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DYNAMIC CHANGES OF FOOD PRODUCERS IN BULGARIA*

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Abstract. The food and beverage production in Bulgaria has dramatically changed after the full EU membership in 2007. This change has affected not just the production structure, but also the import and export structure as well as overall production potential of the agri-food sector. The aim of the paper is to look inside the changes from the perspective of the single producer. This means to answer to the question: why has the Bulgarian agri--food production been getting worse? The analyses showed that food industry does not have the ability to move over the 1980s values. Partially this state is a result of misunderstanding by food processors how to manage their production more efficiently. The greatest potential for dynamic change of Bulgarian food industry is in the innovation inputs (development of new products and technologies improvement overall marketing). For food sector the major role, among all types of innovations, is played by product innovations.

Key words: food and beverage industry (FBI), industrial dynamics, agri-food development

INTRODUCTION

Bulgarian food industry has developed very fast after the year of 2000. This development has been connected not just with production and turnover's growth but with improvement of technics and technology inside the industry entities.

Nevertheless, there are a lot of authors [Noev 2003, Mishev et al. 2003a, Mishev et al. 2003b, Ivanov et al. 2005, Ivanov 2009] that report on decrease of the growth potential of the Bulgarian food sector not just recent days but for long-time period during the last 20 years. Thus, the analysis of dynamics of food production in Bulgaria needs to look inside the changes of food production not for 20-year-period, but through a century.

The analysis on the food industry includes the analysis of a change of the overall food production as well as total food products turnover in Bulgaria over time. To ensure that there is no statistically confidential autocorrelation we use the time log-function of the production and turnover for constructing the industry dynamic index – IDI [Kopeva et al. 2011, Blagoev et al. 2013] – Figure 1.

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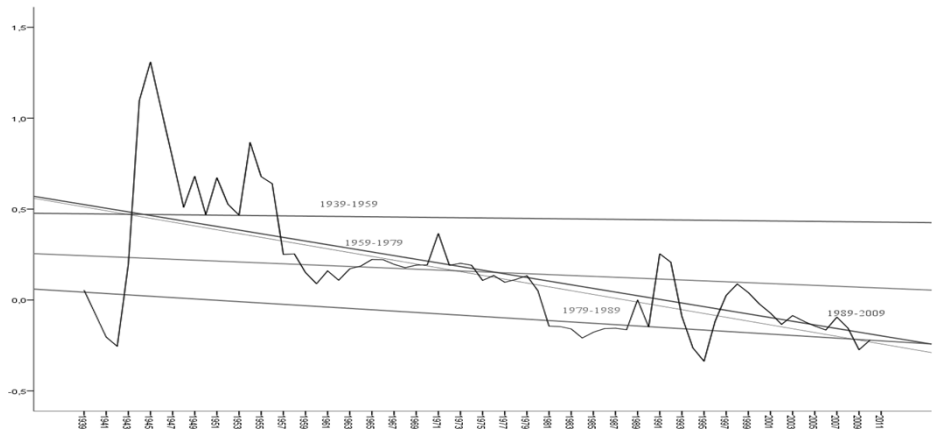

Fig. 1. Industry dynamic index of food industry in Bulgaria
Source: Blagoev et al. 2013.

The data show not just the stages of development of food production and consumption in Bulgaria, but also give a picture of overall dynamic growth of the food industry in Bulgaria for the last century.

This industry dynamic index has a negative value for the Bulgarian food industry. As the Figure 1 shows, the food turnover exceeds the food production in Bulgaria for the whole period. But this was not so sufficient in the middle of the 1950s than in nowadays.

Thus, it is very important for understanding the figures that the food consumption in Bulgaria grows much faster than the food production. This could be percept as a first demonstration of growth potential loss of the food producers in Bulgaria. This could be pointed to these authors who showed Bulgarian food production as declining one.

Therefore, such negative dynamic change is a result of the lost connection between production growth and business competitiveness. In addition, the factors for the lost connection are:

- deterioration of food industry competitiveness – in this meaning the added value of the food production is lower than the added value of other industries;
- deterioration of international competitiveness – in this meaning Bulgaria has lost its competitive advantage in food specialization since 1990s. So, the Bulgaria has changed its position and from the food exporter became a food importer for the last 10–20 years.

The deeper explanation of the dynamic changes inside the Bulgarian food industry needs to use a clear methodological instrument for dynamic analysis.

METHODOLOGY

Even though there are some practical instruments for dynamic analysis we use to study the dynamic changes by instruments of Industrial dynamic function.

The study is based on Cobb-Douglas production function and Solow-Swan growth model [Kuznetsov and Michasova 2007].

Production function is represented as a multiplication of all factors of production at business level (labour, capital and resources)[1]:

$$P = f(L, K, R, M) = b_1.L.K.R.e^M + b_0 + \varepsilon \quad (1)$$

where: L – labour (expresses the influence of the labour as a factor of production);
K – capital (expresses the influence of the capital as a factor of production);
R – resources (express the influence of the use of material resources and services as a factor of production);
M – scientific and technological development (expresses the influence of the R&D as a factor of production);
b_1 – function parameter (expresses the degree of influence of variables – factors of production: labour L, capital K and use of resources R on production function P);
b_0 – intercept – constant (expresses the influence of unreported outside factors of production in the model);
ε – random variable (expresses the influence of changing production conditions over time).

In order to focus on the dependence of different variables of production function, respectively labour inputs (L), material inputs (R), capital inputs (K), innovation inputs (M), we could further develop production function by putting it to logarithmic base. This results in the Formula 2:

$$\ln P = a_1^L \ln L + a_1^K \ln K + a_1^R \ln R + a_1^M M + a_0 + \varepsilon \quad (2)$$

Furthermore, the impact of any single variable on the dependent: Production function could be found as the Formulas 3–10.

– Labour inputs:

$$\ln L = \frac{\ln P - a_1^K \ln K - a_1^R \ln R - a_1^M M - a_0 - \varepsilon}{a_1^L} \quad (3)$$

or

$$\ln L = c_1^L \ln P - c_0^L - \varepsilon \quad (4)$$

where: $c_1^L = 1/a_1^L$;

c_0^L – reflects the degree of dependence of K, R and M of a given company on its labour activities (L).

[1]A similar explanation is done by A. Vezzani and S. Montresor [2013].

– Material inputs:

$$\ln R = \frac{\ln P - a_1^L \ln L - a_1^K \ln K - a_1^M M - a_0 - \varepsilon}{a_1^R} \tag{5}$$

or

$$\ln R = c_1^R \ln P - c_0^R - \varepsilon \tag{6}$$

where: $c_1^R = 1/a_1^R$;

c_0^R – reflects the degree of dependence of L, K and M of a given company on its material usage (R).

– Capital inputs:

$$\ln K = \frac{\ln P - a_1^L \ln L - a_1^R \ln R - a_1^M M - a_0 - \varepsilon}{a_1^K} \tag{7}$$

or

$$\ln K = c_1^K \ln P - c_0^K - \varepsilon \tag{8}$$

where: $c_1^K = 1/a_1^K$;

c_0^K – reflects the degree of dependence of L, R and M of a given company on its fixed assets usage and respectively capital intense (K).

– Innovations inputs:

$$M = \frac{inP - a_1^L \ln L - a_1^R \ln R - a_1^K \ln K - a_0 - \varepsilon}{a_1^M} \tag{9}$$

or

$$M = c_1^M \ln P - c_0^M - \varepsilon \tag{10}$$

where: $c_1^M = 1/a_1^M$;

c_0^M – reflects the degree of dependence of L, R and K of a given company on its innovation activities (M).

As mentioned earlier, the different indices $c_1^i, i \in \{L,R,K,M\}$ could be used for evaluation of the resource capacity and respectively – resource potential of the food producers for growth of entities' total production output.

DATA ANALYSIS

Analysis of dynamic changes of Bulgarian food industry is based on business data from 515 food processors. The data is collected[2] by National statistical office from their annual financial books.

The observation sample includes more than 10% of Bulgarian food entities (compared to their number in 2010) in six major food specializations that are very important for Bulgarian food industry as follows: a) processing and preserving of meat and production of meat products; b) manufacture of dairy products; c) manufacture of grain mill products, starches and starch products; d) manufacture of bakery and farinaceous products; e) processing and preserving of fruit and vegetables; f) manufacture of other food products.

The distribution of observation by their food specialization is given in the Table 1.

Table 1. Number of enterprise and their share in total of observed food processors

Specification	Number of enterprises (for 2010)	Share (%)	Number of enterprises of observation	Share of observation (%)
Manufacture of food products	4 829	100.0	515	10.6
Processing and preserving of meat and production of meat products	491	10.2	65	13.2
Processing and preserving of fruit and vegetables	329	6.8	62	18.8
Manufacture of dairy products	296	6.1	26	8.8
Manufacture of grain mill products, starches and starch products	155	3.2	49	31.6
Manufacture of bakery and farinaceous products	2 652	54.9	163	6.1
Manufacture of other food products	583	12.1	148	25.4

Source: Eurostat, Trade Register of the Registry Agency and own calculations.

The biggest share in observation is given by the most important products as: bakery and confectionery (other food products) as well as dairy and meet processing products. Observation covers food processors from five major regions on NUTS 2 as follows: South East, South Central, South West as well as North Central and North West regions. In addition, different regions have different food specialization according to the resources.

The dynamic analysis is based on the basic book results of the observed entities that are connected to the production function as the next: labour costs (L); material costs (R); investments costs (K); value of fixed assets; innovation costs (M); total production costs ($L + R$); total costs ($L + R + K + M$ + administrative costs = P); turnover (To); profit (To-P); number of employees (N_{empl}); labour efficiency (To/N_{empl}); labour intensity (L/P).

The analysis of food producers' business data (Table 2) allows identifying different groups of entities divided by their product specialization.

[2]Data is collected by research under project INI DMU 02 – 24/2009.

Table 2. Distribution of major business activities by food specialization

Product Specialization	Personnel Cost: L (€ 1,000)	Fixed assets (mln €)	Investment cost: K (€ 1,000)	Material cost: R (mln €)	Innovation cost: M (€ 1,000)	Production cost (mln €)	Total cost: P (mln €)	Turnover: To (mln €)	Profit: To-P (mln €)	Number of Employees: N_{empl}	Labour efficiency (€ 1,000/ /empl.)	Labour Intensity
Manufacture of grain mill products, starches and starch products	152.26	0.74	4.15	1.391	0.00	1.421	1.268	1.614	0.2	17.8	36.1	0.31
Manufacture of bakery and farinaceous products	229.34	1.02	0.85	1.490	0.00	1.576	0.674	1.78	0.95	42.9	139.2	1.25
Production of sugar and sugar products	749.30	12.26	0.00	4.873	0.00	5.270	13.60	16.14	0.79	146.3	56.4	0.28
Processing and preserving of fruit and vegetables	231.52	1.02	1.53	1.017	0.00	1.165	0.949	1.5	0.18	35.4	54.5	0.27
Processing nuts and spices	165.03	0.70	0.00	0.72	0.00	0.856	0.830	1.010	0.12	21.5	54.6	0.27
Production, processing, preserving of meat and meat products	481.52	2.91	2.76	5.196	0.00	5.441	6.289	6.89	0.33	91.8	73.6	0.33
Manufacture of dairy products	524.40	4.27	0.00	4.988	0.00	5.250	5.691	6.37	0.39	85.8	82.0	0.13
Manufacture of other food products	281.83	1.15	0.00	0.799	0.00	1.080	1.225	1.58	0.35	31.8	47.0	0.58
Production of sweets and confectionery products	380.17	235.5	0.00	0.348	0.00	0.729	47.66	0.11	0.06	11.16	17.53	3.00
AVERAGE	332.62	2.401	1.22	2.217	0.00	2.414	3.017	3.78	0.44	52.63	78.60	0.74

Source: Project data and own calculations.

According to the earlier mentioned data, two groups of food processors are identified as follows:

- **First group** covers the food producers with the highest enterprise activities, including personnel costs, material costs, turnover and fixed assets as well they have the greater number of employees and average levels of labour efficiency. Their labour intensity is not high too. In this group we find production specialization as follows: a) manufacture of dairy products; b) production, processing, preserving of meat and meat products; c) production of sugar and sugar products.
- **Second group**, as opposite to the first one, covers the enterprises with the lowest enterprise activities, inclucing personnel costs, material costs, turnover and fixed assets as well they have the smallest number of employees and lower labour efficiency. They could be divided just by the labour intensity as the next: a) with low level of labour intensity: processing and preserving of fruit and vegetables, and processing nuts and spices; b) with average level of labour intensity: manufacture of other food products; c. with highest level of labour intensity: manufacture of bakery and farinaceous products, and production of sweets and confectionery products.

Therefore, authors did a cluster analysis of the observed sample that helped them to analyze more sufficiently the dynamic changes of the Bulgarian food industry. The basic elements of the cluster analysis are given in the next:

- **independent variables**: personnel costs; investments costs; number of employees; labour efficiency; labour intensity; administrative code; product code;
- **parameters of clustering** are as follows: clustering method: increase of sum of squares; number of cases: 515; number of variables: 7; proximate coefficient: squared Euclidean distance; randomize tree by proximities; randomize tree: at 515 cluster levels; number of random trials: 120; evaluate and display: 10 final fusions; save validation results: 50 final fusions; significance test: 2.57 t-test;
- **tree cut** and **tree validation** (Fig. 2).

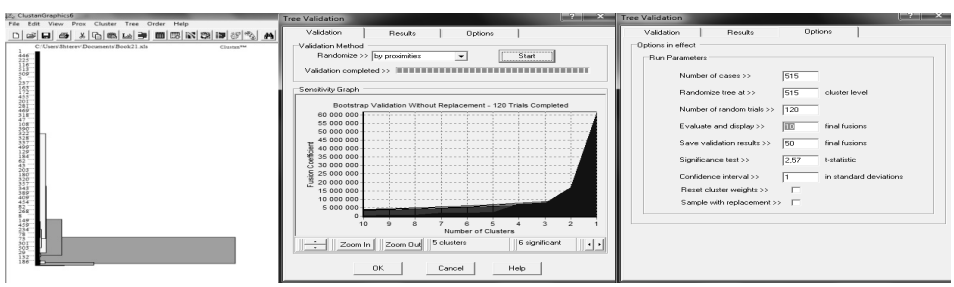

Fig. 2. Distribution of observation by region at NUTS 2 (right) and by their product specialization (left)

Source: Project data and own calculations (by Clustan Graphics 1.0).

According to the best tree cut, the number of clusters is set to 3.

The distribution of the enterprises among different clusters is not equal and the figures are given in Tables 3 and 4:

- **Cluster Distribution** (Table 3)

Table 3. Distribution of identified three clusters

Cluster	Number of members	Share of members
1	484	94%
2	16	3%
3	15	3%

Source: Project data and own calculations

- **Cluster Table** (Table 4)

Table 4. Mean of independent variables by clusters

Cluster	Personnel costs	Investment costs	Number employees	Labour efficiency	Labour intense	Administrative code
1	113.58	0.96	17.13	28.66	0.49	3.05
2	1 423.43	Missing	132.44	94.56	0.09	2.94
3	3 734.90	Missing	536.08	94.90	0.08	3.15

Source: Project data and own calculations.

The final test of clustering is the correlation table (Table 5) that helps to understand what explains the cluster membership.

Table 5. Correlation between all variables and clusters' membership

Cluster	personnel Cost: *L*	Fixed assets	Investment cost: *K*	Material cost: *R*	Innovation cost: *M*	Production cost	Total cost: *P*	Turnover: *To*	Profit: To-P	Number of employees: N_{empl}	Labour efficiency: To/N_{empl}	Labour intensity: *L*/*P*
Pearson Correlation	.878**	.602**	.[a]	.799**	.[a]	.838**	.588**	.597**	.132*	.546**	.299**	-0.05
Sig. (2-tailed)	0.000	0.000	0.000	0.000	.	0.000	0.000	0.000	0.015	0.000	0.000	0.454

**Correlation is significant at the 0.01 level (2-tailed).
.[a]Cannot be computed because at least one of the variables is constant.
Source: Project data and own calculations.

According to the figures, the cluster membership is strongly connected with the enterprise activities level as well as not so strong with the labour efficiency and labour intensity. The cluster membership is not dependent on the region of the production neither the product specialization. The differentiation by the cluster membership is given in on Figure 3.

The next step of analysis is the verification of production function (Formula 1) for the whole sample. We use statistical analysis by parametric correlation.

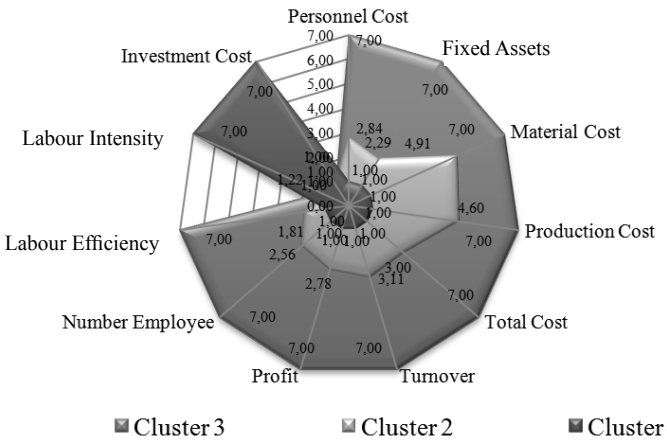

Fig. 3. Cluster profile by analyzed variables
Source: Project data and own calculations

The analysis gave us back that the production function could be evaluated as significant as the Pearson correlation coefficient is bigger than 0.67 as well as the significant coefficient is 0.00 (Table 6).

Table 6. Correlation between production value (total costs = P) and production function ($Y = F(P)$)

Specification	Correlation	Production value: P	Production function: Y
Production value: P	Pearson Correlation	1	.676**
	Sig. (2-tailed)		0.000
Production function: Y	Pearson Correlation	.676**	1
	Sig. (2-tailed)	0.000	

**Correlation is significant at the 0.01 level (2-tailed). The evaluation is done with significance coefficient $\alpha < 0.05$.
Source: Project data and own calculations (by SPSS 19.0).

In addition, the statistical analysis verified the cubic model (Table 7 and Figure 4) of production function as all of its parameters are dependent of each other.

Table 7. Model summary and parameters estimates

Equation	Model summary					Parameter estimates			
	R Square	F	df_1	df_2	Sig.	Constant	b_1	b_2	b_3
Cubic	0.785	439.772	3	362	0.000	1 238.830	0.000	0.000	0.000
Quadratic	0.749	542.271	2	363	0.000	1 376.398	0.000	0.000	
Linear	0.457	306.273	1	364	0.000	1 748.985	0.000		

Dependent variable: production value: P; independent variable is production function: Y.
Source: Project data and own calculations (by SPSS 19.0).

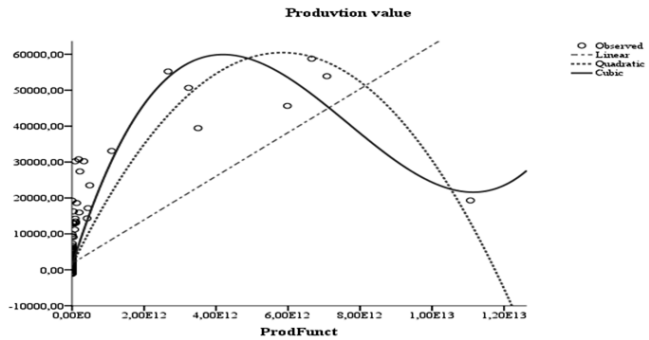

Fig. 4. Production function's graphic models
Source: Project data and own calculations

This allows us to concern our attention on analysis of log-functions (Formulas 3–10). Thus, the first test is a correlation analysis between log-value of production costs: *P* and log-values of elements of production function separately as follows (Table 8): material costs: R, respectively LOG of material costs; labour costs: *L*, respectively LOG of labour costs; capital costs: *K*, respectively LOG of capital costs; innovations' costs: *M*, respectively LOG of EXP innovations' costs.

Table 8. Correlation between LOG Production value and LOG Labour, LOG Materials, LOG Investments, LOG Innovations

Specification	Correlation	LogProd	LogLabour	LogMat	LogInv	LogexpInnov
LogProd	Pearson Correlation	1	.781**	.860**	.219**	.[a]
	Sig. (2-tailed)		0.000	0.000	0.004	.
LogLabour	Pearson Correlation	.781**	1	.897**	.250**	.[a]
	Sig. (2-tailed)	0.000		0.000	0.001	.
LogMat	Pearson Correlation	.860**	.897**	1	.248**	.[a]
	Sig. (2-tailed)	0.000	0.000		0.001	.
LogInv	Pearson Correlation	.219**	.250**	.248**	1	.[a]
	Sig. (2-tailed)	0.004	0.001	0.001		.
LogexpInnov	Pearson Correlation	.[a]	.[a]	.[a]	.[a]	.[a]
	Sig. (2-tailed)	.	.	.	.	

**Correlation is significant at the 0.01 level (2-tailed). The evaluation is done with significance coefficient $\alpha < 0.05$.
[a]. Cannot be computed because at least one of the variables is constant.
Source: Project data and own calculations (by SPSS 19.0).

The correlation analysis verified that food processors are resource intensive ones. Therefore, we found that there is a high (Pearson correlation above 0.78) dependence of production on labour input as well as materials input. In addition, even though the overall production value depends on investments' inputs, the dependence is insignificant as the Pearson correlation is below 0.25. This conclusion is verified by constructing the dependency models (Table 9).

Table 9. Model summary and parameters estimates

Independent variable	Model summary					Parameter estimates			
	R Square	F	df_1	df_2	Sig.	Constant	b_1	b_2	b_3
LogLabor	0.616	194.371	3	363	0.000	0.473	0.416	0.227	–0.018
LogMaterial	0.743	348.807	3	362	0.000	0.295	0.808	0.012	0.001
LogInv	0.072	4.240	3	164	0.006	3.074	7.124	–3.798	0.558
LogProdFunct	0.720	311.020	3	362	0.000	0.165	0.391	0.015	0.000

Dependent variable: Log production value.
Source: Project data and own calculations (by SPSS 19.0).

As the results show, the higher level of material or labour inputs gives a higher level of production. This is not so obvious for the capital inputs, where the higher investment rate does not mean a higher production value.

In addition, the variance of LOG-function of material inputs is lowest as the parameter estimation for b_1 is above 0.8. These figures show how strong is material intensity of the Bulgarian food processors. Even though, the correlation between production value and labour input is significantly strong, the dependence between production and its independent variable: labour inputs, is not so strong as the variance of the LOG-function is greater as well as the parameter estimation for b_1 is below 0.45.

The final step of our dynamic analysis is the verification of production function's differentiation between different clusters. As the above analysis gave us back that the production function could be evaluated as significant there is significant difference between different clusters (Table 10).

