_{t(i)<t} \frac{n_j - d_j}{n_j} \quad (5)$$

Our paper employs European cheese trade data for 1990-2013, in this context, the EU is defined as the member states of the EU-27. Cheese trade is defined as intra-EU27 trade in SITC (Standard International Trade Classification) revision 4, product code: 0240 cheese and curd. Furthermore, the paper concentrates on the RCA index (and its transformation RSCA and NRCA indices) as it excludes imports, which are more likely to be distorted by policy interventions.

The Pattern of European Cheese Trade

The production of milk and cheese dated back to a long documented history in Europe. By the time of Roman Empire, several varieties of cheese were being produced and traded across and beyond the Empire. Despite cheese making and trade predates ancient time, the pattern of cheese trade is scarily analysed. To date, the Netherlands, France, Italy, Germany and Denmark can be considered as the biggest cheese producers in Europe. World Bank trade statistics suggest that the majority of European cheese produced is mainly sold within EU member states. In addition, we can conclude that the share of EU cheese shipped to third countries is also pretty stable (Figure 1). Accordingly, the EU long-haul cheese export increased by only 3% (from 18% to 21%) between 1990 and 2013.

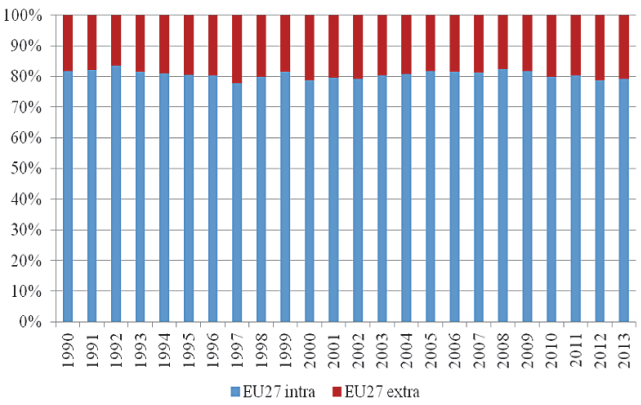

Fig. 1. European cheese export by destination, percentage (1990-2013)

Source: own composition based on World Bank (2014) WITS COMETRADE database

Table 1 shows that the Netherlands (22%), France (21%), Germany (20%), Italy (8%) and Denmark (8%) were the top 5 biggest cheese exporters in the European Union between 1990 and 2013. They all together were almost responsible for 80% of European cheese export in value, suggesting an extremely high concentration. Moreover, it should be also noted that the top 10 cheese exporters accounted for 93% of European cheese export in value.

At the same time, relatively high concentration can be observed in European cheese imports (Table 2). The three biggest importers – Germany, Italy and the UK – accounted for 53% of total European cheese import, while the share of top 10 countries reached 89%. Intra-industry trade patterns emerge for all countries analysed as they appear on both sides of European cheese trade.

Table 1
TOP 10 cheese exporters in the EU, 1990-2013, million USD and percentage

Country	million USD	export share
Netherlands	2115	22%
France	2045	21%
Germany	2160	20%
Italy	893	8%
Denmark	789	8%
Belgium	635	5%
Ireland	431	4%
United Kingdom	271	2%
Austria	245	2%
Poland	200	1%
Top 10 total	**9784**	**93%**

Source: own composition based on World Bank (2014) WITS COMETRADE database

Table 2
TOP 10 cheese importers in the EU, 1990-2013, million USD and percentage

Country	million USD	import share
Germany	2504	26%
Italy	1420	15%
United Kingdom	1253	12%
Belgium	1101	9%
France	853	8%
Spain	620	6%
Netherlands	517	5%
Greece	350	4%
Denmark	175	2%
Austria	250	2%
Top 10 total	**9043**	**89%**

Source: own composition based on World Bank (2014) WITS COMETRADE database

Regarding the trade balances, Netherlands, France and Denmark were the market leader in line with highly positive cheese trade balance for the period analysed, while United Kingdom, Italy and Spain accounted for the highest cheese trade deficits (Figure 2).

Concerning the share of competitive and non-competitive EU cheese exporters over time, we can conclude that each index indicates the same frequency of countries; the ranking is different only by indices. The share of indices indicates that the majority of EU countries are non-competitive in cheese trade, however, the share of competitive exporters increased by the end of the period (Figure 3).

