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Determinants of the revealed comparative advantages: The case of the European ham trade

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Abstract: Revealed comparative advantages are widely used by the global literature to analyse the international trade flows, though agricultural trade is usually neglected in the empirical works. Moreover, the determinants of revealed comparative advantages are scarcely investigated. This article analyses revealed comparative advantages in European ham trade from 1999 to 2013 and identifies its determinants by using the panel data econometrics. The results suggest that quality linked to the production area highly affects the competitiveness of the European ham trade. Also, the EU accession is positively correlated with the competitiveness, meaning that the economic integration fosters competitiveness. However, in spite of the initial expectations, the FDI is negatively related to the competitiveness of the European ham trade, underlining the importance of the national ham processing companies.

Keywords: EU accession, factor endowments, FDI, geographical indication, ham trade

Since the seminal work of Balassa (1965), a vast amount of literature is dedicated to the analyses of revealed comparative advantages of the global trade. Despite the apparent importance of the topic, however, most studies have focused on industrial products, while the agri-food sectors are usually neglected in the empirical works. Moreover, the determinants of revealed comparative advantages are scarcely investigated in empirical works. This article aims to analyse the revealed comparative advantages in the European ham trade from 1999 to 2013 and seeks to identify its determinants by using the panel data econometrics. Such an approach, at least to our knowledge, is currently missing from the literature. The ham trade is important for investigation because it is one of the most important high-value added meat products with the relevant international trade where the importance of the place of origin is also high. This paper expands the existing literature in three ways. First, it applies the theory of revealed comparative advantages on an agricultural product. Second, it analyses the stability of comparative advantages. Third, it seeks to identify the factors lying behind comparative advantages.

LITERATURE REVIEW

There is just a limited amount of literature analysing revealed comparative advantages in the field of agriculture. Fertő and Hubbard (2003) were among the first to analyse revealed comparative advantages in the Hungarian agri-food sectors and identified eleven competitive product groups. Fertő (2008) analysed the evolution of agri-food trade patterns in the Central European Countries and found the trade specialisation to be mixed. For particular product groups, greater variation was observed, with generally stable (unstable) patterns of variation for product groups with the comparative disadvantage (advantage). Qineti et al. (2009) analysed the competitiveness and comparative advantage of the Slovak and the EU agri-food trade with Russia and Ukraine and found that the comparative advantage had been lost for a number of product groups over time, though the results for the individual product groups varied significantly.

Bojnec and Fertő (2009) searched for the agro-food trade competitiveness of the Central European and Balkan countries and showed that the bulk primary raw agricultural commodities had higher and more stable relative trade advantages compared to the consumer-ready foods, implying competitiveness shortcomings in the food processing and in international food marketing. Bojnec and Fertő (2012) investigated the impact of the EU enlargement on agro-food export performance of New Member States (NMS) over 1999–2007 and found longer duration for exporting the higher value-added specialized consumer-ready food and more competitive niche

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agro-food products. Bojnec and Fertő (2014) analysed the agri-food competitiveness of the 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 the revealed comparative export advantages than most of the new EU-12 member states have.

Jámbor (2013) analysed the comparative advantages and specialisation of the Visegrad Countries agri-food trade and showed that comparative advantages decreased after the accession in all countries, suggesting a weakening stability of the competitive positions. Török and Jámbor (2013) analysed the New Member States agri-food trade patterns and highlighted that almost all countries experienced a decrease in their comparative advantage after the accession, though it still remained at an acceptable level in most cases. Sahinli (2013) analysed the comparative advantages of the agriculture sectors of Turkey and the European Union and found the EU to be more competitive in the majority of the products. Serin and Civan (2008) analysed similar relations and found the Turkish fruit juices and olive oils to be highly competitive in European markets.

All the above raises the questions what determines a country's comparative advantages in a market? What factors are behind the changes in comparative advantages? This topic is very much understudied in the literature. It was just Couillard-Turkina (2014) doing such research when analysing the effects of the free trade agreements on the competitiveness of the dairy sector. Their results suggest that the free trade agreements actually have a positive impact on comparative advantages. Therefore, the paper seeks to contribute to the scant literature of the field by analysing the determinants of the revealed comparative advantages in the European ham industry.