Table 10. Model summary and parameters estimates

Equation	Model summary					Parameter estimates			
	R Square	F	df_1	df_2	Sig.	Constant: c	b_1	b_2	b_3
Cluster 1	0.545	134.72	3	338	0.000	402.375	9.17E-07	–2.98E-17	3.22E-28
Cluster 2	0.658	10.585	2	11	0.003	9770.434	4.86E-08	–1.11E-20	0
Cluster 3	0.805	9.661	3	7	0.007	11582.305	1.86E-08	–2.29E-21	6.11E-35

Dependent variable: production value; independent variable is production function.
Source: Project data and own calculations (by SPSS 19.0).

The relation "production value – production function" gives the different starting point of the function parameters. Taken the values of the estimated parameters (resp. b_1, b_2, b_3 from Table 10) of the variable: production function, the differentiation is given by the value of the constant: $c_0^1 = 402$; $c_0^2 = 9{,}770 = 24\ c_0^1$; $c_0^3 = 11{,}582 = 29\ c_0^1$.

So, the dependence of the production value on the change of different production factors is sometimes greater for the enterprises of clusters 2 and 3 than the enterprises of cluster 1. In addition, the dependence of the production value on the production factors is greatest for the enterprises of cluster 3. The range of activities of cluster 1 members is greatest. Nevertheless, there are critical points of production and respectively – material and labour inputs, that do not allow transition from cluster to cluster. Thus, the variations

of LOG-functions are greatest for the cluster 1 members and these variations are shrinking for the other two clusters. But the function model was kept one and the same.

CONCLUSIONS

Bulgarian food industry does not stand at a good position at present. As the results of the research show, this traditional Bulgarian industry sector was unable to move over the 1980s values. Partially this state is a result of misunderstanding by food processors how to manage their production more efficiently.

In addition, food consumption in Bulgaria grows much faster that the food production. That situation presents not just decline of food industry in Bulgaria but demonstrates how great is the loss of growth potential of the food producers in Bulgaria. Thus, we need to explore inside these negative processes. So, authors' study was based on Cobb-Douglas production function that was represented as a multiplication of all factors of production (labour inputs – L, material inputs – R, capital inputs – K, innovation inputs – M). In order to focus on the dependence of different variables of production function, authors used logarithmic value of the production function. This approach could be used as a prognostic tool as well as serve as a basis for time dependent comparative analyses for a variety of companies from Bulgarian food industry.

According to used business data for sample consisting 10% of food producers in Bulgaria, with higher level of material or labour inputs the higher is the level of overall production. But this is not the same as for the capital inputs as well as the innovation inputs. So, this gives the very high importance of the resource intensity of Bulgarian food industry.

As the different types of entity (resp. clusters) were tested, authors received a significant difference between them. Nevertheless, the production model was one and the same for the different clusters.

In summary, the greatest potential for dynamic change of Bulgarian food industry is in innovation inputs. Even though, the innovations have always been an important factor for the development and growth of companies, they are particularly important for the observed food processors. And for food sector the major role, among all types of innovations, is for product innovations.

Although the innovation capacity of Bulgarian food and beverage companies is relatively low, more and more companies had to realize the crucial role of innovations for their competitiveness. Moreover, innovations explicitly could re-define the margins of production capacity, and higher capacity means higher productivity and lower resource consumption.

The evaluation of innovation capacity for Bulgarian food entities, according to the suggested approach, could be of use in different strategy building. For example, the food processors could use enlarges of their innovative potential for basic aims:

– First, as process of utilization of basic innovation, they could raise their expenses for development of new products and technologies;

- Second, as result of general development of the entities, they could improve their overall marketing as well as the total turnover;
- Third, as result of the improvement of overall innovation capacity at national level, they could improve the overall technology level as well as found the next generation one.

Finally, the proposed approach of dynamic change analysis could be used to analyze the annually-based change of the importance of different production factors. This approach could help to learn in deep the change of any of the production variables as well as the production function.

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ZMIANY DYNAMICZNE PRODUCENTÓW ŻYWNOŚCI W BUŁGARII

Streszczenie. Produkcja żywności i napojów w Bułgarii zmieniła się dramatycznie po pełnym przystąpieniu do UE w 2007 roku. Zmiana ta wpłynęła nie tylko na strukturę produkcji, ale także na strukturę eksportu i importu jak też na całkowity potencjał produkcji sektora rolno-spożywczego. Celem artykułu jest wejrzenie w te zmiany z perspektywy pojedynczego producenta. Oznacza to odpowiedź na następujące pytanie: dlaczego bułgarska produkcja rolno-spożywcza pogorszyła się? Analiza pokazała, że przemysł spożywczy nie ma zdolności do przekroczenia poziomu produkcji z lat osiemdziesiątych XX wieku. Ważną przyczyną jest niezrozumienie przez przetwórców, że powinni zarządzać bardziej efektywnie produkcją. Największy potencjał dla zwiększenia dynamiki zmian w bułgarskim przemyśle spożywczym kryje się w innowacjach (rozwój nowych technologii i produktów, poprawa marketingu). Dla sektora spożywczego najważniejsze są innowacje produktowe.

Słowa kluczowe: przemysł spożywczy, dynamika przemysłu, rozwój przemysłu rolno-spożywczego

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ECONOMIZATION OF ACTIVITIES IN THE SATISFACTION SURVEY PROCESS BY MEANS ON-LINE ELECTRONIC QUESTIONNAIRE SYSTEMS

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Abstract. In the paper, the types of activities have been indicated which allow to economize the satisfaction survey process in case of which systems supporting on-line electronic questionnaires have been applied. The use of these systems leads to a departure – where possible – from traditional satisfaction surveys. The above mentioned activities include: adopting system activities that reduce costs; rendering available the protections that significantly reduce the supply of unreliable data; generating automatically many products (questionnaires) on the basis of the same platform formed by the IT system; minimising constrains on both the respondent's side and the research organiser's side; providing facilities that shorten the customisation process realisation time. The indicated types of activities have been provided with details. The types of activities economizing the said process create an ontology that may be applied by knowledge engineering.

Key words: satisfaction survey, on-line questionnaires, economisation of process activities, knowledge engineering

INTRODUCTION

Satisfaction (contentedness) surveys are more and more frequently used – at the very least – as an evaluation element. Satisfaction of customers, personnel members, students, patients, etc. is subject of examination. The parties ordering the surveys expect a quick and reliable feedback on the activities undertaken by them in relation to populations surveyed. In some cases (e.g. quality management systems conformable with the ISO 9000 series standard), the surveys have to be done obligatorily within the time limits indicated most frequently by the applicable procedure [Wolniak, Skotnicka-Zasadzień 2008]. The procedure is necessitated in turn by the requirement that the organisation intending to comply with the standard should monitor the customers' opinion on the manner in which their needs are satisfied [PN-EN ISO 9001:2009, 2009], since quality and satisfaction

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(contentedness) are related to each other in a specific way. As it has been demonstrated in the literature on the issue, quality precedes satisfaction [Stodolny 2006]. Quality is also identified as a factor determining the customer's satisfaction [Nieżurawski et al. 2010]. Apart from examining their customers' satisfaction, organisations usually survey the satisfaction of their personnel. The survey findings pertaining to the personnel should in consequence serve the purpose of limiting uncontrolled resignations of dissatisfied employees, and thereby reduce the company's operation costs – e.g. the costs related to renewed recruitment, new personnel's adaptation, etc. [Jaros 2005]. As regards the customers, the above mentioned surveys are undoubtedly aimed at gaining knowledge on customers and their preferences [Mruk 2012].

For examining customers' and/or personnel's satisfaction, questionnaire surveys are usually applied. Author has made an attempt at identifying the stages and scopes of activities in the questionnaire survey process. A review of reports available on such surveys (for instance, those published on municipal offices' websites) was helpful here. The verification of the reports was facilitated by author's personal participation in preparation, realisation and elaboration of similar surveys. It seems that in consequence of the performed and verified review, a structure of stages, scopes of activities and references to the same in the survey process can be proposed. The stages are presented in Figure 1.

Author defines the approach proposed as traditional, i.e. the one which does not use the tools provided by the e-business in the broad meaning of the term. It should be emphasised that the term "traditional" has not been used here in the pejorative meaning. Currently, specific situations occur – and will probably still occur in future – where traditional surveys are preferred, e.g. a survey of a relatively large group of farmers in the territory of a particular province [Borkowska, Kruszyński 2013].

The questionnaire surveys carried out in compliance with the stages indicated in Figure 1 have been classified as expensive. Their costs include, without limitation, the costs of questionnaire printing, traditional distribution (post, courier service, etc.), errors which sometimes occur in questionnaires and which cannot be removed when the paper carrier is applied. The possibility to economise the satisfaction survey process occurred when Internet applications became widespread and e-business emerged along with the solutions it offers. For the purpose of this paper, e-business can be defined as follows: "The concept of electronic business includes an exchange of information between producers, distributors and consumers of products and services, contracting, transmission of documents, etc." [Woźniakowski, Jałowiecki 2013]. The occurrence of mature e-business solutions has been met by survey organisers with approval and hope. These solutions include undoubtedly examining satisfaction in a broad meaning of the term by means of on-line electronic questionnaires (hereinafter called on-line questionnaires).

There are many IT system available in the Polish market that support such surveys. In the literature to this paper, websites are indicated where descriptions of those systems can be found. In some cases, their demo versions are also available.

This paper is not aimed at indicating which on-line questionnaire supporting IT system, from among those available, is the best one. In the paper, types of activities economising the satisfaction survey process have been indicated. The types are assigned to individual stages and scopes of activities of the traditional approach to the customers'/ /personnel's satisfaction survey process. If we treat the proposed types of activities as an

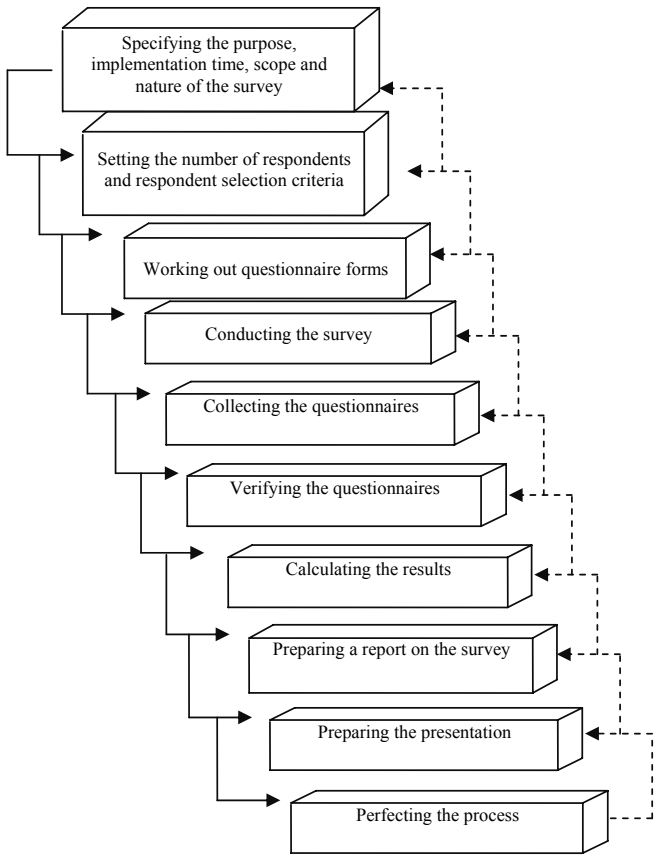

Fig. 1. Stages, scopes of activities and references to the same in the survey process. Traditional approach
Source: Own work.

ontology of the thematic area (field) of economisation of the satisfaction survey process activities, then we can use the knowledge on the thematic area for improving the tools applied, i.e. the software.

MATERIAL AND METHODS

Upon defining stages and scopes of activity in the survey process (Fig. 1), author began to search for activities that economise the process. The starting point was making an assumption that the types of those activities may be a component part of the software supporting the process. Author penetrated the Polish market of available software so that to find some IT systems from the satisfaction survey area. These systems support the satisfaction survey process by providing on-line questionnaires. Upon familiarising with the substance of the systems and making an attempt at operating them, e.g. by using the

demo versions, author identified the types of activities economising the process (Fig. 2), confronted individual versions of activity types with own practical experience and supplemented them accordingly. Author's experience results from leading the teams, which carried out on-line questionnaire based on satisfaction surveys in the years 2011–2013. The surveys were conducted for 13 entities and participated by several thousand of respondents (personnel and customers of territorial self-government units). They were a part of the Operational Programme entitled Human Capital, Priority V "Good Government" [Training… 2012].

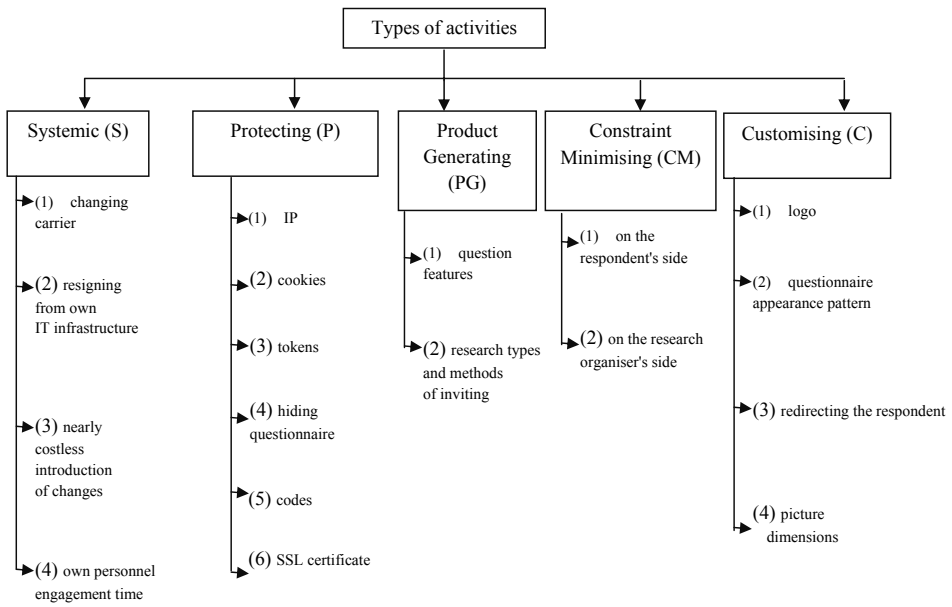

Fig. 2. Types of activities economising the satisfaction survey process by means of on-line questionnaires. A general approach.
Source: Own work.

The identified types of activities economising the satisfaction survey process constitute the ontology of this thematic area (field). The ontology was "superimposed" on the above mentioned stages of the survey process in the traditional approach (Fig. 3). Once the ontology is formulated, improvement of the satisfaction examination process should commence with introducing changes and supplements to the ontology.

RESULTS

On the basis of literature research, author's personal experience gained in the course of managing satisfaction survey teams, and the review of available IT systems supporting satisfaction surveys with on-line questionnaire systems, author has isolated the following process economising activities (Fig. 2):

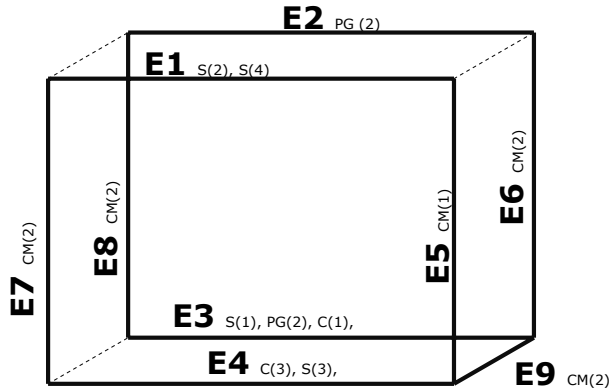

Fig. 3. Types of activities economising the satisfaction survey process by means of on-line questionnaires as related to stages and scopes of activity of the survey process in the traditional approach

Source: Own work.

a) Adopting cost-reducing system solutions,
b) Providing protections that significantly reduce the supply of unreliable data,
c) Generating automatically multiple products (questionnaires) on the basis of the same platform of the IT system,
d) Minimising constrains on both the respondent's and the research organiser's side,
e) Providing facilities that shorten the process realisation time, including customisation.

Each of the activities indicated has been elaborated (provided with details) on Figure 2.

Adopting cost-reducing system solutions

The cost-reducing system solutions are the ones that can be defined as radically changing the satisfaction survey process with the use of electronic questionnaires. They include as a minimum:

a) A change of the carrier for the available questionnaires. In practice, this means that the use of paper is eliminated or significantly reduced. The consequences of this fact should be related to the place of the questionnaire carrier in the survey realisation cycle (creating a questionnaire, preparing it for printing, printing, organising distribution, collecting filled-out questionnaires, processing paper questionnaires, preparing the final analysis, archiving the data). Monitoring of progress of each of the above stages is laborious, hence errors often occur. Even a slight mistake noticed after questionnaires have been collected from a printing house frequently results in the necessity to destroy the whole stock of printed material and start the process of preparing a new questionnaire for printing.
b) Resignation from own IT infrastructure in favour of an outsourced one. In these circumstances, customers do not have to purchase servers and network software, employ network administrators, etc. The care for efficiency of the IT infrastructure is a responsibility of the IT company that offers software in the form of an on-line question-

naire system. The research leader and research participants only need computers fitted with any operating system with a simultaneous access to a browser.

c) Possibility to introduce, nearly costlessly, continuous improvements to the questionnaire system. The possibility to introduce continuous improvements is an unquestionable advantage of on-line survey systems. The improvements may consist in eliminating any errors noticed and introducing new investigations that make allowance for the experience gained. What more, they are currently visible for all survey participants without having to reinstall relevant software.

d) Minimising the time when the organiser's own personnel is engaged in the course of the survey process. One of the greatest advantages of on-line electronic survey systems is the fact that they are ready to use 24 hours a day. Additionally, survey organisers do not have to worry about the lengthy period of preparing questionnaires (developing the survey concept, preparing a list of inquiries and answers, making the analysis and synthesis of results, including possible interpretation of results, etc.), and creating project groups for conducting surveys with the use of on-line questionnaires. The procedures are "embedded" by means of relevant algorithms which are coded with the use of a proper programme language. In case of any doubts, one can use the assistance of the personnel of the company providing the system and related solutions.

Providing protections that significantly reduce the supply of unreliable data

The protections refer to a number of spheres. They include the following:

a) a particular computer can be used only once in a given time interval as its IP (Internet Protocol) identifier is verified,
b) some information sent by the Internet service is saved in the user's side in the form of cookies,
c) a professional system of tokens is applied which generates, as cryptographic devices, single-use passwords,
d) the questionnaire and its results are hidden,
e) the questionnaire is protected by a code,
f) the questionnaire is protected with an SSL certificate which ensures a complete protection during the communication flow process between the user and the server.

Generating automatically multiple products (questionnaires) on the basis of a common platform of the IT system

The IT system allows to generate automatically products dedicated to various applications through the use of parametrisation (a selection of features of objects, e.g. questionnaires, types of questions used, etc.). Below, some object features are specified which form products when properly configured.

A number of features have been indicated for questions treated as an object. The following question types have been distinguished:

a) Multiple choice question – more than one answer can be marked (checkbox),

b) Multiple choice question with an open option – more than one answer can be marked and the item can be chosen which allows to give a yet another, individual answer (open checkbox),
c) Multiple choice question – one of several answers can be marked (radio button),
d) Multiple choice question – one of several answers can be marked through selection from a list (drop down list),
e) Multiple choice question with an open option – one answer can be marked and the item can be chosen which allows to give a yet another, individual answer (open radio button).

The above mentioned questions can be positioned horizontally or vertically, whereas matrix multiple choice questions with an option to mark one answer from among many answers are formatted into a series of questions and answers in the form of lines and columns.

Different features were taken into account for various types of surveys and for methods of inviting for participation in a survey. Below, exemplary types of questionnaire surveys are presented:

a) open questionnaire,
b) closed questionnaire,
c) personalised questionnaire.

The open questionnaire is the one which is open to everybody and anonymous. Every person who finds a link to the questionnaire can take part in the survey. An invitation to fill out such a questionnaire is usually sent by e-mail, placed on an Internet/Intranet site as a link or as a redirecting link under a banner on a website.

The closed questionnaire is the one which is closed and anonymous. The questionnaire is available only upon providing a relevant password. An invitation to fill out such type questionnaire is usually sent to a specific number of people by e-mail together with a password enabling an access to the survey. The password is common for all the participants. In case of such type surveys, the survey organiser should have a selected group of respondents along with their e-mail addresses. A preferable addressee of the questionnaire is personnel groups.

The personalised questionnaire is a closed survey available only to persons who have been invited to participate in it and have logged properly in the system with the use of the password sent. An invitation to participate in the survey is sent to each participant separately by e-mail. The mail includes a link to the questionnaire with a proper password – unique for each participant. The survey is addressed to narrow groups of employees, executive staff, and customers.

The open questionnaire and the closed one do not allow to learn how a particular respondent has answered and it is possible in case of the personalised questionnaire.

Minimising constrains on both the respondent's and the survey organiser's side

Below, there are solutions reducing constrains on both the respondent's and the survey organiser's side The solutions minimising constrains on the survey organiser's side include the following:

a) An embedded gallery manager allows to add photos and films from the YouTube service,
b) The questionnaire can be divided into pages; the effect of a random order of pages, questions, and answers to a question can be obtained,
c) Whole questionnaires, individual pages and questions can be copied, and the bucket function can be used, if need be,
d) Questionnaires can be defined and assigned randomly to survey conditions,
e) Any logical expressions can be constructed, which makes it possible to apply filtering questions,
f) Questionnaires can be edited continuously, even after publication, what more, without loosing the data collected,
g) Respondents' address book can be embedded, which allows to sent invitations to respondents from the system level,
h) Individual sheets can be viewed from the system level,
i) Summary result sheets (schedules) can be generated automatically,
j) Complete results can be automatically exported in two formats (text and zero-one date) to CSV, XML Excel, SPSS (beta) formats,
k) The survey can be completed after a specified time or once the questionnaire is filled out by a set number of respondents,
l) Maximum time for giving answers can be specified.

The solutions minimising constrains on the respondent's side include the following:

a) Support for multi-language questionnaires (edition of the contents of navigation buttons, the welcoming message and the parting one),
b) Filling out of questionnaires can be paused and resumed any time,
c) Own patterns can be created, typeface, background colours and margins for individual elements can be edited,
d) Support is available for tests, including automatic scoring for answers provided, recording and control of the answering time.

Facilities that shorten the process realisation time, including customisation

Diversely designed questionnaires and surveys should be adjusted to the customer's expectations [Hill, Alexander 2003]. The facilities that shorten the process realisation time and enable customisation include:

a) Applying an own logo,
b) Selecting a pattern for the questionnaire appearance from many proposals,
c) Redirecting the respondent to the organiser's own website once the questionnaire is completed,
d) Setting the size of the pictures that can be placed in questionnaires.

CONCLUSIONS

Author's analysis of the problem started with mapping stages and scopes of activities of the questionnaire survey process in the traditional approach (Fig. 1). In the course of the analyses, activities economising the satisfaction survey process by means of on-line

electronic questionnaires were identified. Electronic questionnaires are generated by relevant IT systems. The solutions adopted in the questionnaires, as well as author's practical experience related to organisation of 13 satisfaction surveys (customers, personnel) for several thousands of respondents allowed to work out an ontology of activities economising the above process. As a result, five groups of activities were identified (Fig. 2). The scope of individual groups was specified in detail. In the final part of the paper, author assigned types of economising activities proposed in the ontology to individual stages of the traditionally presented survey process (Fig. 3).