Regarding the comparative advantages of European cheese trade, the most competitive cheese exporters (RCA>1) were Cyprus, Denmark, Luxemburg and the Netherlands during the period analysed (Figure3). Ioannou and Theocharides (2009) also confirm that more reasons can be found behind the competitiveness of theCyprian cheese industry. First, Cypriot entrepreneurs are highly educated and qualified in milk product processing. Second, Cyprian ethnic minorities living in UK, USA and Australia often buy Cypriot cheese products (Ioannou and Theocharides 2009).

Based on the SRCA indices, Denmark, Ireland and theNetherlands are also in the first three positions, suggesting that their cheese producers are the most competitive in EU. NRCA indices reveal different picture by ranking theNether-

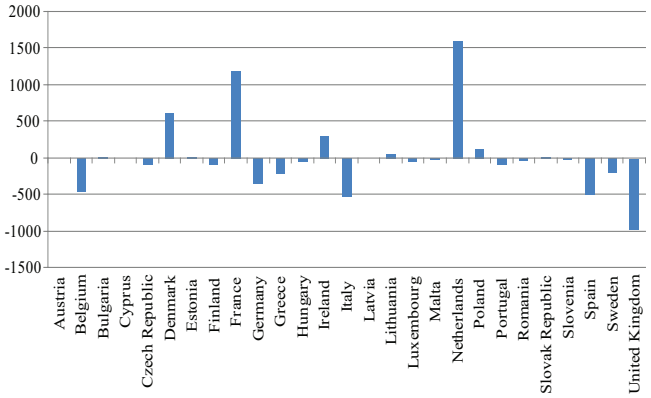

Fig. 2. European cheese trade balance by member state, 1990-2013, million USD
Source: own composition based on World Bank (2014) WITS COMETRADE database

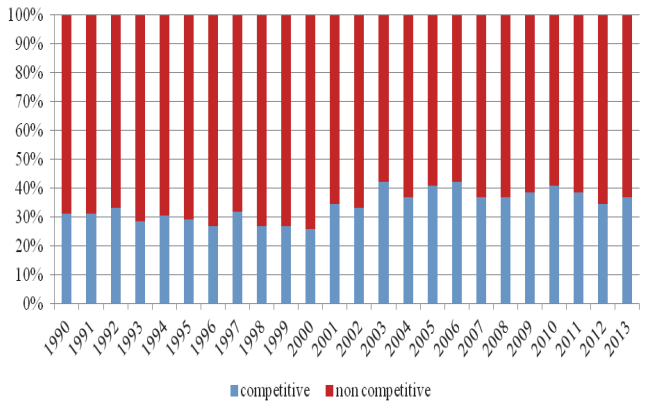

Fig. 3. A number of competitive and non-competitive cheese exporter countries in EU by year, percentage (1990-2013)
Note: competitive if RCA>1, RSCA>0, NRCA>0; non-competitive if RCA<1, RSCA<0, NRCA<0
Source: own composition based on World Bank (2014) WITS COMETRADE database

lands, France and Denmark among the most competitive nations in European cheese industry (Figure 4).

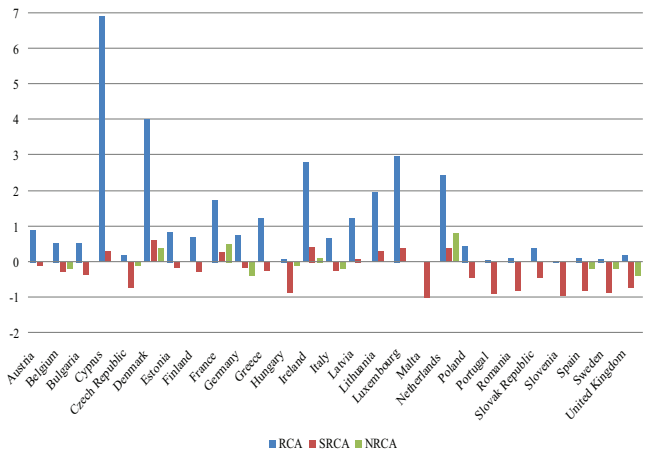

Fig. 4. Revealed comparative advantage of European cheese trade by RCA, SRCA and NRCA indices, 1990-2013
Source: own composition based on World Bank (2014) WITS COMETRADE database

Netherlands produce and export hundreds of millions of tonnes of cheese every year. The cheese markets in Alkmaar, Gouda and Edam remind the origins of a flourishing cheese trade and have become popular in decades (Holland, 2016). Many traditional French kinds of cheese are known all over the world e.g. Camembert, Roquefort, Beaufort exported worldwide. Traditionally, there are more than 400 distinct types of French cheese.