METHODOLOGY

The various methods elaborated around the theory of the revealed comparative advantage provide the basis for analysis. The original index of the revealed comparative advantage was first published by Balassa (1965) who defined the following:

$$B_{ij} = \left(\frac{X_{ij}}{X_{it}}\right) \Big/ \left(\frac{X_{jn}}{X_{tn}}\right) \quad (1)$$

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 the 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 $B < 1$.

The Balassa-index is criticized because it neglects the different effects of agricultural policies and exhibits asymmetric values. The 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 the comparative disadvantage, it varies between zero and one, which overestimates a sector's relative weight. Vollrath suggested three different specifications of the revealed comparative advantage in order to eliminate the disadvantages of the Balassa index, the detailed description of which can be found in Vollrath (1991).

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

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

The RSCA takes values 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).

Besides calculating the revealed comparative advantages, the literature suggests that their stability and duration should be measured as well. In analysing the stability of the RSCA index, a regression was run on the dependent variable, the RSCA index at time $t2$ (for sector i in country j), which is tested against the independent variable – the RSCA index in year $t1$ (3).

$$RSCA_{ij}^{t2} = \alpha_i + \beta_i RSCA_{ij}^{t1} + \varepsilon_{ij} \quad (3)$$

where α and β are the standard linear regression parameters and ε is a residual term. If $\beta = 1$, then this suggests an unchanged pattern of RSCA between periods $t1$ and $t2$, meaning there is no change in the overall degree of specialization in the European ham trade. On one hand, if $\beta > 1$, the existing specialization is strengthened, meaning that a low level of speciali-

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zation in the initial period leads to less specialization in the future, which is called β divergence (Bojnec and Fertő 2008b). On the other hand, if $0 < \beta < 1$, the commodity groups with a low initial B indices grow over time, which is called β convergence (Bojnec and Fertő 2008b). However, if $\beta < 0$, a change in the sign of the index is shown.

However, as Dalum et al. (1998) point out, the $\beta > 1$ is not a necessary condition for the growth in the overall specialization pattern. They argue that sufficient conditions for specialization or de-specialization need further analyses. If R is the correlation coefficient of the regression, then the pattern of a given distribution is unchanged when $\beta = R$. If $\beta > R$, then the degree of specialization has grown (leading to divergence). If $\beta < R$, then the degree of specialization has fallen (meaning convergence).

Following Bojnec and Fertő (2008a), a survival function $S(t)$ 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 (2008a), 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 $t < t(1)$):

$$\hat{S}(t) = \prod_{t(i)<t} \frac{n_j - d_j}{n_j} \quad (4)$$

In analysing the determinants of the European ham trade, the following hypotheses are tested in the paper.

H1: Higher factor endowments increase comparative advantages

The difference in factor endowments is usually measured by the inequality in the per capita GDP, in line with Falvey and Kierzkowski (1987). It seems reasonable that higher factor endowments of a country lead to higher comparative advantages based on the higher number of resources available. Factor endowments are proxied by the logarithm of per capita GDP (lnGDPPC), which is expected to be positively related to comparative advantages. Per capita GDP is measured in PPP in constant 2005 US dollars, where the data come from the World Bank WDI database.

H2: Capital investments foster comparative advantages

The process cured ham production is very long. Prosciutto di Parma, one of the most well-known hams of Italy, for instance, has to be cured for at least 12 months, but in the European market, the most expensive hams could be aged up to 4–5 years. This process is very capital intensive, only financially strong companies could afford it. Therefore, we assume that the capital investment, proxied by the Foreign Direct Investment (FDI) intensity, encourages the growth of comparative advantages. FDI intensity data is coming from the EUROSTAT market integration indicator database and reflects the total FDI due to the lack of the industry specific data in this regard.

H3: Geographical indication is positively related to comparative advantages

The food quality policy of the European Union underlines the importance of the place of origin. The geographical indication guarantees that an agricultural product is produced under the highest food quality standards in a region. By the end of 2014, 8 EU member states had 43 different hams with the geographical indication (17 Protected Designation of Origin and 26 Protected Geographical Indications). The geographical indication is included in the model with a dummy variable, taking a value of 1 if the given country has a PDO or PGI ham product (see appendix). Note that the share of the GI products in the total production would be a better proxy for this variable, though such share is not available in any database.