The presented ontology of activities economising the satisfaction survey process by means of on-line electronic questionnaire systems is a promising starting point. Application of knowledge engineering achievements will allow to extend the proposed ontology. Additionally, it will be possible to include successively ontology elements to the tools offered (here: the software). Placing of the presented subject matter in areas of interest of knowledge engineering could have the following structure [Gołuchowski 2012]:

a) Tasks – surveys of customers' and personnel's satisfaction,
b) Task solving models – economisation of activities of the customers' and personnel's satisfaction survey process with the use of on-line electronic questionnaires,
c) Model of the field of activity, i.e. ontology – types of activities economising the customers' and personnel's satisfaction survey process,
d) Systems for generating knowledge-using applications – software supporting the customers' and personnel's satisfaction survey process.

The presented structure of areas of interest of knowledge engineering corresponds to process improvement as the final stage of the survey process (Fig. 1). The proposed ontology is a key to improvement of the satisfaction survey process through economisation of undertaken activities. Changes and supplements introduced to the ontology should be reflected in the software supporting the process, with particular regard to the knowledge contributed.

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EKONOMIZACJA DZIAŁAŃ W PROCESIE BADANIA SATYSFAKCJI POPRZEZ SYSTEMY ELEKTRONICZNYCH ANKIET W TRYBIE ON-LINE

Streszczenie. Artykuł wskazuje na rodzaje działań, których realizacja ekonomizuje proces badania satysfakcji w sytuacji zastosowania systemów obsługujących elektroniczne ankiety stosowane w trybie on-line. Posługiwanie się tymi systemami powoduje odejście – tam gdzie to jest możliwe – od tradycyjnych badań satysfakcji. Do wspomnianych rodzajów działań zaliczono: przyjęcia działań systemowych obniżających koszty; udostępnienie zabezpieczeń znacząco zmniejszających dostarczanie niewiarygodnych danych; automatyczne generowanie wielu produktów (ankiet) według tej samej platformy, jaką stanowi system informatyczny; minimalizowanie ograniczeń zarówno po stronie respondenta, jak i organizatora badań; wprowadzanie ułatwień, które skracają czas realizacji procesów kastomizacji. Wskazane rodzaje działań są uszczegółowiane. Rodzaje działań ekonomizujących wspomniany proces tworzą ontologię, którą może zastosować inżynieria wiedzy.

Słowa kluczowe: badania satysfakcji, ankiety on-line, ekonomizacja działań procesu, inżynieria wiedzy

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THE IMPACT OF AGRARIAN FRAGMENTATION ON THE DYNAMICS OF REGIONAL CHANGES IN DAIRY CATTLE BREEDING IN THE YEARS 1990–2010

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Abstract. Since the commencement of political system transformations in Poland the number of farms keeping cows and the stock of milk cows has been decreasing very fast. A basic factor behind the regional diversity of the process is the scale of agrarian fragmentation and the size of farms. This hypothesis was verified by analyzing changes affecting cows bred in a sector of farms operated by natural persons (private farms) in the entire country and in two regions where private farms predominated. The first region is the south-eastern region characterized by a very unfavorable acreage structure of farms while the other one is the central and eastern region where the structure of farms is relatively favorable. Research results clearly indicate that, due to increasing market competition, cow breeding is concentrated and has been moving to higher and higher acreage groups. As a result, strong stock regress has been observed in the region with fragmented agriculture and such trend has been on the increase. However, in the area characterized by the favorable farm structure such regress which marked the commencement of the political system transformations was relatively quickly slowed down; already in the period preceding Poland's accession to the UE the stock quantity and quality growth emerged which can also be seen during the post-accession era.

Key words: dairy cattle breeding, agrarian fragmentation, regional diversification of milk production

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INTRODUCTION

Dairy cattle breeding, due to the necessity of obtaining large quantities of bulky fodder, is strongly connected to plant production. Naturally, also this type of production can rely on feeds obtained from outside the farm, including as part of co-operation, however, it is difficult and was not popularized in Poland to a greater extent. As a result, the scale of cattle breeding has been and is strongly dependent on appropriate fodder area on farms. In the case of extensive cattle breeding its scale is basically conditional on the area of compound feeds, especially those obtained from pastures. However, due to changes in the organization of breeding and cattle feeding technologies, especially, in regard of dairy cows, currently the scale of cattle breeding depends on the acreage of the entire farm, hence, also on the area of arable land. Such basic plants are cultivated on arable land required for preparing good bulky feeds, such as corn, crops and legumes. However, as the development of the process of concentration and specialization of farms progressed due to competitiveness on the agricultural market, cattle breeding has been shifting over to farms from higher and higher acreage groups [Parzonko 2013]. Due to being uncompetitive, farms keeping small herds of cows face the following choices: either expanding the herd and staying on the market or abandoning breeding, or reducing its scale to satisfy their family needs and selling directly to consumers. Most frequently option number two is chosen. It is only possible to expand the herd if the farm has fodder base growth reserves as part of its area of arable land or expand the farm by leasing or purchasing arable land. The third variant, which has been chosen by the farmers more and more frequently, involves liquidating the herd and shifting over to the production of animals which are more loosely connected to own fodder base or abandoning livestock production altogether. The first and the second possibility are not always viable due to different reasons. In regions of defragmented agriculture the share of farms with larger acreage that breed cows is insignificant and it proves very difficult to expand the farm's acreage [Musiał, Wojewodzic 2011]. Therefore, it can be hypothesized that a sub-regional acreage structure is a major factor[1] behind the regional diversification of changes in cow breeding during the period of political system transformations and Poland's accession to the European Union, including, in particular, the acreage of farms, especially those breeding cattle, specifically, milk cows.

The hypothesis presented earlier will be verified based on the analysis of changes in cattle raised in the entire country and in two regions predominated by private farms which, however, are completely different in terms of their acreage structure. Changes in cow breeding were analyzed based on data collected in the course of Common Agricultural Censuses (CAS) in 1966, 2002 and 2010 and representative research of the stock of farm animals conducted by the Central Statistical Office (GUS). The process was analyzed solely on farms operated by natural persons. The related changes on farms of legal persons were very strongly distorted by the political system transformations, mostly due to the liquidation of state-owned farms (PGR) and the deterioration of agricultural production co-operatives. The share of the farms in the sector of legal persons which

[1]Naturally, additional factors limiting greater herd size increase may include: the necessity of engaging considerable funds to develop the existing or the construction of a new barn, the certainty of milk purchasing by a milk processing plant etc.

specialize in cow breeding Poland-wide is very small and almost non-existent in selected regions. The analysis was performed taking into account the following periods: the period of intensive political system transformations, that is, 1990–1997, the pre-accession period 1998–2003, the post-accession period 2004–2012.

In 1990–1997 region no 1 (characterized by fragmented agriculture) covered former southern and eastern voivodeships: Krośnieńskie, Nowosądeckie, Rzeszowskie and Tarnowskie, while the region with a relatively good acreage structure of farms operated by natural persons – the south-eastern region – consisted of the former Białostockie, Ciechanowskie, Łomżyńskie and Ostrołęckie Voivodeships. However, as of 1998, after the new administrative division, region no 1 included voivodeships covering former administrative and territorial structures, i.e. the new Małopolskie and Podkarpackie Voivodeships and the Podlaskie and Mazowieckie Voivodeships, respectively.

COW BREEDING IN THE PERIOD OF A BREAKTHROUGH AND AFTER THE DEVELOPMENT OF A MARKET ECONOMY

In Poland during the period of the centrally planned economy, purchasing prices for agricultural produce, including milk and meat, were relatively high and agricultural and food processing plants were obligated to purchase any quantities of animal produce offered by farms, even the smallest quantities [Cieślik 2010]. As a result, in that period the definite majority of farms was engaged in breeding cattle and the stock of cattle, including cows, was relatively high[2] [Dzun 2012a]. Despite a crisis in the 1980s, back at the early stage of the political system transformations the definite majority of private farms was still engaged in raising dairy cattle. In 1990 cattle was raised by 70.5%, and cows were raised by 68.5% of private farms (above 0.5 ha of utilized agricultural area – UAA). The percentage of farms engaged in raising cows on private farms of an acreage of 1 ha and over was much higher accounting for as much as 77.4% back in 1991.

The share of the farms keeping cows in the voivodeships of the south-eastern region was still the highest in 1991 in Poland and even slightly higher than in the central and eastern region which was characterized by a definitely more favorable acreage structure of farms. In that region the share of the farms keeping cows ranged from 82.6% in the Krośnieńskie Voivodeship to 90.7% in the Nowosądeckie Voivodeship vis-á-vis the national average of 77.4%. The region was also a leader in regard of cow density per 100 ha of UAA and milk production per 1 ha of UAA. Those voivodeships have been (and still are) predestined to animal production, including keeping grass-eating animals, which stems from the area's hilly structure and, thus, a high share of permanent grassland. Due to higher rainfall and other climate and topography-related difficulties, the production of many varieties of plants there, including crops and rape, is significantly hindered or unprofitable. The Nowosądeckie Voivodeship was a definite leader in the area of the density of cows and milk production with 54.1 cows per 100 ha of AAL and 1,500 l per ha, respectively, vis-á-vis the average national totaling 30.7 cows per 100 ha and 821 l

[2]In mid-1970s nearly 73% of farms of an area of over 0.5 ha of UAA was engaged in cattle breeding and the stock totaled 13.2 million heads, including 6.1 million cows – the highest number of cattle in Poland.

per ha, respectively. The density of cows in the remaining voivodeships in that region was higher compared to other voivodeships in Poland, including voivodeships of the eastern and central part of the region. In the central and eastern region the Ostrołęckie Voivodeship was the leader with 38.4 cows per 100 ha and 1,039 l of milk per ha, respectively.

However, in the south-eastern region, due to strong agrarian fragmentation, the structure of farms keeping cows, by herd size, was very unfavorable (Fig. 1). Farms keeping 1–2 cows constituted an overwhelming majority (ranging from nearly 90% in the Krośnieńskie Voivodeship to 78% in the Nowosądeckie Voivodeship), and the share of the farms with larger herds (6 and more cows) was insignificant (between 0.8% in the Nowosądeckie Voivodeship to 0.2% in the Rzeszowskie Voivodeship). A definitely more favorable situation was recorded in the central and eastern region where the share of the farms keeping 1–2 cows ranged from 28% in the Łomżyńskie Voivodeship to 40% in the Ostrołęckie Voivodeship, and, what's more important, the share of the farms with larger herds was radically higher ranging from 24% in the Łomżyńskie Voivodeship to more than 18% in the Ostrołęckie Voivodeship.

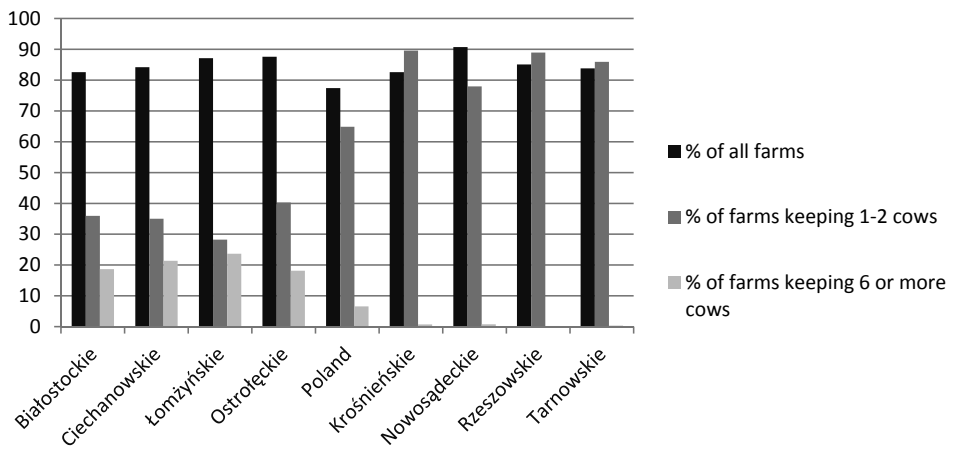

Fig. 1. Farms keeping cows in of total farms and the structure of the farms by herd size in 1991 (%) by selected voivodeships

Source: Results of the 1991 Agricultural Census, The use of land, the area of crops and farm animals, GUS, Warsaw 1991.

Changes in the political system, which followed in the second half of 1989 and rapidly accelerated in 1990 (a shock therapy)[3], adversely affected the situation in agriculture, especially in the areas characterized by agrarian fragmentation. A wide gap of price scissors[4] resulting in the rapidly deteriorated profitability of agricultural output, the destruc-

[3]Rapidly rejected existing rules of managing social and economic development and adopting an assumption that such role will be assumed by "the market's invisible hand".

[4]If in 1989 the "price scissors" ratio (y-o-y) was 128, then in 1990 it reached 41.7, and in 1991 – 74.5. After such rapid changes the price scissors' rate, with 1988 being the base year, reached approx. 45 in 1992–1993 and after a few following years, which were more favorable to agriculture, it reached 50 in mid-1990s.

tion of the existing purchasing system, radically deteriorated conditions of crediting and financial support for farms with an additional retrospective effect (the application of such terms and conditions to credits and loans taken prior to the changes), with nearly complete abandonment of the nation-state's interventionism towards agriculture, led to very difficult conditions for farms to operate in [Świtłyk, Ziętara 2011]. To the greatest degree, the situation of the farms producing agricultural raw materials for the production of food products, which until 1990 had, to the greatest extent, enjoyed the system of subsidies and additional payments (to which group the animal products belonged, mostly milk and its basic products[5]), deteriorated the most. Under such circumstances[6] agricultural output recorded clear regress, especially animal production. Animal stock in large head pieces declined in 1991 (vis-á-vis 1990) by 6%, and in 1992 by 11% (vis-á-vis in 1985 by more than 10% and more than 15%, respectively). Such decrease resulted from the regress of dairy cattle and sheep breeding because the stock of swine increased back then. Due to a much smaller slump of the profitability of raising pigs compared to breeding cattle and sheep, farms shifted over to raising swine.

The circumstances described earlier contributed to even greater regress in raising dairy cattle; such trend has been observed since the 1980s (in 1985–1990 the cow stock decreased by 11%). If in 1990 approximately 1,780,000 private farms were engaged in cow breeding (of more than 0.5 ha of AAL), then in 1996 the corresponding figure was 1,372,000 (including 59k of up to 1 ha of AAL), i.e. approximately 23% less. In the sector of private farms the number of commodity farms keeping small herds of cows (3–5) changed particularly quickly. In 1990–1996 the stock of cows in the sector of natural persons decreased by 27%. The process of the rapid decrease of the number of farms engaged in breeding dairy cattle was clearly visible along with the process of restructuring those farms (which decided to maintain breeding cows), involving the adjustment of the size of the herd of cows and a milk production technology to a new market situation, especially, local demand for milk and quality requirements. Increasing competition on the milk market and growing demands of dairy plants were the driving force behind those processes. However, the dynamics of the processes was considerably diversified in individual periods and strongly diversified in terms of regions [Seremak-Bulge et al. 2006, Dzun 2012a and 2012b, Ziętara 2012].

The dynamics of the decrease of the stock of cows and milk production was particularly high in the south-eastern region (Fig. 2). In that region only in the Nowosądeckie Voivodeship the dynamics of the decrease of the number of stock of cows was much smaller and more or less resembled that recorded in the Białostockie and Ciechanowskie Voivodeships. That allowed the Nowosądeckie Voivodeship to maintain its leading position in Poland in terms of cow density (despite the decline from 54.1 to 45.3 cows per 100 ha of AAL). It should also be noticed that in the Nowosądeckie and Krośnieńskie Voivodeships the decrease of commodity milk production was higher than the decrease of

[5]It can be said that if in 1988 the purchase price of 1 kg of pig livestock was the equivalent of 5.5 l of milk and 1.1 kg of beef livestock, then in 1990 such figures were 12.6 and 1.9, respectively.

[6]The above also resulted from the activities in agriculture towards elimination or at least deterioration of the so-called socialized sector (manifested by closing down state-owned farms which was not thought over, prepared poorly, very rapid and mishandled) for the purpose of expanding and strengthening the sector of private farms [Dzun 2011].

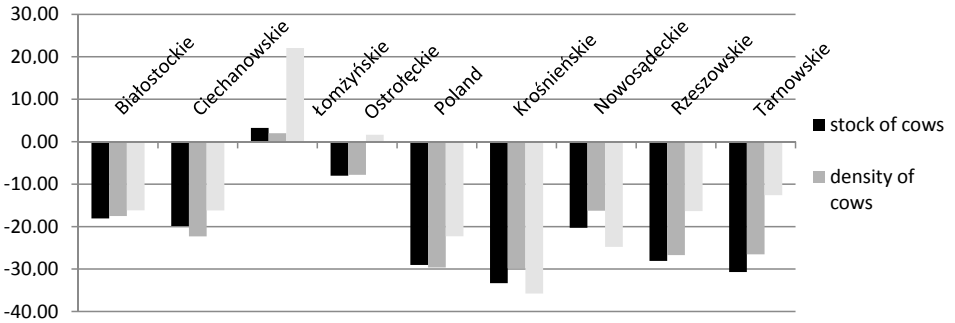

Fig. 2. Basic indices of changes in cow breeding in 1990–1997 by selected voivodeships (%)
Source: Own calculation and breakdown based on: Agriculture and Farm Management 1986–1990, GUS, Warsaw 1992; 1998 Agriculture Statistical Yearbook, GUS, Warsaw 1999.

the cow stock as, due to closing many dairy plants and the impossibility of selling milk, the farms limited such output to satisfy their household needs and possible direct sales to neighbors and markets. Production extensification occurred, including food extensification, which led to the decline in milking yield. However in the central and eastern region definitely the most advantageous situation was recorded in the Łomżyńskie Voivodeship which, being the only one in Poland, observed the increase of the stock as well as considerable increase of milk production. Also in the Ostrołęckie Voivodeship the cow stock level slightly decreased with the concurrent milk yield increase.

In the entire south-eastern region the stock of cows in the period under analysis (i.e. in 1990–1997) dropped by 27%, and milk production – by 23%, whereas in the entire central and eastern region the decrease of the stock of cows was 2.5 times smaller and milk production – 6.5 times smaller. Very strong agrarian fragmentation was the reason for such disadvantageous relations in the case of the south-eastern region which, in the period under analysis, not only was not decreased but even intensified. The above prevented the improvement of the concentration of animals, density and size of the herds. Whereas in the central and eastern region the share of the farms in a group with more than 10 ha of AAL rose clearly, which permitted to increase the number and share of the farms keeping smaller herds of cows (Fig. 3).

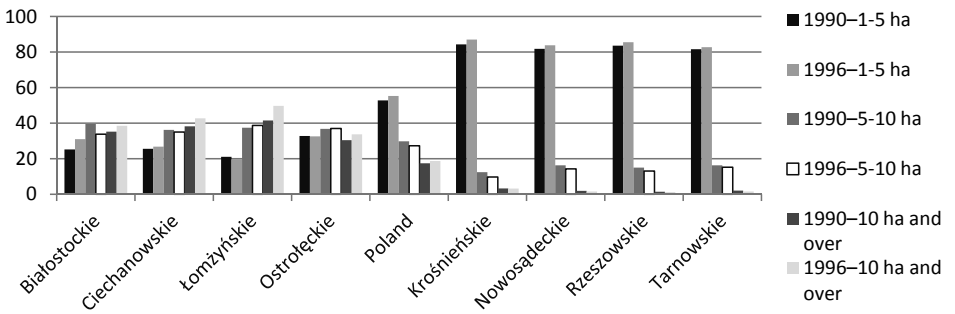

Fig. 3. Changes in the structure of farms by acreage groups in selected voivodeships under analysis against the average for Poland in 1990–1996 (%)
Source: Own calculation and breakdown based on: Agriculture and Farm Management 1986–1990, GUS, Warsaw 1992; 1998 Agriculture Statistical Yearbook, GUS, Warsaw 1999.

The effects of the presented changes of the acreage structure of farms can be illustrated based on the changes in the structure of herds kept in the leading voivodeships of the regions under comparison. In the Łomżyńskie Voivodeship the share of the farms with 1–2 cows in a total number of the farms keeping cows decreased in 1991–1995 from 28 to 24%, and in the case of the farms keeping at least 6 cows – such share rose from 24 to 30%, whereas in the case of the Nowosądeckie Voivodeship, the share of the farms with 1–2 cows rose from 78 to 83%, and the share of the farms with 6 or more cows the share's level was maintained, i.e. approximately 0.8%. Hence it can be said that in the Łomżyńskie Voivodeship the considerable increase of the number of commodity farms capable of competing on the milk production market occurred. However, in the Nowosądeckie Voivodeship, due to the considerable drop of the total number of farms, the number of farms with small herds of cows dropped considerably which phenomenon was accompanied by the considerable drop of the number of farms with larger herds allowing competition on the milk market[7].

CHANGES IN COW BREEDING AND MILK PRODUCTION IN PRE-ACCESSION AND POST-ACCESSION PERIODS

Since 1997 until Poland's accession to the European Union a tendency of gradual deterioration of farmers' economic condition was observed. Also the profitability of agricultural production did not improve considerably after Poland joined the European Union[8]. However after the accession to the European Union, farmers' incomes, including incomes of milk producers, were considerably higher thanks to subsidies and additional payments. Regarding dairy farms' economic standing, 1996–2000 can be described as a period of insignificant deterioration and 2000–2003 as a period of considerable deterioration of milk production profitability. On the other hand, the period since 2004 was the period of significant improvement of such profitability[9]. Under such difficult macroeconomic conditions the trends related to changes in cow breeding were mostly affected by changes in the structure of produce prices (especially animal produce) and demand for milk as well as possibilities of restructuring farms keeping cows. In the period under analysis, the prices of milk and beef vis-á-vis the prices of swine and poultry improved gradually. The dynamics of such improvement was particularly strong after Poland's accession to the

[7]In mid-1990s the minimal cow herd size ensuring profitability was approx. 6–7 cows.

[8]The price scissors rate in the pre-accession years (2001–2003), with 1988 being the base year, was nearly 34, and with 1995 being the base year – approx. 69. After Poland's accession to the UE the situation in that area hardly changed. After short-term improvement of the price relations the price scissors' rate in 2007, with the 1995 being the base year, reached 73, but in the subsequent years it dropped to reach almost 70 in 2010.

[9]In the initial period milk prices rose by approx. 50%, beef livestock purchasing prices by 10% with the increase of the prices of agricultural production means by approx. 50%, in the second period the prices of milk and beef livestock purchasing decreased by 8 and 14%, respectively, and the prices of production means rose by 48%, whereas in the post-accession period the prices of beef livestock purchasing rose by 82%, milk prices by 48% (with the breakdown by 11% in 2009 y-o-y), while the prices of production means rose by 39%.