Test of Stability and Duration for SRCA Indices

In order to test the stability and duration of comparative advantages, we selected the SRCA index that is symmetric around the origin. Our stability tests were conducted by estimating various lags forSRCA indices using equation 4. The estimated β values show that patterns of European cheese trade have not changed significantly during the period analysed (Table 3).

By running the model with a single lag, the value of β was relatively high and by increasing the number of time lags, β values remain relatively stable. The β values indicate that the pattern of revealed comparative advantage has diverged, or in other words, low B values decreased over time while high values increased, resulting in an increasing specialisation of European cheese trade after EU accession. These results are also underpinned by the β/R ratio, as suggested by Dalum et al. (1998).

Table 3
Stability of the SRCA index, 1990 -2013

Lags	**α**	**β**	p-value	R^2	R	**β/R**	N
1	0.0081	0.9913	0.0000	0.9747	0.9873	1.0041	557
2	0.0173	0.9828	0.0000	0.9498	0.9746	1.0084	536
3	0.0266	0.9711	0.0000	0.9309	0.9648	1.0065	508
4	0.0357	0.9609	0.0000	0.9114	0.9547	1.0065	481
5	0.0460	0.9517	0.0000	0.8896	0.9432	1.0090	452
6	0.0579	0.9443	0.0000	0.8689	0.9321	1.0130	428
7	0.0692	0.9345	0.0000	0.8452	0.9193	1.0165	396
8	0.0793	0.9325	0.0000	0.8322	0.9122	1.0222	373
9	0.0912	0.9245	0.0000	0.8127	0.9015	1.0255	343
10	0.1021	0.9205	0.0000	0.7990	0.8939	1.0298	318
11	0.1104	0.9122	0.0000	0.7835	0.8852	1.0306	291
12	0.1180	0.9086	0.0000	0.7679	0.8763	1.0369	266
13	0.1230	0.8979	0.0000	0.7515	0.8669	1.0358	238
14	0.1232	0.9045	0.0000	0.7628	0.8734	1.0356	213
15	0.1199	0.9101	0.0000	0.7753	0.8805	1.0336	187
16	0.1247	0.9084	0.0000	0.7643	0.8742	1.0391	161
17	0.1294	0.9238	0.0000	0.7636	0.8738	1.0572	138
18	0.1335	0.9230	0.0000	0.7513	0.8668	1.0649	113
19	0.1375	0.9167	0.0000	0.7269	0.8526	1.0752	89
20	0.1434	0.9249	0.0000	0.7141	0.8450	1.0945	69
21	0.1478	0.8982	0.0000	0.6834	0.8267	1.0865	49
22	0.1553	0.8726	0.0000	0.6419	0.8012	1.0891	29
23	0.1465	0.9021	0.0000	0.6674	0.8169	1.1042	15

Source: own composition based on World Bank (2014) WITS COMETRADE database

In further analysing the stability of revealed comparative advantages in European cheese trade, its duration was estimated by the using the non-parametric Kaplan–Meier product limit estimator. As described in the methodology section, equation 5 was run on our panel dataset. Our results confirm that the survival times of revealed comparative advantages in European cheese trade were not persistent over the period analysed (Table 4). Survival chances of 98% at the start of the period fell to 5% for 2013, suggesting that fierce competition is existent in European cheese trade.

However, the biggest European cheese exporters were able to maintain their comparative advantages. Netherlands, France and Denmark had stable positions between 1990 and 2013, while competitiveness of German and Italian cheese products deteriorated significantly. The equality of the survival functions across countries can be checked using two non-parametric tests (Wilcoxon and log-rank). The hypothesis of equality can be rejected at the 1% level of significance, meaning that similarities across countries in the duration of comparative advantage are absent (Table 4).