H4: EU accession is positively related to comparative advantages

The previous studies (Fertő and Soós 2009; Bojnec and Fertő 2012) show that the duration of trade in both manufacturing and agri-food products differs across the European markets. For the majority of countries, the duration of trade is greater in the EU the 10/12 markets than in the EU15 markets. It is evident that the economic integration fosters the agri-food trade, which will occur as the new members become integrated. This hypothesis is tested by a dummy variable with a value of 1 if the reporter is an EU member and a 0 if not.

The paper applies the gravity equation approach to analyse the determinants of comparative advantages

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Table 1. Description of variables

Variable	Description	Data source	Exp. sign
Dependent variable			
RSCA	Revealed Symmetric Comparative Advantage	Eurostat	n.a.
Independent variables			
lnGDPPC	Real GDP per capita (in euro)	Eurostat	+
lnFDI	Foreign Direct Investment intensity	Eurostat	+
GI	GI dummy (1 if a country has a PDO and/or PGI in ham products and 0 otherwise)	DOOR database	+
EU	EU accession dummy (1 if a country is the member of the EU in a given year and 0 otherwise)	–	+

Source: Own composition

of the European ham trade in 1999–2013. On the whole, we estimate the following regression model:

$$RSCA_{it} = \alpha + \beta_1 \ln GDPPC_{it} + \beta_2 \ln FDI_{it} + \beta_3 GI_{it} + \beta_4 EU_{it} u_i + \varepsilon_{it} \quad (5)$$

Table 1 provides an overview of the description of variables and related hypotheses.

In estimating the determinants of comparative advantages, the panel-corrected standard errors (PCSE) panel estimation technique is applied to equation (4) in order to ensure the robustness of the results and the control for heteroskedasticity and contemporaneous correlation across panels (Beck and Katz 1995, 1996). Many other static and dynamic panel data techniques are available including the pooled OLS, the fixed effects (FE) and the random effects (RE), the feasible generalised least squares (FGLS) and the GMM-SYS method, though contrary to the recent studies (Leitao 2012; Jámbor 2014; Fertő and Jámbor 2015), the PCSE method provided the best results for our sample.

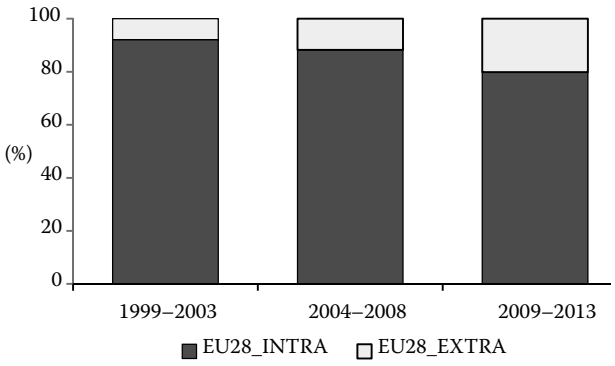

Figure 1. European ham export by destination, 1999–2013, percentage

Source: Own composition based on the Eurostat (2015)

The paper employs the European ham trade data for 1999–2013 and, in this context, the EU is defined as the member states of the EU28. Furthermore, it concentrates on the B index (and its transformation, the RSCA index) as it excludes imports, which are more likely to be influenced by the policy interventions. The phasing out of export subsidies is a further reason to choose a B-based index. In order to calculate the various indices mentioned above, the paper uses the Eurostat CN8 trade data. The ham trade is defined as the trade of the domestic swine hams and cuts thereof, as detailed in the appendix. The paper works with the trade data for 1999–2013 and divides this period into three sub-periods (1999–2003, 2004–2008 and 2009–2013).

The characteristics of the European ham trade

The vast majority of European hams is sold within Europe, though the share of export to third countries is increasing (Figure 1). The growing share of the ham sold to third countries (from 8% to 20% between 1999 and 2013) is due to the increasing demand of countries from the Far-East. In the period analysed, the European ham export to Japan increased by more than thirteen times and thereby Japan is the most important third country partner of Europe in this regard. Other important ham destinations are the United States and Russia, though the latter shows high fluctuations due to the increasing number of trade barriers emerged.