EU. The improved relation of milk prices[10] was decisive which rose until 2007, including that year. This factor unquestionably contributed to cow breeding [Seremak-Bulge et al. 2006, Dzun 2012a].

The fact that in the entire pre-accession period (apart from 1999–2000), in particular, in the first post-accession years, a noticeable increase of purchases and milk market occurred, was also crucial to changes in cow breeding. Such increase was basically attributed to the dynamic increase of the exports of milk and milk products, while import continued to be low. Since 2005 an insignificant increase of internal milk consumption was also observed, basically due to the increased consumer consumption [Seremak-Bulge 2006, Dzun 2012a and 2012b, Ziętara 2012].

RELATIONS OF CHANGES IN COW BREEDING AND ACREAGE STRUCTURE OF FARMS

Due to the conditions described in previous chapter, a very strong tendency of the decline in the number of farms engaged in cow breeding occurred which was observed in the period of intensive changes of the political system transformations and continued until years directly preceding Poland's accession to the UE. The perspective of Poland to join the European Union shortly and then the application of the Common Agricultural Policy's tools in Poland clearly weakened the speed of the decrease of the number of farms breeding cows. However at the end of that period, due to the considerable deterioration of the dynamics of the improvement of milk production's profitability and its deterioration in 2009, the tendency to resign from cow breeding strongly intensified. In total in 1996–2002 the number of farms of natural persons keeping cows was reduced. The annual average dynamics of the decrease of the number of such farms in 2002–2010 (5.9%) was even slightly higher than in 1996–2002 (5.5%).

In the entire period under analysis the loss of farms keeping cows was mostly recorded in regard of the groups of small and medium-sized acreage farms (the most intensive process was observed in 5-ha-acreage groups), and the increase – in regard of the groups of large acreage farms (in recent years only in the group of very large acreage farms).

As a result, despite significant changes affecting all farms (the decreasing number of small and medium-sized acreage farms and the increasing number of large acreage farms) in the entire period, definitely the greatest decrease of the share of the farms keeping cows was observed in the group of the smallest farms (Fig. 4).

The changes presented earlier resulted in a clear shift in cow breeding from smaller acreage farms to the larger acreage ones. This trend is particularly noticeable in regard of the change of the number of cows by acreage groups. The tendency clearly intensified as a result of the acceleration of the process of the specialization and concentration of cow breeding. At the same it should be noted that the dynamics of the increase of the number of cows on large acreage farms was, after 2004, to a significant extent slowed down

[10]If back in 1996 the purchasing price of 1 kg of swine livestock was the equivalent of 5.9 l of milk and the purchasing price of 1 kg of poultry livestock was the equivalent of 6.4 l of milk, then in 2003 the corresponding figures were 4.4 and 4.4 l of milk, respectively, in 2007: 3.2 and 3.3 l of milk, respectively, and in 2010: 3.6 and 3.2, respectively.

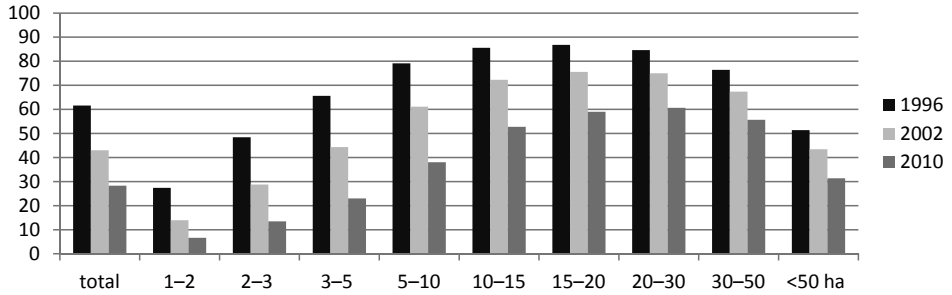

Fig. 4. Changes of the share of the farms keeping cows in individual acreage groups in 1996––2010 (%)

Source: Own calculation and breakdown based on: Farm animals, PSR 1996, GUS, Warsaw 1997; Farm animals, PSR 2002, GUS, Warsaw 2003; Farm animals and selected elements of animal production methods, PSR 2010, GUS, Warsaw 2011.

due to introduced milk quotas, i.e. mostly limits of milk supplies to processing plants. Both in the pre-accession and post-accession periods the average national dynamics of the decrease of the number of cows affected the farms belonging to a few lower acreage groups, i.e. up to 15 ha and was noticeably correlated with the acreage, i.e. the higher the dynamics the smaller the farm acreage. At the same time it should be noted that in the group of the farms of up to 3 ha in the post-accession period the dynamics rose while in other acreage groups it dropped.

Farms of very small acreage did not stand any chance of improvement as the possibility of obtaining bulky fodder prevented higher increase of the number of cows kept and in the case of a small herd increase the obtained output did not guarantee collection by

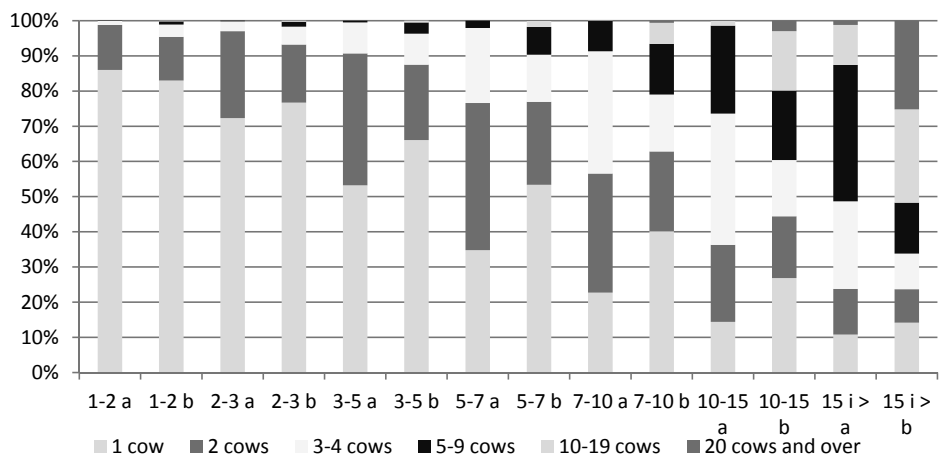

Fig. 5. Changes in the structure of farms keeping cows by the size of herds kept in individual acreage groups in 1996–2010 (in % of total farms keeping cows in a given group) – (a) 1996 (b) in 2010

Source: Own calculation and breakdown based on: Farm animals, PSR 1996, GUS, Warsaw 1997; Farm animals, PSR 2002, GUS, Warsaw 2003; Farm animals and selected elements of animal production methods, PSR 2010, GUS, Warsaw 2011.

dairy plants. Despite such difficulties, especially in recent years, a tendency to increase the number of cows being bred is visible which is manifested by the increasing share in the case of farms' acreage groups keeping herds consisting of 5–9 cows or 10 and more cows (Fig. 5). Those farms mostly obtain bulky fodder through the lease of land from neighboring farms and sell their milk to dairy plants or directly to consumers in such way earning a decent income from such output based on the prices charged.

CHANGES IN COW BREEDING IN VOIVODESHIPS CHARACTERIZED BY STRONG AGRARIAN FRAGMENTATION VIS-Á-VIS VOIVODESHIPS WITH A MORE FAVORABLE ACREAGE STRUCTURE

The trends in cow breeding presented in previous chapter are particularly severe in regard of regions of fragmented agriculture where the overwhelming majority of farms has remained in the acreage group of up to 5 ha despite the fact that it has been 20 years since the political system transformations (Fig. 6). In 1996–2010 the share of the farms of the area of 1–5 ha in the Małopolskie Voivodeship slightly decreased from 85 to 84% (farms of up to 3 ha account for 62%), and in the Podkarpackie Voivodeship it totaled 82% (60%, respectively). The share of larger acreage farms on which cows can be bred allowing competition on the milk production market, has been growing in that region quite dynamically; however, taking into account the initial level it still remains to be very low (in 2010 in the Małopolskie Voivodeship – 3.5% and in the Podkarpackie – 4.5%). In absolute terms taking into account the period under analysis (14 years) such increase is small totaling in the Małopolskie Voivodeship – 36% (from 3.8k to 5.2k), and in the Podkarpackie – 46% (from 4.3k to 6.3k). In the Małopolskie and Podlaskie Voivodeships in the period under analysis the share of very small acreage farms rose minimally, but at the same time the share of farms of an area of 20 ha or over rose quickly and the total

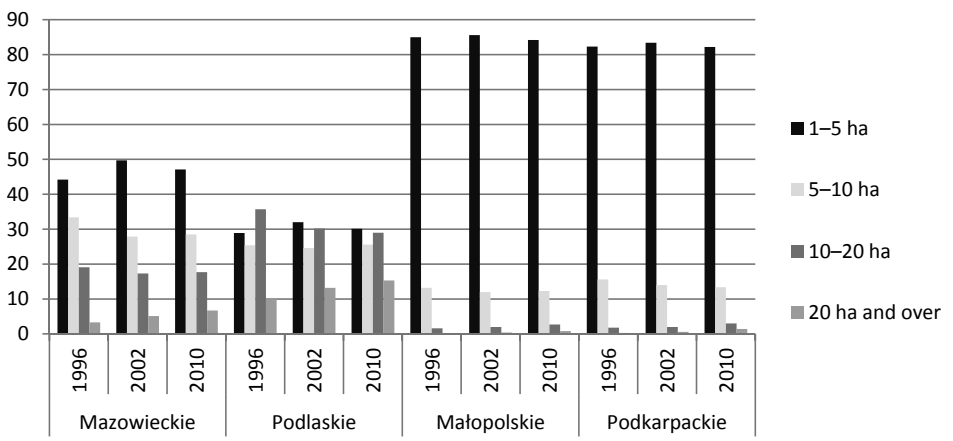

Fig. 6. Changes of the structure of agricultural farms of natural persons in comparable voivodeships by acreage groups in 1996–2010 (ha)

Source: Systematics and characteristics of farms, PSR 2002, GUS, Warsaw 2003; The characteristics of farms, PSR 2010, GUS, Warsaw 2012.

number of those farms is significant (in 2010 – 15.8k in the Mazowieckie and 13.1k in the Podlaskie Voivodeships).

As a result in the voivodeships characterized by strong agrarian fragmentation, the dynamics of the decrease of the farms keeping cows both in the pre- and post-accession period was much higher than on average in the sector of natural persons and definitely higher than in the voivodeships characterized by the favorable structure. In 2002–2010 the number of the farms keeping cows operated by natural persons Poland-wide decreased by 48%, while in the Małopolskie Voivodeship – by 52%, and in the Podkarpackie Voivodeship by as much as 61%. In the Podlaskie Voivodeship it decreased by 32%, and in the Mazowieckie Voivodeship – by 43%.

The changes of the number of farms breeding cows in comparable voivodeships are spread differently by the size of herds kept. First of all in the voivodeships characterized by the favorable agrarian structure a noticeable increase of the share of farms keeping larger herds of cows can be seen, while such share in the voivodeships with the fragmented agrarian structure, despite growth, remains at a very low level.

As a result in the Małopolska Voivodeship, in particular, the average size of a cow herd has slightly increased, whereas in the Mazowieckie and Podlaskie Voivodeships it has increased clearly. Currently in the Podlaskie Voivodeship the average size of the herd is nearly 6 times bigger than in the Małopolskie and Podkarpackie Voivodeships (Fig. 7).

Due to the changes described earliere, regress in cow breeding in the Małopolskie and Podkarpackie Voivodeships is clearly on the rise. Even though the dynamics of the decrease of the stock of cows in the two voivodeships slightly decreased (from 40% in the pre-accession period down to 38% in the post-accession period), however, the dynamics of the decrease of milk production rose considerably (from 22 to 51%, respectively). Also the dynamics of the decrease of the density of cows per 100 ha of UAA rose which evidences the decline in the interest in cow breeding and poor progress in the specialization and concentration on farms breeding cows, whereas a considerable decline in milk production shows that in regard of a significant portion of the farms keeping cows (the above

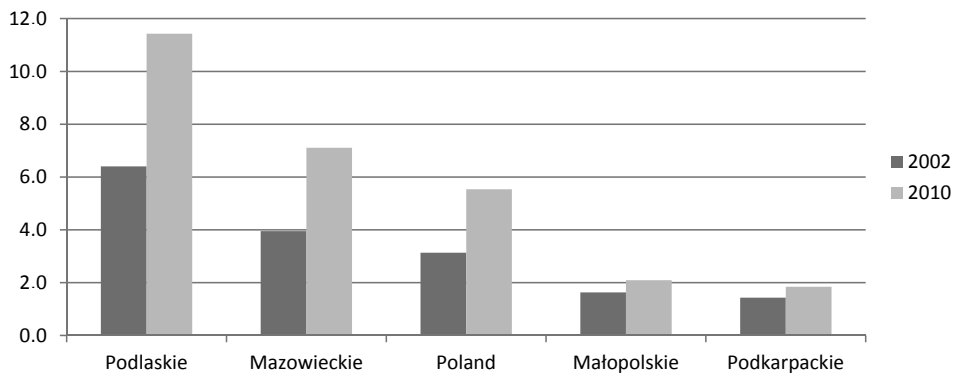

Fig. 7. Changes of the average size of a cow herd in 2002–2010 in comparable voivodeships (cows)

Source: The systematics and characteristics of farms, PSR 2002, GUS, Warsaw 2003; The characteristics of farms, PSR 2010, GUS, Warsaw 2012.

mostly refers to the farms keeping the smallest herds of cows) the interest in the growth of cow milking capacity decreased which may indicate that the tendency to withdraw from their breeding has been reinforced.

Whilst in the Mazowieckie Voivodeship, in particular, in the Podlaskie Voivodeship, the tendency to develop cow breeding can be observed very clearly. It is mostly manifested by the increased dynamics of milk production – from nearly 8% in the pre-accession period to more than 39% in the post-accession period (Fig. 8). In the Podlaskie Voivodeship such growth results both from the increased number of stock and cows' milking yield, while in the Mazowieckie Voivodeship – the cows' milking yield predominantly (in 1998–2010 the milking capacity rose from 3.4 to more than 5.2 l).

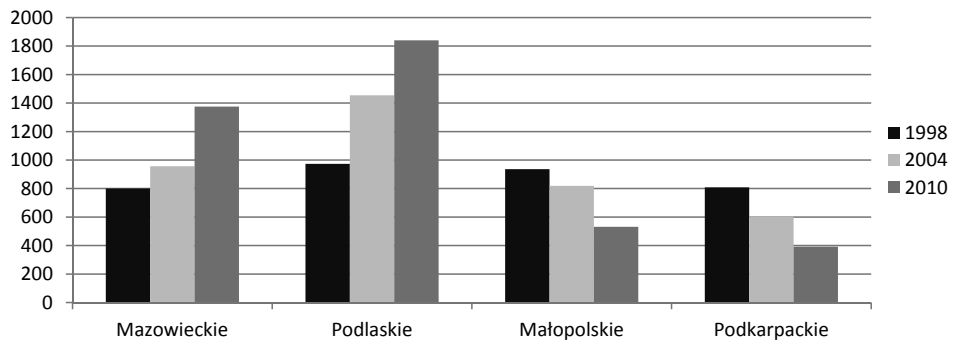

Fig. 8. Changes in milk production on farms of natural persons in the voivodeships under analysis per 1 ha UAA (l)

Source: Own calculation and breakdown based on: the 2001 Statistical Agricultural Yearbook, GUS, Warsaw 2002; the 2005 Statistical Agricultural Yearbook, GUS, Warsaw, 2006; the 2011 Statistical Agricultural Yearbook, GUS, Warsaw 2011.

In the central and eastern voivodeships the majority of farms keeping cows are commodity entities. Despite the fact that in the voivodeships of the region, being the subject matter of the analysis, the increase of the dynamics of milk production in 2004–2010 was higher than the dynamics of milk purchases, the share of milk purchases in the production of the same in the region has already been very high (in 2004 – 82%, and in 2010 – approx. 74%). Regarding the south-eastern region the trend is the opposite. Due to a very intensive decline of milk production and a definitely smaller decrease of milk purchases, the share of the milk purchased in its production rose slightly, yet it remains very low (2004 – 27%, and in 2010 – 38%). The majority of the farms in the region are the farms engaged in production to satisfy the needs of their households or to sell directly to consumers. They are predominantly typically peasant farms whose users, usually the elderly ones, are used to the fact that the farm should keep farm animals and good farms – cattle. The majority of the farms will cease to keep cows when the ownership passes to the next generation [Parzonko 2010, Musiał 2011].

While searching for scientific justification of the regional differences in the size of the stock and the intensity of the cattle production in both provinces Małopolska and Podlasie emphasis has been put on the problem of support for structural changes in livestock production in the 1990s. In the Małopolska Province these changes were extremely vio-

lent, and consequently they resulted in the decline of local dairies and the elimination of dairy herds. In the Podlasie Province, on the other hand, in 1988–1995 the Polish-Dutch experimental farm programme has been implemented by the local authorities to support the development of production in small farms [Majewski 2006]. This programme was so successful that local farms have multiplied its positive effects.

CONCLUSIONS

In Poland since the commencement of the political system transformations (since 1990), the number of the farms keeping cows (and cattle stock) has been decreasing very rapidly. The scale of the farms' acreage fragmentation is a basic factor behind the regional diversity of the process. The hypothesis was positively verified by analyzing changes of cow breeding in the sector of natural persons (private farms) in the whole Poland and in two regions where private farms predominated. The first region was the south-eastern region characterized by a very unfavorable agrarian structure, while the other one was the central and eastern region with a relatively favorable acreage structure of farms. Research results clearly show that due to the increasing competition on the market, cow breeding has been shifting over to higher and higher acreage groups. As a result, in the region of the fragmented agriculture strong and increasing regress in cow breeding has been observed while in the region with the favorable structure of farms such regress affecting cow breeding occurring upon the commencement of the political system transformations was relatively quickly slowed down and in the pre-accession period its qualitative and quantitative development emerged. It is also observed in the post-accession period. The research clearly shows that the further development of cow breeding in Poland is conditional upon the acceleration of the process of the improvement of farms' acreage structure. In the situation of the absence of the progress in the agrarian structure, progressing integration, lifting milk quotas and fading competitive edges of our agriculture and agricultural processing, Poland can still decrease cattle stock and lose its good position in the area of the production and exports of dairy products to European markets.

Huge differences in the stock of cattle in Podlasie, Małopolska and Podkarpacie Provinces have their grounds in both the support for farm work and the perfection of technological production via the Polish-Dutch project of the development of small farms. Unfortunately, in the southern Poland there are no special programmes aimed at the support for cattle breeding.

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WPŁYW ROZDROBNIENIA AGRARNEGO NA DYNAMIKĘ REGIONALNYCH ZMIAN W CHOWIE BYDŁA MLECZNEGO W LATACH 1990–2010

Streszczenie. W Polsce, poczynając od momentu rozpoczęcia przemian systemowych, w bardzo szybkim tempie zmniejsza się liczba gospodarstw utrzymujących krowy i pogłowie krów mlecznych. Podstawowym czynnikiem zróżnicowania regionalnego tego procesu jest skala rozdrobnienia agrarnego i rozmiary gospodarstw rolnych. Weryfikację tej hipotezy przeprowadzono poprzez analizę zmian w chowie krów w sektorze gospodarstw osób fizycznych (gospodarstw indywidualnych) w całym kraju i w dwóch regionach zdominowanych przez gospodarstwa indywidualne. Pierwszy to region południowo-wschodni cechujący się bardzo niekorzystną, a drugi środkowo-wschodni cechujący się stosunkowo korzystną strukturą obszarową gospodarstw rolnych. Wyniki badań wyraźnie wskazują, że w warunkach nasilającej się konkurencji rynkowej następuje koncentracja chowu krów, który przesuwa się do coraz wyższych grup obszarowych. W rezultacie w regionie rozdrobnionego rolnictwa widoczny jest silny, przy tym narastający, regres w pogłowiu. W regionie z korzystną strukturą gospodarstw regres w chowie krów, który wystąpił na początku

przemian systemowych, został natomiast stosunkowo szybko zahamowany i już w okresie przedakcesyjnym zarysował się rozwój ilościowy i jakościowy pogłowia, który widoczny jest także w okresie poakcesyjnym.

Słowa kluczowe: chów bydła mlecznego, rozdrobnienie agrarne, regionalne zróżnicowanie produkcji mleka

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"REVEALED" COMPARATIVE ADVANTAGE: PRODUCTS MAPPING OF THE RUSSIAN AGRICULTURAL EXPORTS IN RELATION TO INDIVIDUAL REGIONS

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Abstract. This paper studies specialization and competitive performance of the Russian agricultural sector through analysis of "revealed" comparative advantage of country's agricultural and food exports over the period 1998–2010. The aim of this analysis is to identify the main segments of the Russian agricultural export from the two points of view: international competitiveness and country's trade balance. For the purpose of detailed analysis all commodities exported and imported by the Russian Federation can be divided into separate groups according to two parameters: the revealed comparative advantage (RSCA index by Dalum et al. [1998] and Laursen [1998]) and domestic trade-balance (trade balance index by Lafay [1992]). This analytical tool is named "products mapping". In accordance with this methodology, we distinguished four groups of products. In the first group products have a comparative advantage and positive trade balance (5% of the exported goods, about 50% of the value of total agricultural exports). There was also identified an opposite group: all items have comparative disadvantage and negative trade balance (80% of items account for only about 30% of total exports, but 95–99% of the total imports). Further we identified one controversial group where products have comparative disadvantages, but have a positive trade balance. In most cases the products have comparative advantages in relations to the CIS, EU or Asian countries, while trade in these products in relation to countries located in Africa and Americas in most cases does not exist.

Key words: foreign trade, comparative advantage, trade balance, agricultural products, Russia

INTRODUCTION

This paper presents an analysis of Russia's international trade in agricultural and foodstuffs in terms of its comparative advantage. Relevance of the topic is determined by the growing role of Russia in the international agricultural market. During the 2000s, Russian

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agricultural import increased from $7 billion in 2000 to $33 billion in 2008. Country's agrifood exports also increased, albeit at a slower pace.

In such circumstances, it would be useful to identify markets where Russian products have comparative advantage, and therefore they have prospects for further development.

In the theories of international trade, comparative advantage is an important concept for explaining trade patterns.

The concept of comparative advantages was first developed by the classical economist David Ricardo [1817] building on principle of absolute advantages (1776) by Adam Smith.

Smith and Ricardo explained the occurrence of absolute and comparative advantages as the result of differences in labor productivity. Eli Heckscher (1919) and Bertil Ohlin (1933) developed the idea of comparative advantages in a model based on differences in factors endowments.

The idea of exploring the comparative advantage from observed trade patterns belongs to Hungarian economist Béla Alexander Balassa [1965].

He noted that measuring comparative advantage and testing the Heckscher-Ohlin theory have some difficulties since relative prices under autarky are not observable. Given this fact, Balassa [1965] proposes that it may not be necessary to include all constituents effecting country's comparative advantage. Instead, he suggests that comparative advantage is "revealed" by observed trade patterns, and in line with the theory, one needs pretrade relative prices which are not observable.