Table 4
Kaplan-Meier survival rates for SRCA index and tests for equality of survival functions in EU intra cheese trade by TOP5 exporters, 1990–2013

Years	Survivor function	Netherlands	France	Germany	Italy	Denmark
1990	0.9815	1.0000	1.0000	0.9583	0.9583	1.0000
1991	0.9629	1.0000	1.0000	0.9167	0.9167	1.0000
1992	0.9390	1.0000	1.0000	0.8750	0.8750	1.0000
1993	0.9131	1.0000	1.0000	0.8333	0.8333	1.0000
1994	0.8851	1.0000	1.0000	0.7917	0.7917	1.0000
1995	0.8549	1.0000	1.0000	0.7500	0.7500	1.0000
1996	0.8207	1.0000	1.0000	0.7083	0.7083	1.0000
1997	0.7897	1.0000	1.0000	0.6667	0.6667	1.0000
1998	0.7543	1.0000	1.0000	0.6250	0.6250	1.0000
1999	0.7183	1.0000	1.0000	0.5833	0.5833	1.0000
2000	0.6797	1.0000	1.0000	0.5417	0.5417	1.0000
2001	0.6462	1.0000	1.0000	0.5000	0.5000	1.0000
2002	0.6097	1.0000	1.0000	0.4583	0.4583	1.0000
2003	0.5784	1.0000	1.0000	0.4167	0.4167	1.0000
2004	0.5414	1.0000	1.0000	0.3750	0.4167	1.0000
2005	0.5052	1.0000	1.0000	0.3333	0.4167	1.0000
2006	0.4694	1.0000	1.0000	0.2917	0.4167	1.0000
2007	0.4265	1.0000	1.0000	0.2500	0.3571	1.0000
2008	0.3809	1.0000	1.0000	0.2083	0.2976	1.0000
2009	0.3348	1.0000	1.0000	0.1667	0.2976	1.0000
2010	0.2842	1.0000	1.0000	0.1250	0.2976	1.0000
2011	0.2267	1.0000	1.0000	0.0833	0.2976	1.0000
2012	0.1540	1.0000	1.0000	0.0417	0.2976	1.0000
2013	0.0570	1.0000	1.0000	0.0417	0.2976	1.0000
Log-rank test	0.0000					
Wilcoxon test	0.0000					

Source: own composition based on World Bank (2014) WITS COMETRADE database

On the whole, the considerable loss of comparative advantages is confirmed by several papers (see e.g. Qineti, 2009; Fertő, 2008; Jámbor, 2013), though the stability of advantages for the major players is a new phenomenon.

Discussion and Conclusions

The European cheese and milk products are well known all over the world. Especially cheese from France, Netherlands and Italy are very special and famous worldwide. The majority of the top cheese producers and exporters are the countries from the European Union at the global level. However, according to World Bank statistics, the majority of European cheese is sold to the European Common Market; the export share of EU cheese shipped to third countries is also relatively high. Within the EU, the Netherlands, France and Germany accounted for more than 60% of European cheese export in value, with high market concentration.

In the last decades, a vast amount of literature is dedicated to the analyses of revealed comparative advantages of international trade. By contrast, the competitiveness of EU cheese industry is rarely investigated in empirical works. Therefore, our research aimed to analyse the trade pattern, the stability and the duration of revealed comparative advantages in European cheese trade.

We employed using panel data at SITC-4 revision, product code: 0240 cheese and curd for a period of 1990 and 2013.

In order to test the duration and stability of Balassa type indices, we employed regression with lagged indices and calculated the Kaplan-Meier survival rates for SRCA index.

Our results revealed that European cheese export is mainly internal in nature and is highly concentrated. Netherlands, France and Denmark had the highest positive cheese trade balances during the period analysed, while the United Kingdom, Italy and Spain had the biggest cheese trade deficits. Regarding comparative advantages Netherlands, Denmark, Cyprus and Luxemburg were the most competitive cheese exporters between 1990 and 2013. Only the biggest European cheese exporters - Netherlands, France and Denmark - were able to maintain their comparative advantages and had stable positions between 1990 and 2013.Conversely, the competitiveness of German and Italian cheese products deteriorated significantly.

The results of Kaplan-Meier survival rates confirmed that the survival times of revealed comparative advantages in European cheese trade were not persistent over the period analysed. Survival chances of 98% at the beginning of the period felt to 5% for 2013, suggesting that fierce competition holds for European cheese trade. The Wilcoxon tests revealed that similarities across countries in the duration of comparative advantage are absent. We can conclude that comparative advantages were very stable for these countries, though the overall stability declined in line with previous literature.