Ham imported by the European Union is not relevant at all. Although the share of import from third countries increased from 1999 to 2013, it is still below 2%. On the whole, one can conclude that the most important market for European hams is the European Union, therefore, this paper only deals with the intra-European ham trade.

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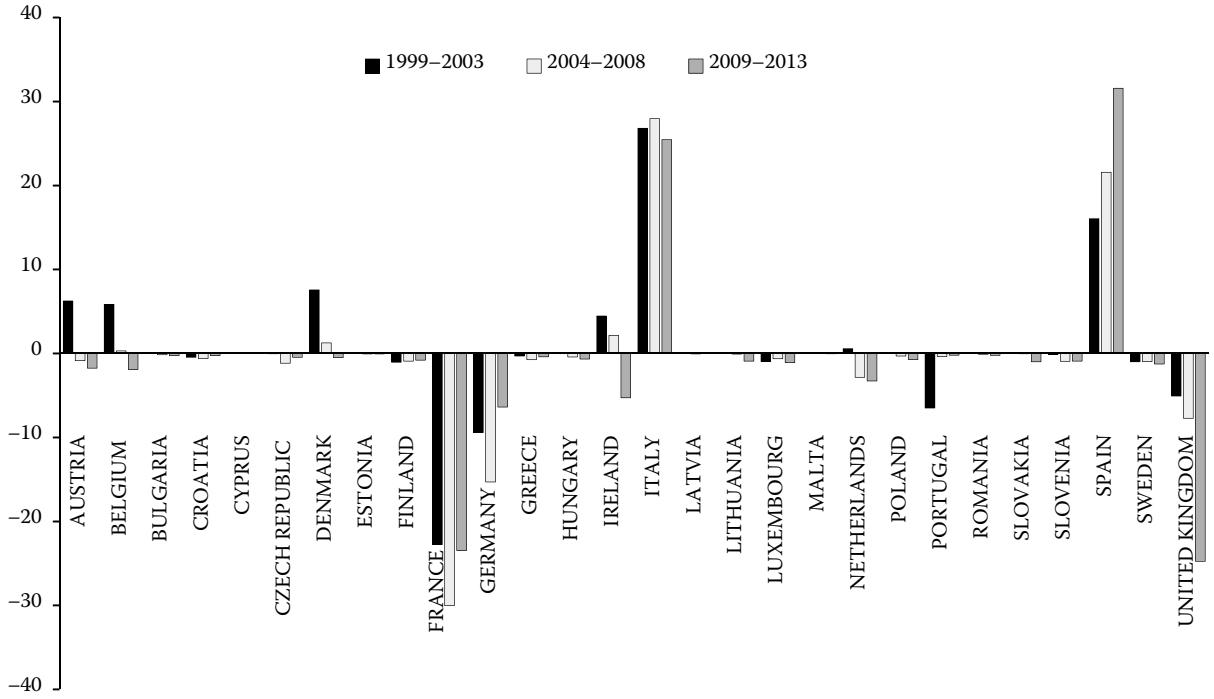

Figure 2. Trade balance of ham in the EU member states, 1999–2013, million euro

Source: Own composition based on the Eurostat (2015)

As to the most important players of the European ham market, Italy and Spain are leading the line with highly positive trade balances in all the sub-periods (Figure 2). The Spanish ham trade balance shows a dynamic increase, while the Italian is almost the same. At the other end, three countries (France, Germany and the United Kingdom) are the places where the biggest amount of European ham is sold.

Two other country groups are recognized: countries with the positive trade balance in the first and/or second sub-period (1999–2003 and 2004–2008) and countries with the negative trade balance in all the years. In the first group, Austria, Belgium, Denmark and Ireland used to have significant surplus in the ham trade between 1999 and 2003 but finally their import (most assuredly from Italy and Spain) has exceeded their export (Figure 2). In the case of some New Member States (e.g. Estonia and Hungary), the negative change in their ham trade balance is supposedly caused by the negative effects of the EU accession on their ham industry. In the second group, Portugal should be highlighted: its ham trade deficit decreased significantly from 6.5 million euro to 0.2 million euro from 1999 to 2013.