This method considerably simplifies the calculations but does not determine the underlying sources of comparative advantage.

Due to the fact that it allows us to process large amounts of data, using readily available figures on trade flows between countries, method of Balassa is often used by economists in the analysis of foreign trade patterns.

A few such studies exist with respect to Russia. For example, Tabata [2006] investigated changes in Russia's comparative advantage in 1994–2005 by revealed comparative advantage (RCA) index, revealed comparative disadvantage index, and trade specialization index (TSI). The results of his work show the increasing competitiveness of oil and gas exports (and secondarily those of armaments, selected base metals, roundwood, and fertilizers) and declining competitiveness in meat, plastics, and automobile production and stagnation in the machinery sectors.

Westin [1998] has examined the pattern of revealed comparative advantage of Russia in its trade with the EU using the Balassa index, and an index based on import-export ratios. His findings show that Russia reveals a comparative advantage in primary products and that there is no sign of change in terms of manufacturing export, which is still suffering from being unsalable on Western markets due to weakness in quality.

Ahrend [2004] argues that international competitiveness of Russian Federation – as measured by revealed comparative advantage remains limited to a small number of sectors that mainly produce primary commodities (particularly hydrocarbons) and energy--intensive basic goods.

These studies are based on the traditional use of the Balassa index. However, after Balassa other researchers have created different versions of this index. Modifications of

the Balassa index, its combinations with other indexes allow researchers to develop effective tools for the analysis of trade flows between countries.

In this paper we have used one of these tools, named "products mapping". This tool was used by Widodo [2009] and applied to ASEAN countries. "Products mapping" method enables us to assess products exported by particular country or by the group of countries from two different points of view, i.e. domestic trade-balance and international competitiveness. This analysis allows us to identify basic segments where Russia is competitive in the global markets. This tool can also help us to identify potentially promising areas and important trends in the structure of Russia's foreign trade.

MATERIAL AND METHODS

The idea of this article is to examine the structure of Russian foreign trade in agricultural products from the point of view of its specialization and the competitive performance over the period 1998–2010.

The aim of the analysis is to distinguish from the total agricultural export flows specific groups of products from the point of view of comparative advantage and trade balance, to trace the changes that have occurred in these groups over the period and to explain why these changes have taken place.

The classification of agricultural commodities used in the paper is the FAOSTAT Commodity List (FCL) that is originally based on the Standard International Trade Classification of the United Nations. All value figures are calculated at current prices in USD.

The analysis presented in this paper was conducted using the analytical tool, named "products mapping" (Fig. 1). This tool enables to assess leading exported products from two different points of view, i.e. domestic trade-balance and international competitiveness [Widodo 2009]

The revealed symmetric comparative advantage (RSCA) by Dalum et al. [1998] and Laursen [1998] is the indicator of comparative advantage, and trade balance index (TBI) by Lafay [1992] is the indicator of export-import activities.

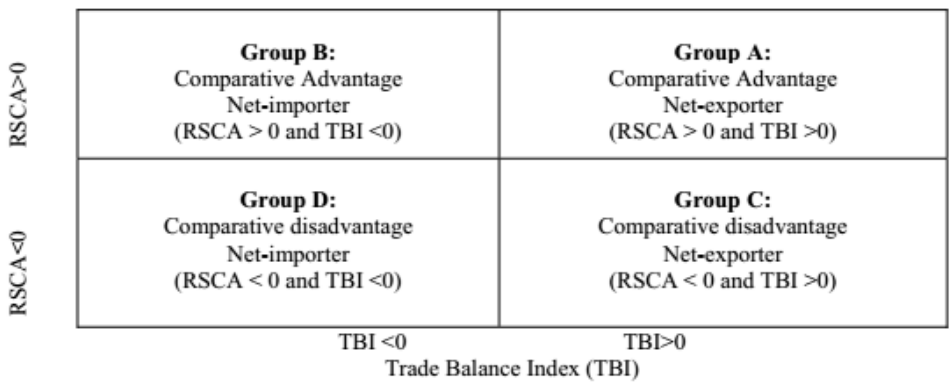


Fig. 1. Product mapping scheme
Source: Widodo [2009].

Measuring the comparative advantages in this paper is based on the Balassa index. RCA (revealed comparative advantage) is expressed through export performance and observed trade patterns. It measures a country's exports of a commodity relative to its total exports.

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

where: X – exports;
i – a country;
j – a commodity;
n – a set of countries;
t – a set of commodities.

In normal situations, if RCA > 1, then a comparative advantage is revealed. However, to perform the "product mapping" we use RSCA index that is formulated as follows:

$$RSCA = (RCA_{it} - 1)/(RCA_{ij} + 1) \quad (2)$$

The RSCA index is a simple decreasing monotonic transformation of revealed comparative advantage (RCA) or Balassa index.

The values of $RSCA_{ij}$ index can vary from –1 to +1. The $RSCA_{ij}$ greater than zero implies that country i has comparative advantage in group of products j. In contrast, $RSCA_{ij}$ less than zero implies that country i has comparative disadvantage in group of products j [Dalum et al. 1998].

Trade balance index (TBI) is employed to analyze whether a country has specialization in export (as net-exporter) or in import (as net-importer) for a specific group of products. TBI is simply formulated as follows [Lafay 1992]:

$$TBI_{ij} = (x_{ij} - m_{ij})/(x_{ij} + m_{ij}) \quad (3)$$

where: TBI_{ij} – trade balance index of country i for product j;
x_{ij}, m_{ij} – represent exports and imports of group of products j by country i.

Values of the index range from –1 to +1. Extremely, the TBI equals –1, if a country only imports, in contrast, the TBI equals +1, if a country only exports. Indeed, the index is not defined when a country neither exports nor imports. A country is referred to as "net-importer" in a specific group of product if the value of TBI is negative, and as "net-exporter" if the value of TBI is positive [Widodo 2009].

The next index used in the paper is Lafay index. This index was applied in the second part of the paper when it became necessary to analyze bilateral trade flows.

Using this index we consider the difference between each item's normalized trade balance and the overall normalized trade balance. Thereby LFI index is used to eliminate the influence of cyclical factors, which can affect the magnitude of trade flows in the short run and to focus on the bilateral trade relations between the countries and the regions.

For a given country i and for any given product j the Lafay index is defined as:

$$LFI_j^i = 100\left(\frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum_{j=1}^{N}(x_j^i - m_j^i)}{\sum_{j=1}^{N} x_j^i + m_j^i}\right)\frac{x_j^i + m_j^i}{\sum_{l=1}^{N} x_j^i + m_j^i} \quad (4)$$

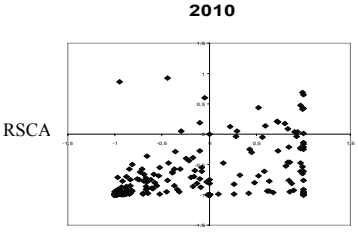
where: x^i_j, m^i_j – exports and imports of product j of country i, towards and from the particular region or the rest of the world, respectively;
N – number of items.

Positive values of the Lafay index indicate the existence of comparative advantages in a given item; the larger the value the higher the degree of specialisation. On the contrary, negative values points to de-specialisation.

RESULTS AND DISCUSSION

According to the described methodology, authors conducted an analysis and distinguished four specific groups of products from the total agricultural export flows.

Authors have identified a group that creates the foundation of the country's exports. It contains the best products in term of their comparative advantage and trade balance. Authors also isolated a group that has no revealed comparative advantage and keeps negative trade balance as opposed to the first group [Widodo 2009]. Results of product mapping are presented in Figure 2.



Group A

1) Sunflower Cake (111,534; 1.91%)*
2) Beet Pulp (41,059; 0.70%)
3) Linseed (45,480; 0.78%)
4) Sunflower Oil (379,106; 6.5%)
5) Hair Coarse, nes (497; 0.01%)
6) Wheat (2,069,121; 35.48%)
7) Barley (197,095; 3.38%)
8) Pot Barley (162; 0.01%)
9) Bran of Wheat (20,567; 0.35%)
10) Rice Flour (1,173, 0.02%)
11) Cereal Preparation, nes (13944; 0.24%)
12) Barley Flour and Grits (596; 0.01%)
13) Offals Liver Chicken (9,445; 0.16%)
14) Milk Whole Condensed (15,517; 0.27%)
15) Barley Pearled (267; 0.01%)
16) Buttermilk, Curdled, Acid. Milk (46,137; 0.79%)

*Products are presented in decreasing order of the index RSCA. In brackets next to the name of the product its value is specified (in thousands of US dollars), as well as its share in total Russian export.

Fig. 2. Products mapping of Russian export in 2010
Source: FAO, author's calculation (2012).

According to the results of "products mapping", the largest number of the agricultural products exported by Russian Federation is part of the group D (the bottom left area on diagram on Fig. 2). They have no revealed comparative advantage and keep negative trade balance. Production of these commodities is ineffective due to economic, historical, natural or geographical factors within the Russian Federation, so country has to import them. Such goods are, for example, tropical fruits (bananas, apricots, coconut, etc.), meat, and most of the meat products, tea, coffee, etc.

But considering the value of products in each group instead of the number of products, authors have completely different results.

According to the results of calculations, much of the export value is concentrated in group A (Table 1). In 1998, the group A comprised 43.8% of the total value of agricultural exports, in 2002–2003 it increased to almost 60%, in 2007 reached its maximum of 65.7% and in 2010 it was 50.6%.

Table 1. The share of individual groups in the total value of Russian agricultural export in 1998––2010 (%)

Item	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Group A	43.8	35.3	32.9	30.8	59.3	56.9	40.8	53.1	51.0	65.7	59.1	59.4	50.6
Group B	1.3	0.8	6.9	5.0	4.5	5.3	8.3	3.6	4.1	0.4	0.5	0.4	2.2
Group C	20.4	6.4	15.4	18.7	11.7	7.2	11.3	13.0	12.2	9.5	9.9	15.0	15.7
Group D	34.5	57.5	44.8	45.6	24.4	30.6	39.6	30.3	32.7	24.3	30.5	25.2	31.5
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: FAO, author's calculation [2012].

From the domestic point of view, leading exported products are supposed to be the products that can give bigger amount of foreign exchange for domestic economy. It means that the higher the share of a specific product in the total domestic exports, the more significant the contribution of the exported product to the domestic economy becomes. Such product can be considered as foreign exchange creator for domestic economy [Widodo 2009].

Wheat has the greatest weight in the group A and accounted for 42.02% of total exports in 2002, 31.3% in 2006 and 35.5% in 2010, while the whole group A represented 59.3, 51 and 50.6% of total exports respectively.

We can see that the first three groups of products for the entire investigated period have not exceeded the share of 3–4% of the total import (with the exception of 2003 and 2004 when the share of groups A, B and C for a total was 5–7%, which in fact is also not a big amount) – Table 2.

Thus, there is a situation when 5% of the exported goods, belonging to group A, account for about 50% total agricultural exports. In turn, 80% of items included in the group D, account for only about 30% of total exports, but 95–99% of the total imports. On this basis, we can consider the contents of the group A as the foundation of the Russian agri-food export.

Table 2. The share of individual groups in the total value of Russian agricultural import in 1998––2010 (%)

Item	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Group A	0.2	0.3	0.2	0.8	0.8	1.3	2.6	1.9	1.5	1.8	1.5	0.7	0.6
Group B	0.8	0.5	1.3	1.3	2.0	3.2	3.2	1.2	1.2	0.2	0.2	0.2	0.6
Group C	1.6	0.2	1.2	1.3	1.0	0.5	1.0	1.5	1.4	1.1	0.9	1.4	0.8
Group D	97.4	99.1	97.2	96.6	96.2	95.0	93.2	95.5	95.9	96.8	97.4	97.7	98.0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: FAO, author's calculation [2012].

During the analyzed period, the structure of Russia's foreign trade in agricultural products has undergone some changes.

At the beginning of the period, in 1998, wheat had no comparative advantage and sunflower seed (20.7% of the total export) and hides (wet, salted) cattle (14.6%) constituted the basis of group A. Later they have lost their relevance. In the case of sunflower seed it was likely caused by increase in production capacity for oilseed processing and by the increase of the export of vegetable oils instead of raw materials (sunflower seeds), as it was in the 1990s. In relation to hides (wet, salted) cattle, the reduction of export performance was caused by the continued decline in the livestock sector and by the establishment of licensing for export of hides and skins of cattle, sheep and other animals.

During the analyzed period there were significant changes in the volumes and structures of these groups. In 1998 group A comprised 43.8% of the total value of agricultural exports, in 2002–2003 increased to almost 60% of the total value and in 2007 reached its maximum of 65.7% of the total value of Russian agricultural exports. In 2010 its share was 50.6%. Despite some fluctuations, the overall trend can be assessed as a steady growth of the share of the group A in the total value of Russian agricultural exports.

At the same time, there is a reduction in the share of groups D and C in the total exports value. These trends can be considered as a strengthening of the comparative advantages of Russian exports on the whole.

It should be noticed that group C products are also important. They do not have comparative advantages, but have a positive trade balance. The comparative disadvantage in this case, may occur in relation to the whole world, while in bilateral trade with individual regions or countries comparative advantages quite possibly exist.

To test this hypothesis, we analyzed bilateral trade flows between Russia and individual regions. In this case, LFI index, which is used exactly for the analysis of comparative advantage on bilateral level, is the most suitable.

A detailed analysis of this group using the LFI index shows that some products actually have revealed comparative advantages in relation to particular regions.

In 1998 there was 28 items in the group C. As we can observe in the Table 3, each product (with rare exceptions) has a comparative advantage in relation to at least one region. For example, rapeseeds have comparative disadvantage in relation to African and American countries, but it have positive values of LFI index in relations to Commonwealth of Independent States – CIS, Asian countries and especially to the EU. The export of rapeseed in Europe is important and promising area for Russia, since European countries use it for bio-fuel production. Exports of rapeseed in the EU amount to 68.2% of the total Russian exports of this commodity.

Wheat has a comparative advantage in relation to all regions with the exception of America. Barley has a positive value of LFI in relation to Asian countries, etc.

In this group 9 out of 28 products have a comparative advantage in relation to Asian countries, 13 products in relation to CIS as well as EU countries and only one product in relation to Africa.

Considering the group C in 2002, we see that the largest number of the products have a comparative advantage in relation to EU (31 items out of 55), Asian countries (26 items) and CIS countries (22 items) – Table 4.

Table 3. Values of LFI index in relation to specific regions in 1998

Specification	Asia		Africa		Americas		CIS		EU	
	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export
Anise, Badian, Fennel, corian	–0.065	16.8	x	0	x	0	0.013	4.4	–0.115	79.1
Barley	0.016	41.0	x	0	x	0	–1.677	7.4	–13.081	46.8
Bran of Wheat	–0.047	76.3	x	0	x	0	–0.034	2.0	–0.684	21.7
Broad beans, Horse Beans (dry)	–0.002	0	x	0	x	0	x	0	0.087	100
Cocoa husks, Shells	x	0	x	0	x	0	0.092	100	x	0
Cocoon (unrecled) Wastes	0.000	10.7	x	0	x	0	–0.020	0	0.200	89.3
Food Wastes	x	0	x	0	x	0	0.006	100	x	0
Grease including Lanolin Wool	–0.011	0	x	0	x	0	0.001	50.0	x	0
Hair (carded/ /combed)	–0.004	0	x	0	x	0	x	0	0.040	100
Hair (fine)	0.005	99.2	x	0	x	0	–0.023	0	–0.233	1.0
Lard	–0.006	0.2	x	0	x	0	0.021	2.8	–0.830	97.0
Lard Stearine Oil	x	0	x	0	x	0	0.005	100	x	0
Mushrooms and Truffles	0.000	0.3	x	0	x	0	x	0	–0.472	99.7
Mustard Seed	0.000	30.2	x	0	x	0	0.375	68.9	0.004	0.9
Nuts	–0.289	99.9	–0.336	0	x	0	–0.008	0	–0.314	0
Oilseeds	0.009	84.9	x	0	x	0	–0.004	0.7	0.070	14.4
Rapeseed	0.008	6.6	x	0	x	0	0.079	0.8	5.426	68.2
Raspberries	–0.007	0	–0.067	0	x	0	x	0	0.229	100
Skins (wet, salted) Goats	x	0	x	0	x	0	x	0	0.028	100
Skins with Wool Sheep	0.015	77.4	x	0	x	0	–0.036	13.8	0.012	8.8
Soybeans	0.059	99.4	x	0	x	0	0.076	0.6	–0.664	0
Strawberries	–0.224	0	–3.800	0	x	0	–0.001	0	–2.338	0
Tapioca of Cassava	x	0	x	0	x	0	0.009	100	–0.004	0
Vegetables in Temporary Preservatives	–0.136	61.2	x	0	x	0	–0.000	0.2	–1.660	38.6
Wheat	0.660	48.7	4.204	4.5	x	0	1.356	29.6	8.904	15.0
Wool (degreased)	0.008	12.4	x	0	x	0	0.856	30.3	2.591	57.3
Wool (greasy)	0.009	17.7	x	0	x	0	–1.169	2.8	2.444	67.4
Wool Hair Waste	x	0	x	0	x	0	0.084	17.2	0.362	82.8

x means that there was no trade in this commodity with this particular region.
Source: FAOSTAT, author's calculations [2013].

Table 4. Values of LFI index in relation to specific regions in 2002

Specification	Africa		Americas		CIS		EU		Asia	
	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export
1	2	3	4	5	6	7	8	9	10	11
Homogenic Meat Preparations	x	0	–0.193	0	0.067	95.6	–0.111	0.7	x	0
Cotton Lint	x	0	x	0	x	0	0.040	100	x	0
Leather (use, waste)	x	0	x	0	x	0	0.001	100	x	0
Cereals	x	0	x	0	0.000	100	x	0	x	0
Meat Extracts	x	0	x	0	0	0	x	0	x	0
Tapioca of Cassava	x	0	x	0	x	0	0.001	66.7	x	0
Grease including Lanolin Wool	x	0	x	0	0.006	100	x	0	x	0
Skins (wet, salted) Goats	x	0	x	0	x	0	0.003	100	x	0
Jute	x	0	x	0	0.005	100	x	0	x	0
Hides	x	0	x	0	x	0	0.034	100	x	0
Roots and Tubers	x	0	x	0	x	0	0.020	100	x	0
Cotton Waste	x	0	x	0	0.007	23.0	0.104	77.5	x	0
Skins with Wool Sheep	x	0	x	0	0.003	2.5	0.004	0.9	0.294	96.7
Wool (greasy)	x	0	x	0	x	0	1.857	94.2	0.070	5.2
Coffee Substitutes, Concentrated Coffee	x	0	x	0	0.005	72.7	x	0	x	0
Cake of Rapeseed	x	0	x	0	x	0	0.718	100	x	0
Wool Degreased	x	0	x	0	0.100	10.1	2.166	52.7	1.031	37.1
Flax Tow Waste	x	0	x	0	0.002	2.7	0.267	73.0	0.060	24.1
Hair Fine	x	0	x	0	x	0.0	0.046	16.5	0.157	83.8
Flax Fibre and Tow	x	0	x	0	0.002	0.5	1.111	68.3	0.343	31.2
Hair Coarse	x	0	x	0	x	0	x	0	0.089	100
Hides (wet, salted) Cattle	x	0	x	0	0.108	1.5	28.174	91.8	0.959	4.6
Peas (green)	–0.906	0	x	0	0.007	33.6	0.061	66.4	x	0
Milk (whole, evaporated)	x	0	x	0	2.015	99.0	–0.128	1.0	0.002	0
Broad Beans, Horse Beans (dry)	x	0	x	0	x	0	0.307	100	x	0
Rye	x	0	x	0	0.006	1.5	1.625	92.7	0.068	5.7
Chick Peas	x	0	x	0	0.015	5.0	–0.000	0.9	1.011	94.1
Forage Products	x	0	x	0	–0.002	0	0.322	99.6	0.001	0.4

Table 4 cont.

1	2	3	4	5	6	7	8	9	10	11
Bread	0.531	0.02	4.570	6.6	–0.198	87.7	–1.851	3.2	–0.439	4.4
Cow milk (whole, fresh)	x	0	0.265	0.5	–0.168	36.1	–0.532	0.5	1.016	62.7
Currants	x	0	x	0	x	0	0.003	100	x	0
Dried Mushrooms	x	0	0.248	1.4	–0.002	0	0.482	86.0	–0.953	5.2
Flour of Rye	x	0	x	0	–0.036	39.6	–0.001	0	0.014	15.9
Flour of Wheat	–2.417	0	–7.626	0.3	–2.836	13.8	–2.653	0.2	6.556	85.6
Ice Cream and Edible Ice	x	0	2.660	1.8	1.145	79.3	–2.674	3.7	0.209	11.5
Juice of Grapefruit	x	0	–0.005	0	–0.110	92.4	–0.095	5.5	–0.023	2.1
Juice of Pineapples	–3.323	0	0.032	0.4	–0.118	82.9	–0.109	4.2	0.011	12.3
Leguminous vegetables	x	0	x	0.0	–0.007	0	0.031	100	x	0
Lentils	x	0	0.164	3.8	0.024	30.0	0.035	25.2	–0.057	39.0
Meat of Beef (dried, salted, smoked)	x	0	x	0	0.001	75	–0.002	0	x	0
Milk (skimmed dry)	x	0	–0.563	0	–1.055	13.5	2.089	60.4	0.724	22.2
Milk (whole dried)	14.875	0.8	0.860	1.5	–1.988	77.3	–0.512	2.5	0.202	12.1
Mixes and Doughs	x	0	0.043	0.2	0.133	26.3	0.207	72.4	–0.262	0
Molasses	x	0	x	0	–0.538	8.7	0.588	41.0	0.488	50.3
Oats	x	0	x	0	–0.030	0	–0.006	0	0.017	21.4
Oil Essential	–0.604	0	–1.609	0	0.022	1.4	–1.268	4.0	3.763	94.6
Preparations of Beef Meat	x	0	–0.008	0	–1.242	93.5	–0.424	0	0.004	3.3
Pulses	x	0	x	0	–0.020	0	0.014	100	–0.004	0
Rapeseed	x	0	x	0	–0.002	0.0	2.053	95.9	0.066	4.0
Straw Husks	x	0	x	0	x	0	0.001	100	x	0
Strawberries	–31.115	0	0.506	0.7	–0.008	0	1.982	99.4	–0.084	0
Sugar (refined)	–7.854	0	0.264	0.0	3.043	97.7	–27.086	0.2	–15.982	2.0
Vegetables in Temporary Preservatives	30.813	2.0	–0.037	0	–0.036	0.2	0.427	25.0	0.559	69.1
Yogh (concentrated or not)	x	0	0.199	0.1	1.630	96.5	–7.321	0	0.089	1.9

Source: FAOSTAT, author's calculations [2013].

In regard to the Africa and the Americas, Russia's foreign trade with these regions in the most of the investigated products simply do not exists.

Some of the products are exported only in one direction and have comparative advantages in relation to the region. Thus, for example, straw husks, pulses, leguminous vegetables, currants, hides, cake of rapeseed and and several other products Russia exported only to EU countries and this items have positive values of LFI index in relation to this region.