It should be noted that our estimations also have a few limitations. Firstly, the variables were measured at the macro level. Secondly, the estimated models assumed competitive cheese markets and homogenous cheese and curd products across countries.

Further research would be reasonable in order to take into account the determinants of cheese trade competitiveness at regional or firm level.

Acknowledgements

This paper was supported by the National Research, Development and Innovation Office Grant No. 119669 titled 'Competitiveness of Agriculture in International Trade: A Global Perspective' as well as the UNKP-17-4-III-BCE-7 New National Excellence Program of the Ministry of Human Capacities of Hungary.

References

Balassa, B., 1965. Trade liberalization and revealed comparative advantage. *Manchester School of Economic and Social Studies*, **33** (2): 99-123.

Bojnec, Š. and I. Fertő, 2008. European Enlargement and Agro-Food Trade. *Canadian Journal of Agricultural Economics*, **56** (4): 563-579.

Bojnec, Š. and Fertő, I., 2009. Agro-food trade competitiveness of Central European and Balkan countries. *Food Policy*, **34** (5): 417-425.

Bojnec, Š and Fertő, I., 2012. Does EU enlargement increase agro-food export duration? *World Economy*, **35**(5): 609-631.

Bojnec, Š, Fertő, I., 2014. Agri-Food Export Competitiveness in European Union Countries. *Journal of Common Market Studies*, **53** (3): 476-492

Dalum, B., K. Laursen and G. Villumsen, 1998. Structural Change in OECD Export Specialisation Patterns: de-specialisation and 'stickiness'. *International Review of Applied Economics,* **12** (3): 423-443.

Fertő, I., 2008. The evolution of agri-food trade patterns in Central European countries. *Post-Communist Economies,* **20** (1): 1-10.

Fertő, I. and L.J. Hubbard, 2003.Revealed comparative advantage and competitiveness in Hungarian agri–food sectors. *The World Economy*, **26**(2): 247-259.

Fox, P.F., P.L.H. McSweeney, T.M. Cogan and T.P. Guinee (eds), 2004. Cheese: Chemistry, Physics and Microbiology, Vol. 1. General Aspects. 3rd Edition, *Elsevier Applied Science*, Amsterdam.

Holland, 2016. Tourist Office of Netherlands. http://www.holland.com/global/tourism/interests/traditional/cheese-2.htm (Retrieved: 15/12/2016)

Ioannou, T. and D. Theocharides, 2009. An assessment of the competitiveness of the dairy food chain in Cyprus Enlargement Network for Agripolicy Analysis. *AgriPolicy,* February 2009.

Jámbor, A., 2013. Comparative advantages and specialisation of the Visegrad countries agri-food trade. *Acta Oeconomica et Informatica*, **16** (1): 22-34.

Qineti, A., M. Rajcaniova and E. **Matejkova,** 2009. The competitiveness and comparative advantage of the Slovak and the EU agri-food trade with Russia and Ukraine. *Agricultural Economics–Czech*, **55** (8): 375-383.

Sandine, W.E. and P.R. Elliker, 1970. Microbiologically induced flavors and fermented foods: flavor in fermented dairy products. *Journal of Agricultural Food Chemistry,* 18: 557-562.

Serin, V. and A. Civan, 2008. Revealed Comparative Advantage and Competitiveness: A Case Study for Turkey towards the EU. *Journal of Economic and Social Research,* **10** (2): 25-41.

World Bank, 2014. World Integrated Trade Solution (WITS) COMETRADE database. https://wits.worldbank.org (Retrieved: 20/12/2014)

Worldatlas, 2016. Top 20 Cheese exporters. http://www.worldatlas.com/articles/top-20-cheese-exporting-countries.html(Retrieved 15/12/2016)

Yu, R., J. Cai, M.K. Loke and P.S. Leung, 2010. Assessing the comparative advantage of Hawaii's agricultural exports to the US mainland market. *Annals of Regional Science,* **45** (2): 473-485.

Yu, R., J. Cai and P.S. Leung, 2009. The normalized revealed comparative advantage index. *Annals of Regional Science*, **43** (1): 267-282.

Received December, 5, 2017; accepted for printing January, 24, 2018