In line with Figure 2, a more disaggregated list of the main trading partners of the European ham is given in Table 2 and Table 3. It is evident that the two most important ham exporters are Italy and Spain, representing more than one half of the total European export in all periods. However, Spain has taken the lead after 2008 because of the dynamic expansion in its ham export. Besides these two countries, Belgium

Table 2 TOP 5 ham exporters in the EU, 1999–2013, percentage

Country	1999–2003 (%)	Country	2004–2008 (%)	Country	2009–2013 (%)
Italy	31	Italy	34	Spain	38
Spain	19	Spain	24	Italy	32
Belgium	12	France	13	Belgium	7
Austria	9	Belgium	12	France	7
Denmark	8	Ireland	4	Portugal	6
TOP5 total	79	TOP5 total	87	TOP5 total	90

Source: Own composition based on the Eurostat (2015)

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Table 3. TOP 5 ham importers in the EU, 1999–2013, percentage

Country	1999–2003 (%)	Country	2004–2008 (%)	Country	2009–2013 (%)
France	36	France	37	France	26
Germany	14	Germany	15	United Kingdom	22
United Kingdom	10	Belgium	10	Germany	8
Portugal	9	United Kingdom	9	Belgium	8
Belgium	7	Italy	6	Ireland	5
TOP5 total	76	TOP5 total	78	TOP5 total	69

Source: Own composition based on the Eurostat (2015)

is also an important ham exporter but with a decreasing European share. The very high and increasing concentration of the TOP5 exporters is also evident from Table 2: five countries gave 90% of the European ham export in 2009–2013.

Regarding ham imports, it is observable that the most important importers are France, Germany, the United Kingdom and Belgium, mainly because of the size of their markets with a high demand (Table 3). One-third of European hams were sold in France in 1999-2003 and 2004-2008, while this share decreased to 26% in 2009–2013. Note that some countries (e.g. Belgium, Italy, and France) also appear among the TOP5 importers, suggesting the intra-industry ham trade patterns. This phenomenon can be explained by the great ham processing capacities of these countries - many pigs slaughtered in other countries (e.g. Denmark and the Netherlands) are transferred to Italy, for instance, because of the traditional Italian processing methods. In the end, these products are re-exported, increasing the share of the Italian ham export. The concentration of the European ham import is also high but decreasing.

Specialisation of European ham trade

With the calculation of the RSCA indices, the specialisation of European ham trade becomes apparent (Figure 3). First, it is a general tendency that the competitiveness of the member states has weakened from 1999 to 2013 – only four countries had positive values at the end of the period: Italy, Portugal, Slovenia and Spain. These four countries were the most competitive ones in the European ham trade. Besides the general tendency, Austria, Belgium, Denmark and Ireland faced the most significant fall. However, the vast majority of the European Union members lacked competitiveness in the ham trade. Slovenia was the only New Member State having a comparative advantage, though significantly decreasing, in the period analysed. Figure 3 also suggests that there is