In 2006, the product structure of the group C underwent certain changes. Some items moved to this group from the group D, but in general, the essence of the group C remained the same. The largest number of the products still have a comparative advantage in relation to the EU (26 items out of 56), Asian countries (22 items) and CIS countries (20 items) – Table 5.

Table 5. Values of LFI index in relation to specific regions in 2006

Specification	Africa		Americas		CIS		EU		Asia	
	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export
1	2	3	4	5	6	7	8	9	10	11
Apple juice (single strength)	0.164	0.0	0.432	0.4	–0.586	93.5	–1.308	0.1	0.184	5.8
Berries	x	0	–0.179	0	x	0	1.591	100	–0.001	0
Bran of Pulses	x	0	x	0	x	0	x	0	–0.002	100
Bran of Rice	x	0	x	0	x	0	x	0	0.005	100
Bran of Wheat	x	0	x	0	–0.012	0	–1.309	0	1.879	100
Broad Beans, Horse Beans (dry)	x	0	x	0	x	0	0.437	72.6	x	0
Cake of Linseed	x	0	x	0	x	0	0.013	100	x	0
Cake of Oilseeds	x	0	x	0	x	0	0.012	96.0	x	0
Cake of Rapeseed	x	0	x	0	0.010	2.1	3.044	81.4	0.422	16.5
Cereal Preparations	x	0	6.755	7.6	0.260	76.9	–0.560	12.3	–1.345	1.9
Chick Peas	x	0	x	0	–0.047	2.4	0.265	15.4	0.964	82.2
Cigarettes	20.526	0.1	–0.505	0	7.108	70.2	–16.091	0.7	–26.225	20.2
Coffee Substitutes, Contrated Coffee	x	0	0.038	100	x	0	x	0	x	0
Cow milk (whole, fresh)	x	0	x	0	0.201	59.5	–0.551	0	0.738	40.3
Cranberries	x	0	–0.006	0	x	0	0.036	100	x	0
Dregs from Brewing/ /Distilling	x	0	x	0	0.000	0.5	0.360	60.6	x	0.0
Dried Mushrooms	x	0	0.636	3.7	–0.009	0	0.525	79.4	–0.310	2.5

Table 5 cont.

1	2	3	4	5	6	7	8	9	10	11
Flax Tow Waste	–0.257	0	x	0	0.002	6.9	0.147	91.3	–0.005	1.4
Flour of Wheat	x	0	2.664	0.5	–0.743	23.4	–1.606	0	11.778	76.1
Food Wastes	x	0	x	0	0.000	100	x	0	x	0
Forage Products	x	0	x	0	–0.007	0	0.257	99.0	0.001	0.8
Germ of Wheat	x	0	x	0	0.000	100	x	0	x	0
Hair Coarse	x	0	x	0	–0.046	0	x	0	0.104	99.7
Hemp Tow Waste	x	0	x	0	x	0	x	0	x	0
Hides	x	0	x	0	x	0	0.100	100	x	0
Hides (wet, salted) Cattle	x	0	x	0	–0.090	23.0	0.363	67.3	0.036	9.6
Honey (natural)	x	0	x	0	x	0	x	0	x	0
Ice Cream and Edible Ice	x	0	2.687	1.0	0.938	82.8	–1.883	2.4	0.857	13.2
Juice of Pineapples	x	0	0.089	0.4	0.025	89.7	–0.078	0.1	0.019	9.5
Linseed Oil	x	0	0.013	1.2	–0.008	67.9	–0.002	23.5	0.000	3.7
Molasses	x	0	x	0	0.217	33.5	1.079	21.0	1.596	45.5
Nuts	–2.107	0	–0.066	0.0	0.006	1.2	0.084	1.1	4.730	97.6
Oats	x	0	x	0	–0.016	5.4	–0.011	0	0.091	53.6
Oilseeds	x	0	x	0	–0.452	0	1.402	97.1	–0.496	2.9
Other Fructose and Syrup	x	0	0.064	0.9	0.002	5.3	–0.172	0	0.000	0.2
Peas (dry)	0.164	0.0	–3.666	0.1	0.002	7.8	5.123	78.0	0.604	14.1
Peas (green)	–0.211	0	–0.004	0	x	0	0.620	100	x	0
Preparations of Beef Meat	0.821	0.1	–0.048	0	0.277	60.0	–0.323	0	0.607	39.4
Prepared Meat	0.164	0.2	–0.004	0	0.025	79.5	–0.054	0	0.030	20.2
Rapeseed	x	0	x	0	0.002	0.2	7.447	95.9	0.009	0.1
Rapeseed oil	x	0	x	0	–0.022	1.0	16.596	99.0	–0.004	0
Res. Fatty Subs	x	0	x	0	–0.003	100	x	0	–0.036	0
Rice Flour	x	0	0.320	15	0.009	78.9	–0.028	0.6	–0.038	5.6
Roots and Tubers	x	0	x	0	x	0	0.001	100	0.000	100.0
Safflower oil	x	0	x	0	x	0	–0.001	0	x	0
Sausages of Pig Meat	x	0	–8.149	0	2.252	89.8	–6.166	0	1.210	10.0
Skins (wet, salted) Calves	x	0	x	0	0.000	0.3	0.790	99.7	x	0
Skins (dry, salted) Goats	x	0	x	0	0.001	100	x	0	x	0
Straw Husks	x	0	x	0	0.001	36.0	0.008	64.0	x	0
Sugar (refined)	–19.265	0	–0.775	0.1	–6.698	84.0	–10.670	1.2	3.383	14.7
Vegetable Products for Feed	x	0	–0.196	0	x	0	0.198	68.4	–0.026	0

Table 5 cont.

1	2	3	4	5	6	7	8	9	10	11
Vegetables in Temporary Preservatives	x	0	–0.151	0	0.000	0.1	1.352	46.4	–1.505	48.5
Wool (degreased)	x	0	x	0	–2.999	36.4	1.429	41.9	0.358	21.7
Wool (greasy)	x	0	x	0	–0.729	6.3	0.633	54.9	0.282	38.8
Wool Hair Waste	x	0	x	0	0.007	30.4	0.118	69.6	x	0
Yogh (concentrated or not)	x	0	0.051	0.0	1.124	98.3	–3.217	0	0.105	1.7

Explanations as in Table 3.
Source: FAOSTAT, author's calculations (2013).

The following products showed the highest values of the index: cigarettes in relation to Africa (LFI = 20.5) and CIS countries (LFI = 7.1); flour of wheat in relation to Asia (LFI = 11.8), rapeseed and rapeseed oil in relation to the EU (LFI = 7.5 and LFI = 16.6, respectively).

In 2010, 4 out of 52 items included in the group C had a comparative advantage in relation to African countries, 28 in relation to Asian countries, 16 products in relation to CIS, 22 items in relation to EU countries and 7 products in relation to Americas – Table 6.

Table 6. Values of LFI index in relation to specific regions in 2010

Specification	Africa		Americas		CIS		EU		Asia	
	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export	LFI	% of export
1	2	3	4	5	6	7	8	9	10	11
Apple juice (single strength)	x	0	–0.016	0.4	–0.911	89.9	–0.836	0.2	0.076	3.1
Bran of Cereals	0.010	5.6	x	0	x	0	–0.045	0	1.831	94.4
Bran of Maize	x	0	x	0	x	0	–0.007	0	0.056	100
Buckwheat	x	0	x	0	0.001	9.7	0.063	81.1	0.028	9.2
Cake of Linseed	x	0	x	0	x	0	0.021	89	x	0
Cake of Oilseeds	x	0	x	0	–0.007	0	0.024	100	x	0
Cake of Rapeseed	x	0	x	0	x	0	2.397	64.7	5.177	35.3
Cashew Nuts with Shells	x	0	x	0	x	0	x	0	0.006	100
Cereals	x	0	x	0	0.009	100	–0.001	0	x	0
Chick Peas	0.010	3.5	0.335	1.2	–0.176	7.2	0.007	1.4	2.605	86.8
Cigarettes	0.005	0.0	0.109	0.0	1.201	88.7	–8.989	1.4	–37.29	2.7
Coffee Substitutes, Concentrated Coffee	x	0	0.010	13.3	0.000	80	x	0	x	0

Table 6 cont.

1	2	3	4	5	6	7	8	9	10	11
Cotton Linter	x	0	x	0	x	0	x	0	0.217	100
Dregs from Brewing/Distilling	x	0	x	0	0.003	19.4	0.087	59.3	0.123	21.3
Eggs Liquid	x	0	x	0	0.000	100	x	0	x	0
Flax Tow Waste	x	0	x	0	0.000	6.8	–0.025	91.7	–0.046	0.8
Flour of Roots and Tubers	x	0	x	0	x	0	0.000	100	x	0
Flour of Rye	x	0	x	0	0.006	65.1	–0.018	0	0.119	32.1
Flour of Wheat	x	0	0.835	0.5	0.085	30.3	–0.786	0.1	10.194	55.7
Food Wastes	x	0	x	0	x	0	0.004	100	x	0
Germ of Maize	x	0	x	0	0.000	100	x	0	x	0
Hair (carded/ /combed)	x	0	x	0	–0.024	91.1	0.002	8.9	x	0
Hair (fine)	x	0	x	0	0.003	100	x	0	–0.109	0
Hides	x	0	–0.028	0	x	0	0.002	89.5	0.001	10.526
Meat (dried)	x	0	x	0	x	0	1.166	100	x	0
Meat	x	0	x	0	x	0	0.277	100	–0.082	0
Milk (whole, evaporated)	x	0	x	0	0.109	99.9	–0.036	0	0.003	0.1
Millet	x	0	x	0	–0.094	4.4	0.073	78.6	0.054	14.6
Molasses	x	0	–0.003	0	0.050	29.4	0.250	14.6	3.775	56.0
Mustard seed	x	0	x	0	0.000	0.2	0.180	37.4	1.179	62.4
Nuts	–0.448	0	–2.998	0	0.000	0.6	0.178	29.6	1.582	69.7
Oats	x	0	x	0	–0.003	5.8	–0.007	0.2	0.280	94.0
Other Fructose and Syrup	x	0	–0.149	6.4	0.002	90.0	–0.001	0	–0.022	3.6
Peas (dry)	x	0	–14.402	0.0	–0.000	13.8	1.737	65.8	3.382	20.4
Peas (green)	–0.270	0	–0.026	0	0.000	0.2	0.501	99.8	–0.001	0
Pig meat	x	0	x	0	0.000	15.9	0.012	55.3	x	0
Plums and Sloes	x	0	x	0	0.000	11.5	0.000	15.4	x	0
Preparations of Beef Meat	x	0	–6.692	0	–0.002	84.1	–0.472	0.0	0.427	10.3
Rapeseed	x	0	–1.654	0	–0.000	0.8	1.300	85.6	1.691	13.7
Rapeseed Oil	x	0	–0.074	0	–0.010	0.1	10.136	94.3	1.896	4.4
Res. Fatty Substances	x	0	x	0	0.015	72.4	0.011	5.1	0.181	22.4
Roots and Tubers	x	0	–0.020	0	0.001	89.6	–0.002	5.2	0.000	6.3
Rye	x	0	x	0	0.007	73.7	–0.074	0	0.095	26.3
Sausages of Pig Meat	x	0	–12.37	0	0.356	81.8	–6.098	0.0	0.024	1.0
Skin Furs	x	0	28.707	12.1	x	0	–0.672	71	3.966	15.5
Soybean Oil	1.033	16.5	–0.064	0	–0.901	0.3	9.594	82.5	–1.265	0.7
Straw Husks	x	0	–0.036	0	–0.001	7.1	0.003	52.4	0.008	40.5

Table 6 cont.

1	2	3	4	5	6	7	8	9	10	11
Tobacco Products	–0.340	3.8	8.417	2.3	0.280	78.1	–10.45	6.7	–2.941	4.2
Vegetable Products for Feed	x	0	x	0	x	0	0.318	100	x	0
Whey (condensed)	x	0	x	0	x	0	x	0	x	0
Wool (greasy)	x	0	0.121	0.3	0.000	0.1	0.154	17.7	2.801	81.9
Wool Hair Waste	x	0	x	0	0.002	36.3	0.030	63.7	–0.021	0

Explanations as in Table 3.
Source: FAOSTAT, author's calculations (2013).

The results support the earlier suggestion that in bilateral trade with individual regions products of the group C have comparative advantages despite of comparative disadvantages in relation to the whole world.

In most cases the products have comparative advantages in relations to CIS, EU or Asia countries, while trade in these products with the countries of Africa and Americas in most cases does not exist.

CONCLUSIONS

The analysis presented in this paper was conducted using the analytical tool, named "products mapping", that enables to assess leading exported products from two different points of view, i.e. domestic trade-balance and international competitiveness.

According to the results of "products mapping", the largest number of the agricultural products exported by Russian Federation is part of the group D. They have no revealed comparative advantage and keep negative trade balance. Production of these commodities is ineffective due to economic, historical, natural or geographical factors within the Russian Federation, so country has to import them. Such goods are, for example, tropical fruits (bananas, apricots, coconut, etc.), meat, and most of the meat products, tea, coffee.

But considering the value of products in each group instead of the number of products, we got completely different results. According to the results of calculations, the most of the export value is concentrated in group A. Wheat and sunflower oil has the greatest weight in this group.

Thus, there is a situation when 5% of the exported goods, belonging to group A, account for about 50% of total agricultural exports. In turn, 80% of items included in the group D, account for only about 30% of total exports, but 95–99% of the total imports. On this basis, authors can consider the contents of the group A as the foundation of the Russian agri-food export.

Further authors identified one controversial group where products have comparative disadvantages, but have a positive trade balance. Authors have assumed that items in this group have comparative advantages only in bilateral trade in relation to specific regions/countries. To test this assumption authors calculated LFI index (by Lafay (1992)) for each product/aggregation in this group in relations to five regions: European Union

(EU), Commonwealth of Independent States (CIS), Africa, Asia and Americas as well as in relation to selected important countries.

The results support the suggestion that in bilateral trade with individual regions products of this group have comparative advantages in relation to specific region or country despite of comparative disadvantages in relation to the whole world. For example, rapeseeds have comparative disadvantage in relation to African and American countries as well as to the whole world, but rapeseeds have a strong comparative advantage in relation to the EU since European countries use rapeseeds for bio-fuel production.

In most cases the products have comparative advantages in relations to the CIS, EU or Asian countries while trade in these products in relation to countries located in Africa and Americas in most cases does not exist.

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„UJAWNIONA" PRZEWAGA KOMPARATYWNA: ANALIZA ROSYJSKIEGO HANDLU ZAGRANICZNEGO PRODUKTAMI ROLNYMI W ROZBICIU NA REGIONY

Streszczenie. W artykule zanalizowano zagadnienia handlu zagranicznego Rosji produktami rolnymi w latach 1998–2010. Wszystkie eksportowane produkty podzielono na grupy według dwóch parametrów: ujawnionych przewag komparatywnych (wskaźnik RSCA) oraz krajowego bilansu handlowego. W ten sposób uzyskano cztery grupy produktów: cechujące się przewagą komparatywną i dodatnim bilansem handlowym (5% eksportowanych produktów; około 50% wartości eksportu produktów rolnych), charakteryzujące się ujemnym bilansem handlowym i brakiem przewagi komparatywnej (w tej grupie 80% produktów ujętych ilościowo stanowi zaledwie 30% wartości eksportu, a jednocześnie 95–99% importu), produkty bez przewagi komparatywnej, a jednocześnie zachowujące dodatni bilans handlowy oraz produkty z przewagą komparatywną i ujemnym bilansem handlowym. Na podstawie analiz można wywnioskować, że w przypadku większości produktów Rosja ma przewagę komparatywną nad krajami WNP, UE oraz azjatyckimi, chociaż wobec krajów afrykańskich i z obu Ameryk ta przewaga nie występuje.

Słowa kluczowe: handel zagraniczny, przewaga komparatywna, bilans handlowy, produkty rolne, Rosja

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EFFECTS OF A FLOOD HAZARD ON SOCIAL AND ECONOMIC LIFE OF RURAL INHABITANTS

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Abstract. Climate changes, resulting in occurrence of extreme natural phenomena that do not bypass our country and continent, are the background of the research. In Poland, the areas most endangered with floods are located in the southern part of the country. The subject of author's research is flood hazard and its effect on the strength of social bonds and community actions undertaken by rural inhabitants (communes Gnojnik, Skarbimierz, and Sławatycze). These are the inhabitants living within the flooded areas, both people directly affected by the flood and also their neighbors who provided help. In the examined period (2008–2011), the selected communes experienced floods at least twice, with the assumption that not all the respondents were affected by it. The main research method used in the study was systematic comparison. Despite of the existing flood hazard, the respondents feel secure in their place of residence and do not wish to relocate; they are deeply bounded with it, first of all because of their families and close friends who also live there; They appreciate people whom they can trust. The majority of the respondents from all communes declared their positive attitude towards strangers. The respondents from the examined communes exhibited particularly large trust towards their commune leaders.

Key words: social ties, flood threats

INTRODUCTION

Hazardous situations, risks and disasters are an inseparable element of social life, regardless of a given community's geographical location and the prevailing social and economic conditions. The subject of author's research is flood hazard and its effect on the strength of social bonds and community actions undertaken by rural inhabitants. Climate changes, resulting in occurrence of extreme natural phenomena that do not bypass our country and continent, are the background of the research. In Poland the areas most endangered with floods are located in the southern part of the country. In the resent years some towns have been exceptionally prone to floods. Multidimensionality, diversification of reasons for floods and their course make their psychological and economic

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consequences complex and difficult to examine[1]. In 2010 another great flood re-affected a substantial part of the areas flooded in 1997, which made the community's trauma revived. In Poland it is possible to indicate places where flood, in spite of its distinct character, has been appearing relatively often in the recent years and where it may be considered a recurring phenomenon. Such circumstances suggest the presence of a dependency between the social life and permanent flood hazard. Therefore, it seems fully justified to research local communities that periodically struggle with floods in order to find out whether this fact changes the nature of social bonds and whether the flood hazard implies undertaking community activities. Based on those premises, the main research problems are: Whether situations of flood hazard and flood itself affect the nature of community bonds? If floods occurring in the examined area are cyclical and become one of the elements of social life they must leave the trace, that should, to some extent, modify the existing system of values, hierarchy, binding norms and behaviours. The question is to what extent the flood situation may affect the strength and the character of social bonds, and to what extent the history, culture and adaptive strategies of these communities determine behaviour in extreme situations? In the light of these problems research hypotheses were formulated (Table 1). In this paper will be described only three hypotheses because the editors requirements limiting the size of article.

Table 1. Research hypothesis

Specification	Hypothesis
Hypothesis 1	the forms of cooperation, mutual dependences and trust developed during the flood translate themselves into the common initiatives undertaken later, which encourage sustaining and strengthening of community bonds
Hypothesis 2	flood hazard and the flood itself does not affect significantly the character of family bonds, but changes, to a greater or lesser extent permanently, the neighbourly relations and relations with closer and more distant friends
Hypothesis 3	the attitude of commune inhabitants towards the government representatives and local institutions (village administrator, the head of commune, fire department representatives) in the situation of flood hazard depends on trust (or the lack of such) which the commune inhabitants have for these representatives; the trust is built throughout the years, and the extreme situations put this trust, and people who have it, to the test
Hypothesis 4	there is an organised neighbourly cooperation initiative whose aim is to embark on preventive actions, liquidation of the effects of flood and provision of support for people affected by flood
Hypothesis 5	the interactions within the local community in the situation of flood risk depend on application of different adaptation strategies, resulting mainly from cultural conditions, determined by the effect of the given flood hazard
Hypothesis 6	social interactions occurring during the flood hazard situation and during the flood itself affect the re-evaluation of the importance of individuals' sense of identification with the community (understood as a community of the disaster, namely the community of people affected by natural disaster)

Source: Own research.

[1]The tragic 1997 flood gave start to some research, which included also the social aspect, conducted by both Polish and European researchers. This research indicated the existence of some dependencies emerging in due course of this disaster. Wojciech Sitek [1997], Edward Nycz [2000] and Janina Hajduk-Nijakowska [2005] pointed out such phenomena as: "community order", "short-term community", "retreat of the community", "social solidarity", "victim fraterninzation", "fraterninzation in thoughtlessness".

MATERIAL AND METHODS

According to the assumed objectives, the individuals to undergo the tests were selected from the communes Gnojnik, Skarbimierz, and Sławatycze. These are the inhabitants living within the flooded areas, both people directly affected by the flood and also their neighbours who provided help. In the examined period (2008–2011) the selected communes experienced floods at least twice, with the assumption that not all the respondents were affected by it. The main research method used in the study was systematic comparison. When describing the method, Allen H. Barton and Paul F. Lazarsfeld [1986], drew attention to several significant elements: (a) It is a special method of testing the independencies, between statistic and quasi-statistic methods, consisting in research of relatively small number of cases; (b) It does not include enough cases to conduct statistical analysis; (c) It applies to a natural situation, and each case may differ slightly from the other; (d) The application of statistical comparison method is possible only when specific, complex social phenomena, like wars, revolutions, great social systems, government forms and others, are tested[2]. Systematic comparison method, which belongs to qualitative methods, has been applied for own research to analyze free and expert interviews. Also, quantitative research was conducted, and interpretation of empirical material involved both qualitative systematic comparison method and statistical methods. During sociological recconnaisances the flood area in each of the three communes was defined, as well as the neighbouring villages, inhabitants of which were first to provide help. All households were visited during the research. Not in every one of them the household members were present, and if they were, many did not expressed the consent for participation in the study. The reason could be: distance towards strangers, partly culturally determined (the Skarbimierz commune is the area where many inhabitants were displaced from different areas of pre-war Poland), fear of losing the benefits for flood victims (the Gnojnik commune), unpleasant experiences with door to door fraudsters (the Sławatycze commune). Finally, 229 correctly filled in surveys were collected. The highest representative character was obtained in the Sławatycze commune – 57 respondents, which is 8.7% of village units' population covered by the research, and 2.3% of all inhabitants of the commune; subsequently, the Skarbimierz commune – 79 of the respondents (3.7% of the inhabitants of selected village units and 1.0% of the commune population) and the Gnojnik commune – 93 of the surveyed (2.0% of the inhabitants of selected village units and 2.3% in general). The detailed schedule in terms of participation of different village units in the particular communes is presented in Table 2.

Apart from surveys, the in-depth interviews with inhabitants were conducted in the number of: Gnojnik – 17, Skarbimierz – 8 and Sławatycze – 23. The collected empirical material was broadened by information obtained from expert interviews, conducted with local government representatives and local social leaders (in the number of 9, 8 and 7, respectively). The research took place in spring-summer 2012. In its execution, apart from the author, 3rd year sociology students from the Pedagogical University in Kraków were involved (11 people – as a part of their professional practice).

[2]Barton and Lazarsfeld do not exclude the fact that the statistics will never have been applied for this type of research. If the research of a given complex phenomena would be conducted repeatedly, and the procedure of data collection and preparation would be simplified, then the secondary, quantitative comparative analysis could be conducted.