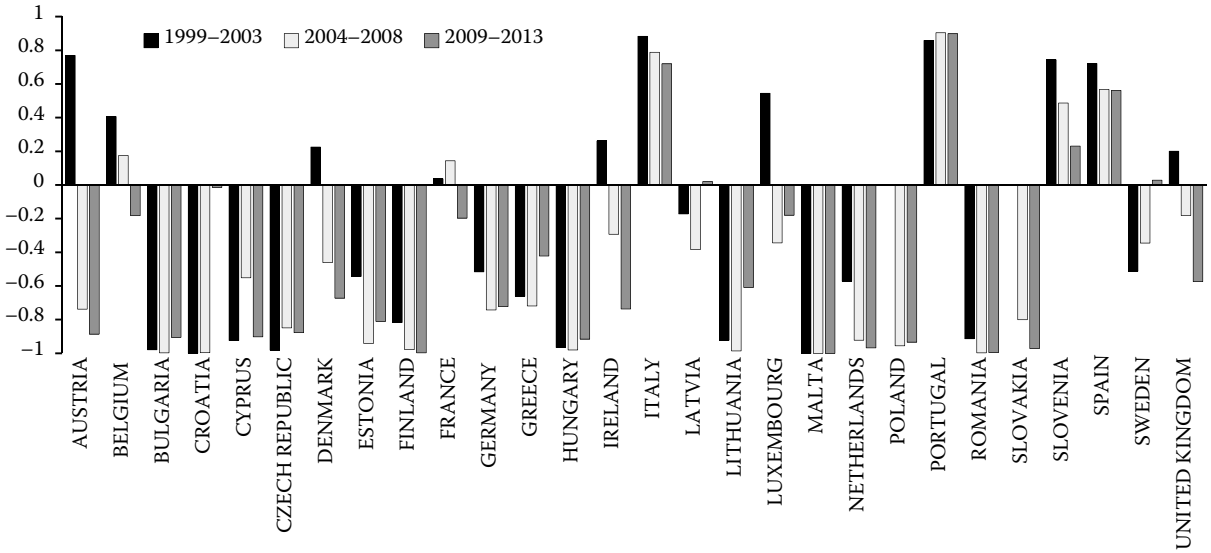

Figure 3. Revealed comparative advantage of the European ham trade by the RSCA index, 1999–2013

Source: Own composition based on the Eurostat (2015)

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Table 4. The distribution of the RSCA index by year

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mean	–0.13	–0.22	–0.24	–0.19	–0.20	–0.34	–0.44	–0.53	–0.52	–0.49	–0.50	–0.46	–0.51	–0.45	–0.41
Standard Deviation	0.72	0.73	0.74	0.80	0.70	0.67	0.65	0.62	0.60	0.61	0.58	0.59	0.53	0.62	0.65
RSCA < 0	0.52	0.60	0.56	0.52	0.56	0.68	0.75	0.79	0.81	0.75	0.79	0.82	0.89	0.75	0.71
RSCA > 0	0.48	0.40	0.44	0.48	0.44	0.32	0.25	0.21	0.19	0.25	0.21	0.18	0.11	0.25	0.29

Source: Own calculations based on the Eurostat (2015)

no clear relationship between the trade balance and competitiveness. France as the biggest ham importer had the revealed comparative advantage in the ham trade between 1999 and 2008, but the Portuguese and Belgian cases are also similar.

Similar conclusions can be drawn if analysing the changing distribution of the RSCA index over time. Table 4 presents the summary statistics – the mean and standard deviation – for the RSCA indices by year, as well as the proportion of indices above and below zero. It is clear that the revealed comparative advantage has weakened in the period analysed, with the mean RSCA falling from –0.13 in 1999 to –0.41 in 2013. The share of RSCA < 0 indicates that a majority of countries had a revealed comparative disadvantage over the entire period, and that this majority was larger in the post-2004 accession period. Standard deviations of the RSCA indices over the whole sample are quite high, suggesting variation from year to year, and they seem to remain relatively stable over the entire period.

Our stability tests confirm the results above. By using our dataset to estimate various lags for Equation 3, the resulting β values show that trade patterns have significantly changed in the period analysed (Table 5).

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

In further analysing the changes of the revealed comparative advantage in the European ham trade, its duration was estimated by the using the non-parametric Kaplan-Meier product limit estimator. As described in the methodology section, Equation 3 was run on our panel dataset and results confirm that the survival times of the revealed comparative advantage in the European ham trade are not persistent over the period analysed in general (Table 6). Survival chances of 97% at the start of the period fell to 4% by 2013, suggesting that a fierce competition is existent in the European ham trade.

Table 5. Stability of the RSCA index between 1999 and 2013

Lags	**α**	**β**	*p*-value	R^2	*R*	**β**/*R*	*N*
1	–0.0486	0.9081	0.0000	0.8447	0.9191	1.0094	374
2	–0.0937	0.8199	0.0000	0.7089	0.8420	0.9738	345
3	–0.1386	0.7465	0.0000	0.6184	0.7864	0.9493	317
4	–0.1806	0.6881	0.0000	0.5649	0.7516	0.9155	291
5	–0.2265	0.6317	0.0000	0.5044	0.7102	0.8895	264
6	–0.2553	0.6120	0.0000	0.4931	0.7022	0.8715	235
7	–0.2803	0.5972	0.0000	0.4874	0.6981	0.8554	208
8	–0.2977	0.5798	0.0000	0.4711	0.6864	0.8447	180
9	–0.3147	0.5337	0.0000	0.4061	0.6373	0.8375	153
10	–0.3243	0.5110	0.0000	0.3836	0.6194	0.8251	125
11	–0.3276	0.4844	0.0000	0.3473	0.5893	0.8220	100
12	–0.3495	0.4603	0.0000	0.3064	0.5535	0.8316	75
13	–0.3475	0.3952	0.0010	0.2033	0.4509	0.8765	50
14	–0.3479	0.4300	0.0140	0.2367	0.4865	0.8838	25

Source: Own calculations based on the Eurostat (2015)

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Table 6. Kaplan-Meier survival rates for the RSCA index and tests for equality of survival functions in the European ham trade with the EU by TOP5 exporters, 1999–2013

Years	Survivor function	Spain	Italy	Belgium	France	Portugal
1999	0.9690	1.0000	1.0000	1.0000	1.0000	1.0000
2000	0.9320	1.0000	1.0000	1.0000	0.9286	1.0000
2001	0.8961	1.0000	1.0000	1.0000	0.9286	1.0000
2002	0.8615	1.0000	1.0000	1.0000	0.9286	1.0000
2003	0.8223	1.0000	1.0000	1.0000	0.8442	1.0000
2004	0.7665	1.0000	1.0000	1.0000	0.7597	1.0000
2005	0.7026	1.0000	1.0000	1.0000	0.7597	1.0000
2006	0.6336	1.0000	1.0000	1.0000	0.7597	1.0000
2007	0.5625	1.0000	1.0000	0.8571	0.7597	1.0000
2008	0.4922	1.0000	1.0000	0.8571	0.7597	1.0000
2009	0.4148	1.0000	1.0000	0.8571	0.7597	1.0000
2010	0.3296	1.0000	1.0000	0.6429	0.5698	1.0000
2011	0.2315	1.0000	1.0000	0.4286	0.3799	1.0000
2012	0.1447	1.0000	1.0000	0.2143	0.1899	1.0000
2013	0.0413	1.0000	1.0000	0.0000	0.0000	1.0000
Log-rank test	0.0000					
Wilcoxon test	0.0000					

Source: Own calculations based on the Eurostat (2015),

Reasons behind the loss of comparative advantages are numerous. First, high competitive pressures exist in the European ham industry with many players producing high quality meat products. Second, the economic and food crisis of 2008 and 2011 also had an impact. The demand for expensive meat products definitely decreased together with the global trend. Moreover, the growth of the global cereal prices increased input costs for the European meat producers, causing them hard times in maintaining their competitiveness. Third, after the 2004 EU enlargement, several new players entered the common market, some of which had long traditions in quality ham producing (e.g. Slovenia), also increasing the competitive pressures.

However, it is also evident that the biggest European ham exporters have maintained their comparative advantages. Italy, Spain and Portugal had stable positions in the period analysed, while competitiveness of Belgian and French ham products deteriorated significantly. The equality of the survival functions across the product groups can be checked using two non-parametric tests (Wilcoxon and log-rank). Results show that the hypothesis of equality can be rejected at the 1% level of significance, meaning that similarities across product groups in the duration of comparative advantage are absent (Table 6). In general, our results are in line with the majority of literature in the field. The considerable loss of the comparative advantage is evident in several papers (see e.g. Fertő 2008; Qineti et al. 2009; Jámbor 2013).

Determinants of comparative advantages

It is evident from the above that competitiveness of countries in the European ham trade differs to a great extent. In line with the aim of our paper, Table 7 presents the results of our model runs on Equation 4.

Table 7 suggests that factor endowments, the geographical indication and the EU accession are positively, while the FDI is negatively related to the competitiveness of the European ham trade. As to the factor endowments, we cannot reject our first hypothesis that higher factor endowments of a country leads to higher comparative advantages based on the higher number of resources available. However, Hypothesis 2 is rejected as a negative relationship exists between the FDI and competitiveness. It appears that the foreign investment is not essential for the European ham products to be competitive, which might be explained by the logic of the geographical indication – the traditional and local processing of high quality food products in the national hands. In line with our previous expectations, Hypothesis 3 and 4 cannot be rejected, meaning that the geographical

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Table 7. Determinants of the European ham trade competitiveness

Variables	RSCA	
lnGDPPC	0.1240	(0.0000)
lnFDI	–0.0011	(0.0000)
GI	0.9111	(0.0000)
EU	0.0041	(0.9370)
Constant	–1.8351	(0.0000)
Observations	402	
R-squared	0.4567	
Number of countries	28	

Standard errors in parentheses: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Source: Own calculations based on the Eurostat (2015)

indication and the EU membership highly determine the competitiveness of the European ham products. Our variables are statistically significant at all levels, except for the EU dummy, and the model has a quite high R^2, meaning that our variables explain almost 50% of the total variance.