Table 2. Number of respondents according to their place of residence

Place of residence	Number	Place of residence	Number	Place of residence	Number
Gnojnik	35	Brzezina	39	Liszna	20
Uszew	48	Kruszyna	13	Mościce	29
Zawada Uszewska	10	Lipki	14	Nowosiółki	8
		Prędocin	9		
		Zwanowice	4		
In total commune Gnojnik	93	In total commune Skarbimierz	79	In total commune Sławatycze	57

Source: Own research

Table 3. Characteristics of communities

Commune	Gnojnik[3]	Skarbimierz[4]	Sławatycze[5]
District	Brzesko	Brzeg	Biała Podlaska
Voivodeship	Małopolskie	Opolskie	Lubelskie
Area in km^2	55	110	72
Total population	7 700	7 633	2 541
Men	3 876	3 842	1 230
Women	3 824	3 791	1 311
Population per km^2	140	69	35
Women per 100 men	99	99	107
Profile	The Gnojnik commune is located in the eastern part of geographical region known as Pogórze Wiśnickie. In the commune there are many architectural monuments, wooden and brick; road-side shrines, statues and crosses can be found, dispersed in the vicinity[6]	The Skarbimierz commune is a typical agricultural commune. 55% of professionally active commune population is involved in farming. Main monuments are churches: in Brzezina, Kruszyna, Zielęcice, Pępice, Zwanowice and in Małujowice, in which beautiful wall paintings can be found[7]	The Sławatycze commune is located on the Bug river, near the Belarusian border. The area is considered attractive, not only because of its picturesque landscape, but also for the presence of various kinds of birds, fish and fertile soils[8]

Source: Own research.

Data relating to population are similar in the case of the surveyed communes located in the south of the country (Gnojnik and Skarbimierz). The Sławatycze commune, on the contrary, located at the eastern border, namely in the less densely populated areas than the other two, differs from them only apparently, because in the case of the Gnojnik commune population density per sq km is four times greater and in the Skarbimierz commune – two times greater.

[3]www.stat.gov.pl/cps/rde/xbcr/krak/ASSETS_12_p_04.pdf
[4]http://www.stat.gov.pl/opole/69_607_PLK_HTML.htm
[5]http://www.stat.gov.pl/lublin/index_PLK_HTML.htm
[6]www.gnojnik.pl
[7]www.skarbimierz.pl
[8]www.slawatycze-gmina.pl

RESULTS

Despite of the existing flood hazard, the respondents feel secure in their place of residence and do not wish to relocate; they are deeply bounded with it, first of all because of their families and close friends who also live there; they appreciate people whom they can trust. The inhabitants of the communes can be distinguished by their attachment to their place of residence, the existing neighbourly assistance, trust for other inhabitants [Wojewódzka 2010, pp. 225–226], respect for the elderly and the importance of faith and the Church. There are also disadvantages which result mainly in the emigration of young people; the main problems which the examined communes are facing include unemployment [Żmija 2013, p. 71], lack of entertainment and the places where people could spend their free time, as well as bad quality of roads. The respondents agree that being close with other people is essential for strengthening bonds and sense of common identity [Sorys 2013] – shared participation in various ceremonies, fests, holidays in which the respondents collectively participate. The sense of shared fate and cooperation initiative established during the flood hazard had a positive influence on neighbourly relations; as stated by ca. $^1/_5$ of the surveyed. Only few pointed out to the deterioration of neighborly relations. The respondents were talking about the existing security systems, together they were building protections of the river bed and the shafts against the flood. When the waters receded, they were also repairing them together. Neighbourly assistance, which the respondents could count on during the flood, did not stop immediately after the disaster, but continues up to this day; as was ascertained by almost half of the surveyed from the communes Gnojnik and Skarbimierz and majority of the Sławatycze commune. The statements of the surveyed concerning continuation of provision of assistance to other inhabitants, excluding neighbours, were at a lower level, but still concerned relatively large group of the respondents (ca. $^1/_3$ and in Sławatycze – $^2/_5$).

Another aspect of trust was the relation of the respondents towards their neighbours, other inhabitants of the village, village administrator and the commune authorities, which are most often identified with a person of the mayor. The respondents from the examined communes exhibited particularly large trust towards their commune leaders. These local leaders can be always relied on in times of flood hazard. On the basis of the research, a conclusion can be drawn that formal authority, assigned to this function is at the same time a confidence and the foundation of the informal authority of the person holding this position. Two village leaders of the Sławatycze commune, who were given a vote of confidence, due to their young age (both are around 30 years old), did not have the possibility to fully prove themselves in social activities yet. In spite of the fact that inhabitants themselves stated that they are "young and did not have time to prove themselves" [9], the respondents trust them because they trusted the previous village leaders, and their successors, in accordance with the society's expectations, continue their work. Majority of the respondents also trust local authorities (identified mostly with the person of the mayor) which manifests itself in the belief that those authorities set the well-being of the inhabitants as their ultimate goal. They expressed similar opinions about the other inhabitants

[9]The research was conducted in March 2012, and the elections for the village administrator took place in autumn 2010.

from their villages. Only in the Gnojnik commune less than half of the respondents were of a different opinion when it comes to sincerity of other inhabitant's intentions displayed towards them. This does not change the fact that most of the surveyed from all communes declared that both now and in the future they could count on help both from their neighbours as well as from other inhabitants. Ostensible conflict between these statements, i.e. the certainty of the reception of help and the fear, showed by certain respondents, that those neighbours (in the Gnojnik commune) and other inhabitants (Gnojnik and Skarbimierz) could use them, is explained by the specific character of interpersonal relations in the rural areas. The attempt to exploit the neighbour (e.g. by unfair purchase or sale deal, repay which is inadequate to favour done by the neighbour etc.) does not have to be connected with the respondents' beliefs, as they probably had an opportunity to verify in practice that, if necessary, they can count on their neighbours and friends.

The trust for village administrators is justified, among other things, by the fact that they are perceived by the local community as leaders who do not only fulfill their obligations, but also engage in social activities, initiate and coordinate charity campaigns. In the Gnojnik commune during the flood hazard it is mainly village leaders and fire fighters who are responsible for efficient evacuation, protection of belongings and any other activities designed to minimize the damage caused by flood and the provide the help to inhabitants after the disaster. Similar situation is observed in the Skarbimierz commune; in the Sławatycze commune through, apart from fire fighters' activity, women from of the Village Women's Club are very active. They arrange help by, e.g. going door to door gathering money or necessary supplies, like food, in order to give it to people in need. However, during the flood the most active group are the village administrators, acting together with fire fighters and Border Guards.

The respondents are also involved in the life of their villages. More than $^1/_3$ of the surveyed from the communes of Skarbimierz and Sławatycze and more than $^1/_5$ from the Gnojnik commune actively participate in their village's life. It suggests high level of social activity. It must also be added that the surveyed help each other during the flood hazard. The respondents are also involved in non-profit organizations and are interested in life of the village, which manifests itself in their participation in village meetings (in the Sławatycze commune the participation level is high; experienced by almost all respondents participating in the meetings). Their participation in social life is strictly related to acceptance of their place of residence and the sense of identity shared with other inhabitants. Also the family support is crucial for the examined community which sense of safety is threatened.

The respondents maintain contact with their neighbours, they live peacefully and can not name persons to whom they could refer to as to enemies. It is another factor affecting their sense of unity with their place of residence and the local community. They spend their free time mostly talking to neighbours. They treat going out to the Church as a propitious opportunity to talk to neighbours as well. They agree as to the fact that bonds can be strengthened not only by personal contact, but also by action, e.g. related to tradition preservation or involvement in social organizations.

As it seems from the respondents' accounts, inhabitants do help each other, particularly in times of flood hazard. However, this assistance is mostly limited to the nearest neighbours. They can also count on assistance from the authorities – this applies, in particular, to

the communes of Gnojnik and Skarbimierz. In the event of flood hazard the vast majority of the surveyed from Gnojnik, if in need of help, could get it both from family and neighbours, friends and institutions. In other communes, among respondents who were expecting the support, only 27.3% in Skarbimierz and 37.9% in Sławatycze received it. Inhabitants together debated on their fate and on possible scenarios related to the upcoming flood. In face of danger, they did not stay at home but discussed the measurers which could possibly be undertaken. The situation, threatening the community's sense of safety requires the presence of impulsive, natural behaviours aimed at undertaking specific steps in order to prevent the upcoming flood. The respondents were engaged in various voluntary works for ensuring flood protection. In this regard, the standing out group covered the inhabitants of Skarbimierz. Respondents declared that their neighbours were engaged in these actions as well. The surveyed did not expect the support and conducted preventive anti-flood actions on their own account. Those who needed help – received it. The conviction of the vast majority of the surveyed that, if they are in need, they can always count on neighbourly assistance, is very important; when it comes to further friends, such an opinion was expressed only by ca. 15% of the surveyed. According to accounts of respondents living in rural areas, included in the surveys conducted by CBOS in 2012 [BS/19/2012], voluntary and unpaid work is provided first for all on behalf of friends, parish, family, neighbours and work environment. Author's studies do not confirm this order – these are often neighbours who will be the first or among the first persons endowed with trust by the respondents. They can count on their help, both today and in the future; and are also glad to help their neighbours. In the examined communes, it was confirmed that the cooperation within the family and between other inhabitants does exist, and in the case of communes of Gnojnik and Sławatycze – their inhabitants also interact with their friends from the neighbouring villages.

In spite of the fact that the primary research methods were qualitative, author decided to use also statistical methods for the sake of hypothesis verification[10].

Hypothesis 1 – after verification it has been stated that common flood experience translated itself into the character of social bonds that, as a consequence of the experienced trauma, have not only not loosen, but became even more tight. Another conclusion that can be drawn: common work during the flood makes people more sensitive to problems of others and creates an attitude of empathy towards people in need – it was proven by the listing of variables taking into account the respondents who experienced flood. The same dependence occurred in Skarbimierz commune, but in this case the examined were not those who were directly affected by flood but those who performed social works in order to provide anti-flood protection. In the light of the above statements the hypothesis should be verified positive.

Hypothesis 2 – it stems from the analysis of quality studies that in Gnojnik commune the flood risk, which is of a permanent character, influences the tightening of social bonds between the inhabitants. However, statistical verification confirmed only the first part of hypothesis (i.e. the assumption that flood hazard and the flood itself do not affect the character of family bonds significantly), while the second part should be entirely rejected in connection with locations where it was assumed that flood affects, more or less permanently, the relations between neighbours and friends.

[10]Using the empirical value of chi squared compared with the table value for given α and the number of freedom degrees.

Hypothesis 3 – the respondents trust their representatives and appreciate their efforts for the local community, but at the same time they also remain active and report on problems they encounter. Also, the fact that the examined address the petitions to the commune's authorities does not contradict the trust which the examined have for authorities, but is a sign of inhabitants' determination who, in order to support the commune's activity, wish to make other authorities aware of their fate. These requests are confirmed by the analysis of the quality studies. In the light of conducted studies, hypothesis should be verified positive.

Tables 4a and 4b present the distribution of dependencies, according to statistical analysis, taking into consideration the quantity of dependencies assigned to all respondents or to a particular commune, and their distribution across the hypothesis. Tables present data concerning verification of hypotheses 1–5 and the hypothesis 6 was verified on the basis of quality studies.

Table 4a. The number of statements intended for statistical verification, with division into particular hypothesis and communes

Specification	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Total
Gnojnik	7	1	9	6	8	31
Skarbimierz	6	1	9	6	8	30
Sławatycze	6	1	9	6	8	30
All	16	11	9	18	12	66
Total	35	14	36	36	36	157

Source: Own research.

Table 4b. The obtained average probability results, with division into particular hypothesis and communes

Specification	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Average results for all combinations
Gnojnik	0.092	0.004	0.3	0.145	0.244	0.203
Skarbimierz	0.195	0.244	0.245	0.104	0.178	0.189
Sławatycze	0.186	0.015	0.511	0.203	0.111	0.261
All the respondents	0.103	0.192	0.436	0.056	0.112	0.152
Average results for all combinations	0.132	0.169	0.373	0.103	0.156	0.19

Source: Own research.

Tables 5a and 5b present data concerning verification of particular hypotheses, including, however, the division of dependences among all the examined and those who experienced, or did not experience, flood, and their distribution across the hypothesis.

For sake of transparency of the received results the graphic evaluation of force dependencies was arbitrarily assumed. It is presented in categories ranked from the strongest to the weakest ([+++] [++] [+]) based on the probability of rejection of dependency hypothesis on the levels covered by the formula $1-\alpha$ (100) – Table 6.

Table 5a. The number of statements intended for statistical verification, with division into particular hypothesis and the examined who experienced, or did not experience, flood

Specification	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Total
Flood victims	12	2	12	11	14	51
No flood victims	10	4	12	11	9	46
All the respondents	13	8	12	14	13	60
Total	35	14	36	36	36	157

Source: Own research.

Table 5b. The obtained average results, with division into particular hypothesis and the examined who experienced, or did not experience, flood

Specification	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Average results for all combinations
Flood victims	0.119	0.078	0.28	0.047	0.229	0.171
No flood victims	0.18	0.141	0.43	0.197	0.129	0.236
All the respondents	0.106	0.206	0.41	0.073	0.095	0.17
Total	0.132	0.169	0.373	0.103	0.156	0.19

Source: Own research.

Table 6. Distribution of graphic force of dependencies.

More than 99%	From 95 to 99%	From 90 to 95%	From 80 to 90%	From 50 to 80%	From 20 to 50%	Less than 20%
[+++]	**[++]**	**[+]**	**[ ]**	**[-]**	**[--]**	**[---]**

Tables 7a and 7b present the distribution of dependencies taking into consideration the quantity of dependencies assigned to a particular hypothesis and average obtained strength of dependencies presented graphically. The attention should be drawn to the blank spaces in the tables. They may prompt questions providing the basis for further exploration of the research field.

Table 7a. The number of statements intended for statistical verification, with division into particular hypothesis and graphically presented dependencies

Symbol	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Total
[ ]	5	3	3	5	4	20
[-]	8	3	4	3	8	26
[--]	2	1	8	3	1	15
[---]	0	0	5	0	1	6
[+]	9	0	4	0	3	16
[++]	4	4	4	6	7	25
[+++]	7	3	8	19	12	49
Total	35	14	36	36	36	157

Source: Own research.

Table 7b. The number of probability statements intended for statistical verification, with division into particular hypothesis and graphically presented dependencies

Symbol	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Average results for all combinations
[ ]	0.151	0.155	0.155	0.128	0.121	0.14
[-]	0.292	0.345	0.338	0.351	0.401	0.346
[--]	0.657	0.791	0.686	0.622	0.529	0.667
[---]	0	0	0.904	0	0.991	0.919
[+]	0.068	0	0.363	0	0.064	0.141
[++]	0.028	0.019	0.032	0.021	0.024	0.024
[+++]	0.002	0.002	0.003	0.001	0.003	0.002
Total	0.132	0.169	0.373	0.103	0.156	0.19

Source: Own research.

DISCUSSION

In this paper author would like to refer to the selected problems taking into consideration the future of the examined communes, analyzed through the prism of discussion started by other authors, during the existing flood hazard, being one of the factors influencing its development. These communities learned how to handle the flood situation but such a statement is a mere simplification of the problem. Particularly, in case of Gnojnik community, which suffer from floods even several times throughout the year. One may learn to cope in this situation, but certainly cannot get used to it. Danuta Hryniewicz [2000], when analyzing psycho-social and organizational aspects of the disaster after the flood of millennium in Racibórz, judging on the basis of conversations with the victims, stated that the most noticeable and most often reported psychological problems were fear, sense of guilt, emergence of new reactions in contacts with other people, in particular suspiciousness and mistrust. It does not result from their suspicious nature, but from the fact that the offered help reminds them of their own weaknesses. It was also typical to "seek" people guilty of the situation and, as a consequence, dividing the world into "we" and "they" cathegories (i.e. "we" are the victims, and "they" should take care of "us"). Such a perception of the world made it impossible to reconcile and internalize the disaster, and the return to normal life was additionally hindered by the reduced self-esteem, outbursts of anger and domestic violence. While analyzing the communal experience of the tragedy caused by the flood, the question of the permanent, positive transformation of a given community being the result of the tragedy should be considered. Author's research confirms that thesis; similar conclusions, among others, by Barbara Dolińska [2001] on the basis of her research conducted in Wrocław, after the flood of millennium in 1997. In her opinion such a permanent change occurs when the given community is successful in its common fight against the forces of nature. The examined communities have adopted to the existing flood hazard; they have applied their own adaptive strategies. These are their own, grassroots initiatives, which have developed individually, based on people's own

experience. The behaviour of the community during flood situation indicates high degree of self-reliance and trust in its own, proven methods. Hanna Podedworna confirms rural populations' individualism and self-sufficiency[11]: "...farmers in Poland adapt more effectively by using individual strategies rather than the existing institutional structure that do not correspond to the dynamics of individual activities. (...) This fact may be associated with double role of culture in the process of social change, which is both the context for a change (delivering the pool of cultural resources used by those who make change) and the object of the change, which is a result of the actions of collective entity" [Podedworna 2005, p. 205].

CONCLUSIONS

This subject matter may serve as a basis for further discussion and with all confidence this field of research requires further exploration, supplementation of knowledge and conduct of deeper analysis involving bigger population and a broader spectrum of factors conditioning the character of bonds and cooperation between the members of the given community, which occur during the different kinds of flood hazard situation. Although the research do not touch upon all aspects of social bonds and kinds of cooperation presented by rural populations in the event of flood hazard, it does form a stable framework for research methods intended to measure social capital in such a situation and the obtained results constitute the basis for further exploration of this subject matter.

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[11]Andrzej Kaleta [2005, p. 49] says that such an attitude is determined by the effect of traditional patterns of life in the countryside "…farmer's work required numerous skills, not only from manager (owner of a farm), but also from every member of his family and, possibly, hired employees (slaves, farmhands). They participated both in activities organizing the production process (...) as well as manufactured, processed, exchanged and sold their agricultural products".

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WPŁYW ZAGROŻENIA POWODZIOWEGO NA ŻYCIE SPOŁECZNO-GOSPODARCZE MIESZKAŃCÓW WSI

Streszczenie. Zmiany klimatyczne, skutkujące ekstremalnymi zjawiskami przyrodniczymi, nie omijają naszego kraju i kontynentu. W Polsce najbardziej zagrożone występowaniem powodzi są obszary położone w południowej części kraju. Przedmiotem badań autora jest zagrożenie powodziowe i jego wpływ na siłę więzi społecznych oraz działania wspólnotowe podejmowane przez mieszkańców obszarów wiejskich, na przykładzie gmin Gnojnik, Skarbimierz oraz Sławatycze. Są to mieszkańcy osiedleni na terenach zalewowych, zarówno ci, których dotknęła powódź, jak i ich sąsiedzi, którzy spieszyli z pomocą. Wybrane gminy w badanym okresie (lata 2008–2011) doświadczyły powodzi przynajmniej dwa razy. Główną metodą badawczą zastosowaną w pracy jest porównywanie systematyczne. Badania wskazują, iż pomimo istniejącego zagrożenia powodziowego respondenci czują się

dobrze w swoim miejscu zamieszkania i nie chcieliby go zmienić; są z nim mocno związani przede wszystkim z powodu posiadania rodziny i bliskich znajomych; cenią sobie ludzi, których darzą zaufaniem. Ankietowani ze wszystkich gmin, w większości, deklarowali swój pozytywny stosunek do obcych ludzi. Szczególnie dużym zaufaniem, we wszystkich badanych gminach, respondenci darzą swoich sołtysów.

Słowa kluczowe: więź społeczna, zagrożenie powodziowe

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TOURISM INTEREST AND THE EFFICIENCY OF ITS UTILISATION BASED ON THE EXAMPLE OF THE EU COUNTRIES

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Abstract. This article discusses the subject of the efficiency of the transformation of tourism interest defined as arrivals in tourist accommodation establishments into outputs, such as collective tourist accommodation establishments and GDP per inhabitant in the EU countries. For the measurement of efficiency the DEA method was used and the following models were assumed: CCR, BCC, NIRS. As a result was confirmed that significant similarity in the efficiency of the transformation of the inputs above referred to into outputs was only observed in the group of richer countries (GDP > average for the EU) or in the group of poorer countries. The analysis conducted proved that richer countries achieved higher PTE, while poorer countries achieved higher SE.

Key words: DEA, European Union, efficiency, tourism, tourism interest

INTRODUCTION

Tourism, though requiring the incurring of outlay, may be a source of numerous benefits in the economic and social spheres [Andereck et al. 2005, Kwon, Vogt 2010].

The tourism interest referred to in the article may be defined and measured in many ways. Accepting the basic assumption that tourism interest is indicated by the number of tourists travelling to a given destination, we may use, for the purpose of such a definition, for example the Schneider tourism traffic intensity indicator or the Defert tourism function indicator. Considering the fact that the presence of tourists may constitute a stimulus to the development of accommodation facilities, we may also use the density of accommodation facilities as an index of accommodation facilities [Lozato-Giotart 1992, Duda-Gromada et al. 2010] for same purpose, that is for coining a proper definition of tourism interest. Considering the availability of international statistical data, for the needs of this article, tourism interest was assumed to be the number of arrivals in tourist accommodation establishments.

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The primary objective of these considerations was the evaluation of the efficiency of the transformation of tourism interest, in respective European Union countries, into such outputs as: increase in the number of business entities directly providing tourism services (collective tourist accommodation establishments) and increase in gross domestic product (GDP) per inhabitant. It should, however, be pointed out that such a definition of the outputs of tourism interest was coined on the basis of the availability of uniform statistical information and it shall not mean that the analysed outputs were solely caused by tourism interest. In view of the methodology of this article, it was, yet, assumed that tourism interest might be regarded as a certain potential for development of tourism function in a given country, and that due to the effects of the tourism multiplier, a GDP growth may also be stimulated.

Thus, the article poses the hypothesis which states that the EU countries are characterised with a similar efficiency in the transformation of the inputs referred to herein into outputs.

In order to characterise the tourism interest in the EU countries, an analysis of the dynamics of the change in the number of arrivals in tourist accommodation establishments in the years 2007–2009 was carried out. The dynamics of the change was calculated on the basis of chain indices, and then, with the use of the arithmetic mean, the average rate of change was calculated. The results are shown in Table 1.

It should be emphasised here that tourism interest, though to a certain extent created by the marketing activity of respective countries [Alvarez 2010, Bornhorst et al. 2010, Cox, Wray 2011], is, to a significant extent, determined by such factors, as trends, economic conditions or location, and even by emergency conditions, such as natural disasters or terrorist attacks [Sausmarez 2007, Alsarayreh et al. 2010, Visser, Ferreira 2011].

As reported by United Nations World Tourism Organization [2011] tourism's contribution to the worldwide gross domestic product (GDP) is estimated at 5%. For advanced, diversified economies, the contribution of tourism to GDP ranges from approximately 2% for countries where tourism is a comparatively small sector, to over 10% for countries where tourism is an important pillar of the economy. For the economic development of a given country, not only is the number of tourists that visit the country significant, but also the volume of their spending. Furthermore, for the tourists' spending habits to become a significant stimulus to the development of the entire economy, such economy shall be in possession of financial, human and social resources. Only with the possession of the essential minimum of the resources referred to the transformation of tourism interest into long term and multifunctional national development possible.