CONCLUSIONS

The paper analysed the European ham market, giving a special attention to the factors influencing the competitiveness of the industry. The paper has reached many conclusions. First, by analysing the most important characteristics of the European ham production, it became clear that the vast majority of the ham products was sold within the European Union, and some dominant players were ruling both the supply (Italy and Spain) and the demand (France, Germany and the United Kingdom) side, indicating that the ham industry is highly concentrated in the EU.

Second, it was evident that only four member states could be competitive in the European ham market (Portugal, Spain and Italy and Slovenia), but it was only Portugal who could increase its competitiveness in the period analysed. The results also suggest that the competitiveness based on the RSCA indices has worsened in the majority of the cases between 1999 and 2013.

Regarding the factors influencing the competitiveness of the European ham trade, the paper identified four major factors. It appears that the factor endowments, the geographical indication and the EU accession are positively, while the FDI is negatively related to the competitiveness of the European ham trade. These outcomes are in line with the initial expectations except for the FDI, underlining the importance of the local (national) players in this high quality-based market segment. Research in the future might check for other variables and sectors to extend these results and make them more valid.

APPENDIX

1. Ham product categories of CN8

CN8 code	Product category
2101111	DOMESTIC SWINE HAMS AND CUTS THEREOF, SALTED OR IN BRINE, WITH BONE IN
2101131	DOMESTIC SWINE HAMS AND CUTS THEREOF, DRIED OR SMOKED, WITH BONE IN

Source: Eurostat (2015)

2. European hams with geographical indications

Designation	Country
Jambon d'Ardenne	Belgium
Jambon de Vendée	France
Jambon sec de Corse/Jambon sec de Corse – Prisuttu	France
Jambon de l'Ardèche	France
Jambon sec et noix de jambon sec des Ardennes	France
Jambon de Bayonne	France
Salaisons fumées, marque nationale grand-duché de Luxembourg	Luxembourg
Westfälischer Knochenschinken	Germany
Holsteiner Katenschinken/Holsteiner Schinken/ Holsteiner Katenrauchschinken/ Holsteiner Knochenschinken	Germany

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Designation	Country
Schwarzwälder Schinken	Germany
Ammerländer Schinken ; Ammerländer Knochenschinken	Germany
Ammerländer Dielenrauchschinken ; Ammerländer Katenschinken	Germany
Prosciutto Amatriciano	Italy
Porchetta di Ariccia	Italy
Prosciutto di Sauris	Italy
Crudo di Cuneo	Italy
Prosciutto di Parma	Italy
Prosciutto di Norcia	Italy
Prosciutto Toscano	Italy
Valle d'Aosta Jambon de Bosses	Italy
Prosciutto di Carpegna	Italy
Pancetta Piacentina	Italy
Prosciutto di S. Daniele	Italy
Prosciutto di Modena	Italy
Prosciutto Veneto Berico-Euganeo	Italy
Presunto do Alentejo; Paleta do Alentejo	Portugal
Presunto de Camp Maior e Elvas; Paleta de Campo Maior e Elvas	Portugal
Presunto de Santana da Serra; Paleta de Santana da Serra	Portugal
Presunto de Vinhais / Presunto Bísaro de Vinhais	Portugal
Presunto de Barroso	Portugal
Presunto de Barrancos	Portugal
Jamón de Serón	Spain
Los Pedroches	Spain
Jamón de Trevélez	Spain
Lacón Gallego	Spain
Jamón de Huelva	Spain
Dehesa de Extremadura	Spain
Guijuelo	Spain
Jamón de Teruel/Paleta de Teruel	Spain
Cecina de León	Spain
Prekmurska Šunka	Slovenia
Kraški pršut	Slovenia
Prleška tünka	Slovenia

Source: own composition based on the DOOR database (2015)

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