MATERIAL AND METHODS

Among the generally applied methods of evaluating efficiency the following should be mentioned: the indicator approach (e.g. indicators of indebtedness, financial liquidity), the parametric approach (e.g. Stochastic fronier approach) and the non-parametric approach in which the linear programming procedure is used, the influence of random factors (e.g. data envelopment analysis DEA) shall be neglected.

Table 1. Average numerical dynamic of change (arrivals in tourist accommodation establishments) in the years 2007–2009

Country	Average dynamic change
Slovenia	111.0
Malta	105.3
Cyprus	105.3
Belgium	103.5
Poland	103.2
Greece	103.1
Austria	103.0
Portugal	102.7
United Kingdom	102.4
Italy	101.0
France	100.9
Slovakia	100.1
Germany	100.1
Sweden	100.0
Ireland	99.8
Finland	99.5
Netherlands	99.4
Hungary	98.8
Bulgaria	97.8
Czech Republic	97.4
Spain	97.1
Denmark	96.8
Luxembourg	96.7
Romania	95.2
Estonia	89.6
Lithuania	85.8
Latvia	77.0

Source: Own elaboration.

The application of the DEA method in the article is supported with the productivity concept worked out by Debreu [1951] and Farrell [1957], which was further developed by Charnes, Cooper and Rhodes [1978], enabling its application in a situation in which there is a plurality of inputs and more than one output. This method has been subject to numerous modifications [Sexton et al. 1986, Doyle, Green 1994, Zhu 2006, Liang et al. 2008].

Classification of DEA models typically applies two criteria simultaneously: type of returns to scale and also model orientation. Use of the returns to scale criterion has allowed for the division of the DEA models into those assuming constant returns to scale (CRS – constant returns to scale) and those assuming variable returns to scale (VRS – variable returns to scale). In the VRS group, the following models are distinguished: DRS – decreasing returns to scale, NIRS – non-increasing returns to scale, IRS – increasing returns to scale or NDRS – non-decreasing returns to scale. At the same time the model orientation indicates whether inputs are minimised or whether outputs are maximised.

The analysis of the efficiency based on the DEA method examines the finite number of decisive units (defined as DMU with identically defined inputs and identically defined outputs). Efficiency is defined as the quotient of the weighed sum of the outputs to the weighed sum of inputs and then, referred to the best units in a set. In order to designate the index of efficiency of a given decisive unit, appropriately formulated non-linear programming task, read as a linear task, is respectively solved. A research group is assumed to include n decisive units. Each unit uses m of the same inputs (in different quantities) and renders s of the same outputs (of different levels).

$$\sum_{r=1}^{S} u_r y_{rj} \div \sum_{i=1}^{m} \upsilon_i x_{ij}$$

where: u_r – means weight connected with r output;
v_i – weight connected with i-inputs;
x_{ij} – i-inputs used by j decisive unit;
y_{rj} – r output obtained by j unit;
while: $i = 1. 2..., m$; $j = 1. 2..., n$; $r = 1. 2. ..., s$.

Units located in envelopes are considered to be effective, and their relative efficiency equals 1 (or 100%). Whereas ineffective units are located outside the envelope, and their efficiency is less than 1. In the DEA method the measure of inefficiency is the distance between the empirical point characterising a given unit, and the estimated edge of the set of production capacity options [Shepard 1953]. Detailed mathematical formulae of the applied method are included in the study elaborated by Cooper, Seiford and Zhu [Cooper et al. 2004].

The assumptions of the DEA method enable its application also in reference to those issues, in which the outputs or inputs are not expressed in cash. Thus, the group of decisive units, being the scope of the said analysis, may be composed of production, trading, service providing enterprises as well as of public sector units, such as e.g. hospitals, schools or local government units. In reference to the analysis of public sector efficiency, the efficiency of management of the specified and available resources is of fundamental significance, and this may not always be translated into the appropriate financial value.

Research works that apply the DEA method for the analysis of the efficiency of units of varying industries and sectors are relatively numerous. This method was applied, in reference to banks and also to other financial institutions, among others by Bradley and others [Bradley et al. 2006, Thoraneenitiyan, Avkiran 2009, Holod, Lewis 2010]. The method was also widely applied with reference to analysing the efficiency of schools and higher educational establishments [Reichmann 2004, Johnes 2006, Leitner et al. 2007, Thanassoulis et al. 2011], as well as to the agricultural sector [Galanopoulos et al. 2006, Anriquez, Daidon 2010]. Selected examples of applications of the DEA method are shown in Table 2.

For the requirements of the article, publications concerning the efficiency of the management of territorial units are of particular value.

Extensive research in this area has been conducted in Finland, where the efficiency was assessed in 353 towns (constant returns to scale model – CCR), for the assessment purposes inputs were assumed to be all the expenses of the town incurred on health

Table 2. Characteristics of chosen examples of the application of the DEA method

Literature	Units	Inputs	Outputs
Hwang, Chang (2003)	45 Taiwan international hotels	(1) number of full-time employees (2) guest rooms (3) total area of meal department (4) operating expenses	(1) room revenue (2) food and beverages revenue (3) other revenue
Barrows (2005)	43 ENATUR's hotels	(1) full times workers (2) cost of labour (3) rooms (4) surface area of the hotel (5) book value of property (6) operational costs (7) external costs	(1) sales (value in euro) (2) number of guests (3) nights spent
Chiang (2006)	24 Taipei international hotels	(1)hotel rooms (2) food and beverages capacity (3) number of employees (4) total operating cost	(1) yielding index (2) food and beverages revenue (3) miscellaneous revenue
Barrows, Dieke (2008)	12 Luanda hotels	(1) total costs (2) investment inputs	(1) revenue per room
Botti et al. (2009)	16 France hotel chains	(1) costs (2) territory coverage (3) chain duration	(1) sales
Yan, Zongguo (2010)	45 cities	(1) electricity consumption (2) water consumption	(1) GDP (2) non-agricultural product (3) green area (4) wastewater (5) sulphur dioxide (6) solid waste
Köksal, Aksu (2007)	24 travel agencies	(1) number of staff (2) annual expenses (3) having service potential	(1) number of customers served
Barros et al. (2011)	22 French regions	(1) accommodation capacity (2) arrivals	(1) nights slept

Source: Own elaboration.

services, social services and education and outputs were defined among others as the number of days spent by children in preschools, number of visits to outpatient clinics, number of books borrowed from public libraries. As a result of the analysis conducted it was proved that the majority of the effective towns were situated in southern Finland [Loikkanen, Susiluoto 2005]. Whereas the assessment of the efficiency of inputs in 24 districts of Sofia showed that 14 of them did not operate effectively, of which the majority were small, low budget districts. It should be mentioned that the researchers for the structuring of the assessment model assumed eight initial variables, such as: size of population, length of roads, area of lawns, parks and gardens, number of pupils in primary and secondary schools, number of beds in hospitals, number of libraries within the area of the town [Michailov et al. 2003].

From the point of view of the subject of these considerations, inclusion of the results of analyses conducted in 103 Italian regions on the basis of the output oriented CCR model seemed fully grounded. The outputs comprised the following: the number of accommodation places in relation to the number of inhabitants of particular regions, at the same time the investment input was defined here as: the number of cultural heritage facilities per inhabitant, share of tourism school graduates in the working age population, share of those working in the tourism sector in the total number of the employed [Cracolici, Nijkamp 2006]. The conducted analysis showed that only seven regions among those examined operated effectively in the analysed scope. These regions included Rimini, Oristano, Trento, Bolzano, Venice, and Siena. The average technical efficiency for the 103 Italian tourism regions amounted to barely 0.29 and 43% of the regions examined did not even achieve average efficiency. In the opinion of the authors of the study the low efficiency of regions with a significant number of cultural objects (regions focused on cultural tourism) may result from "over investment" in cultural tourism assets in comparison to the outputs the tourists can generate for a given region.

The review of the subject related reference literature unambiguously indicates that the data envelopment analysis (DEA) is widely applied in the analysis of efficiency not only of business entities, but also of other institutions, organisations and units whose scope of business does not necessarily focus primarily on profit.

RESULTS AND DISCUSSION

The DEA method based on linear programming was used for the verification of the presented hypothesis. The selection of the method was principally dictated by the fact that this method may be applied to the estimation of efficiency of various units, including commercial firms and also state and regional economies. Thus, in this example, the decision making units were all the EU member states. The efficiency of transformation of inputs into outputs was calculated for these countries, in the calculations the arrivals in tourist accommodation establishments were regarded as inputs (X_1), and collective tourist accommodation establishments were regarded as outputs (Y_1), and GDP per inhabitant as outputs (Y_2). The selection of inputs and outputs was the result of the necessary verification of the hypothesis put forward in the introduction stating that the EU countries are characterised with similar efficiency in the transformation of the earlier referred to inputs into outputs.

Furthermore, for the elimination of accidental deviation of data, mean values recorded for the years 2007–2009 for the calculations were used. The statistical information was obtained from Eurostat. The observations and the variables used ensure the application of the DEA convention which assumes that the minimum number of DMUs is greater than three times the number of inputs plus output [$27 \geq 3(1+2)$] – Raab and Lichty 2002. The characteristics of input and output data are presented in Table 3.

In the calculations the output-oriented approach was applied. In this approach the target is the maximisation of outputs at given inputs. The model is oriented on output based on the assumption that countries should pursue continuous economic development, also in the utilisation of tourism potential, this, in turn, is contrary to the assumptions of

Table 3. Characteristics of the inputs and outputs in the UE country (average for years 2007–2009)

Variables	Units	MaxIMUM	MinIMUM	Mean	SD
		Outputs			
Collective tourist accommodation establishments	Number	18 602	896.6	5 298.296	4 377.201
Gross domestic product at market prices	Euro per inhabitant	78 633.33	4 433.3	23 665.4	15 372.7
		Input			
Arrivals in tourist accommodation establishments	Number	104 207 756.3	60 519	18 096 567.6	28 042 517.3

Source: Own elaboration.

the input-oriented model, whose target would be to obtain the same outputs at a reduced number of arrivals in tourist accommodation establishments. Furthermore, the choice of the model orientation was based on the assumption that the EU member state might only to a limited extent decide upon the number of arrivals in tourist accommodation establishments, since this parameter is, to a significant extent, determined by the climatic and spatial conditions.

In order to verify the hypothesis set forth, the models on the basis of the assumption of CCR model, BCC model, and NIRS model calculated were in the DEASolverPro program with regard to the benefits of the scale proposed by the program.

For the purpose of the considerations described below, the following terms were introduced: poorer countries and richer countries, where the differentiating factor in this instance was the average value of GDP per inhabitant for the years 2008–2009 calculated for all countries of the EU. Thus, whenever this articles refers to poorer countries, it shall mean the countries in which the GDP is lower than the value of the average GDP for all countries of the EU, and in the event of countries designated herein as richer countries, the term shall mean the countries where the GDP for the given country reached a value higher than average.

The CCR model calculated at constant returns to scale in the analysed example shows that the growth of GDP per inhabitant and the increase in the number of collective tourist accommodation establishments should be proportional to the increase in the number of arrivals in tourist accommodation establishments. Such a situation in reality would not be an entirely positive phenomenon, as it might indicate a strong economic dependence on tourism leading to a tourism monoculture. Furthermore, in a free-market economy, we have to assume that both the increase of GDP and also the increase in the number of collective tourist accommodation establishments is conditioned by many endogenous factors, among others, such as: the taxation system, the legal system (specifically regarding the labour law), internal competition and exogenous factors (e.g. trends in global economy or the image of a given country as a tourism destination). Having regard to the already stated, it is necessary to bear in mind that total technical efficiency (TE) indicates only the technical capacity of a given country for the transformation of tourism interest

into such outputs, as collective tourist accommodation establishments and gross domestic product per inhabitant. Results received in the CCR model differ significantly from the results received in the other models, such difference must certainly result from the fact that the countries do not function in the same market conditions. Therefore, it may be assumed that the constant returns to scale model structure is not properly suited to the group of units under the research and shall not be analysed in detail. Varying economic conditions, financial and technological limitations justify the necessity of decomposition of total technical efficiency (CCR model), into pure technical efficiency (variable returns to scale model – BCC model) and scale efficiency (SE model). Such an approach enables us to define which element (inappropriate scale of the phenomenon or inappropriate manner of transformation of inputs) is the principal cause lying behind the lack of full efficiency in the case of each of the analysed countries. Additionally, it may be assumed that the richer the country and the more diversified the economy, the more relevant the account for the variable returns to scale model shall be at the determination of efficiency of the transformation of inputs into outputs.

In the case of the BCC variable returns to scale model, countries with a high GDP and/or an established position among European tourism destinations recorded the highest efficiency. Bearing in mind earlier deliberations, the values determined with the application of this model may be deemed as the best suited to variable operating conditions of the analysed countries, as they reflect the actual state of affairs to a greater degree. For that reason the results obtained via the application of the said model shall be the scope of further analyses. Table 4 presents efficiency according to the values obtained in the BCC model.

The category of pure technical efficiency, despite the great usefulness of the evaluation process of transformation of inputs, is only one of the elements constituting the technical efficiency of a country. The second factor is the scale efficiency – SE, which shows the possibility of improvement of efficiency through the change of scale of the phenomenon (or production). Scale index defines to what degree the analysed unit is efficient in relation to the optimum that is to the maximum efficient use of inputs. High efficiency scale (SE) is typical for poorer countries, where the dynamic tourism development is observed only at present (Latvia, Estonia, Lithuania), and where current GDP is relatively low. Whereas richer countries, with an established tourism destination position (Germany, France, United Kingdom, Italy) achieve low scale efficiency (SE) for another reason being namely the market substantial saturation with tourist accommodation establishments, therefore the tourist arrivals do not represent such a powerful stimulus for the development. Furthermore, a vast majority of the analysed countries operate in a declining scale calibration, which suggests that the positive effects of tourism development (defined in these deliberations as number of collective tourist accommodation establishments and gross domestic product per inhabitant) increase slowly in relation to the increase in the number of arrivals in tourist accommodation establishments. It is a common phenomenon, with one of the reasons behind it being the investment process in tourism.

For the purpose of better adjustment of the BCC model to the differing circumstances, in which the analysed countries function, the values of the model shall be the subject of further analyses. Spearman's rank correlation was used in order to define the factors, which influence the efficiency of the transformation of arrivals in tourist accommodation

Table 4. DEA technical efficiency scores for EU countries in 2007–2009

DMU	Technically efficient, constant return-to-scale index (CCR model)	Technically efficient, variable return-to-scale index (BCC model)	Non-increasing return-to-scale (NIRS)	Technically efficient scale index (SE)	Return -to-scale
Luxembourg	1.000	**1.000**	1.000	1.000	Constant
Malta	1.000	**1.000**	1.000	1.000	Constant
Cyprus	0.256	**1.000**	1.000	0.256	Decreasing
Austria	0.011	**0.881**	0.881	0.012	Decreasing
Ireland	0.016	**0.752**	0.752	0.021	Decreasing
Denmark	0.013	**0.635**	0.635	0.020	Decreasing
Spain	0.001	**0.597**	0.597	0.002	Decreasing
Netherlands	0.003	**0.583**	0.583	0.005	Decreasing
Sweden	0.003	**0.575**	0.575	0.005	Decreasing
Italy	0.001	**0.536**	0.536	0.002	Decreasing
France	0.001	**0.503**	0.503	0.001	Decreasing
Finland	0.005	**0.495**	0.495	0.010	Decreasing
United Kingdom	0.001	**0.482**	0.482	0.001	Decreasing
Greece	0.007	**0.467**	0.467	0.015	Decreasing
Germany	0.0004	**0.467**	0.467	0.001	Decreasing
Belgium	0.006	**0.438**	0.438	0.013	Decreasing
Slovenia	0.037	**0.362**	0.362	0.101	Decreasing
Portugal	0.005	**0.355**	0.355	0.015	Decreasing
Czech Republic	0.005	**0.299**	0.299	0.018	Decreasing
Estonia	0.033	**0.262**	0.262	0.124	Decreasing
Slovakia	0.009	**0.205**	0.205	0.044	Decreasing
Hungary	0.004	**0.186**	0.186	0.024	Decreasing
Latvia	0.025	**0.153**	0.153	0.161	Decreasing
Poland	0.001	**0.150**	0.150	0.006	Decreasing
Bulgaria	0.007	**0.144**	0.144	0.050	Decreasing
Lithuania	0.014	**0.126**	0.126	0.111	Decreasing
Romania	0.002	**0.099**	0.099	0.016	Decreasing
Mean	0.091	**0.472**	0.472	0.112	×
SD	0.261	**0.270**	0.270	0.262	×

Source: Own elaboration.

establishments into outputs: number of collective tourist accommodation establishments and GDP per inhabitant. In order to determine the factors having the highest influence on the said efficiency in the analysed countries, the analysis of reverse stepwise multiple regression was used. The factors, whose influence on the efficiency was the scope of this research, were as follows: harmonised indices of consumer prices (HICP), hourly labour cost (HLC), unemployment rate. For the analysis of all the three factors we used mean values for the years 2008–2009. The extent of the influence and its direction of the correlation of these three factors is shown in Table 5.

Table 5. Correlation in order of Spearman grades ($p < 0.05$)

Variable	R-Spearman	p
BCC, HICP	–0.66	0.0002
BCC, HLC	0.68	0.0001
BCC, Unemployment rate	–0.42	0.0285

Source: Own elaboration.

The presented results indicate that HICP and unemployment rate are de-stimulants, whereas positive correlation can be observed in the case of efficiency and HLC. This may be explained with the fact that greater efficiency at variable returns to (BCC model) is typical for the richer countries, in which labour costs are higher. Next, for the purpose of grouping countries with regard to efficiency, the Ward's method, based on the similarities of taxonomic objects showing a number of characteristic features, being one of the agglomerative clustering methods, was used. The countries were grouped into clusters with the k-means method (Table 6). This method was used for the purpose of defining the most homogenous clusters, which, at the same time, would differ from one another to the maximum extent. Clustering of the countries was preceded with data standardisation. Figure 1 clustering of the countries with the k-means method (graph showing mean values of each cluster).

Analysis of the results received enables us to state that on one hand the cluster of the countries characterised with a low level of efficient use of tourism interest (cluster 2) comprises exclusively those countries whose GDP per inhabitant is lower than average GDP of the EU countries. On the other hand, l' of the countries showing high efficiency are the countries with GDP per inhabitant higher than the average GDP value of the EU countries.

The selection of variable inputs and outputs may give rise to disputes thereon. Such a selection, however, was mainly carried out in view of the availability of statistical information for all the 27 states, recorded in the years 2007–2009. Therefore, it must be emphasised here, that the outputs analysed in the study are not solely determined by the number of arrivals in tourist accommodation establishments. Considering the referred to limitations, we may, however, assume that indices of efficiency evaluated with the use of the DEA method may be the basis for further analyses. Furthermore, the research into other factors determining the efficiency of the transformation of tourist interest into such outputs, as collective tourist accommodation establishments and GDP per inhabitant, is fully grounded. Also opportunity to measure the changes in the efficiency recorded in time in respective EU countries with the use of the Malmquist productivity index opens up a broad perspective for further research.

Table 6. Membership of particular countries to concentrations

Country	Concentration number	Country	Concentration number
Austria	1	Bulgaria	2
Belgium	1	Czech Republic	2
Cyprus	1	Estonia	2
Denmark	1	Hungary	2
Finland	1	Latvia	2
France	1	Lithuania	2
Germany	1	Poland	2
Greece	1	Romania	2
Ireland	1	Slovakia	2
Italy	1		
Luxembourg	1		
Malta	1		
Netherlands	1		
Portugal	1		
Slovenia	1		
Spain	1		
Sweden	1		
United Kingdom	1		

Source: Own elaboration.

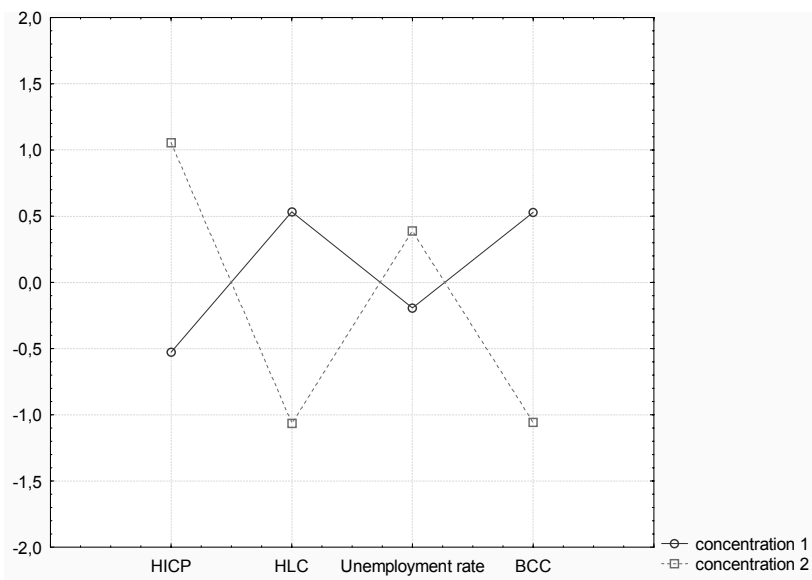

Fig. 1. Grouping of countries by the k-means method

CONCLUSIONS

In conclusion of the earier stated, the initial hypothesis, stating that the EU countries are characterised with similar efficiency in the transformation of the inputs referred to into outputs must be dismissed. Significant similarity in the efficiency of the transformation of arrivals in tourist accommodation establishments into collective tourist accommodation establishments and GDP per inhabitant is only observed within the cluster of richer countries or within the cluster of poorer countries.

Furthermore, the conducted analysis proved that richer countries achieved higher pure technical efficiency (PTE) and poorer countries achieved higher scale efficiency (SE). This may be explained, among others, with the fact that investment is essential for the development of tourism, which in turn is connected with the possession of funds. Thus, in poorer countries the efficiency can be improved through the change of scale of the same phenomenon, however, richer countries face fewer opportunities for the improvement of efficiency with the application of the same solution as proposed for the poorer countries as their tourism services are already highly developed.

Decomposition of technical efficiency into pure technical efficiency and scale efficiency showed that in the case of poorer countries the faulty tourism management strategy at national level relatively low value in BCC model or lack of capital essential for the transformation of inputs into outputs constituted principal causes of inefficiency. In the case of richer countries the low scale efficiency may be caused by the already well--established role of tourism in the national economy, which would result in limited and slow growth of efficiency, if any.

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ZAINTERESOWANIE TURYSTYCZNE A EFEKTYWNOŚĆ JEGO WYKORZYSTANIA NA PRZYKŁADZIE KRAJÓW UE

Streszczenie. W artykule została podjęta tematyka efektywności przetwarzania przez kraje UE zainteresowania turystycznego definiowanego jako (X_1) przyjazdy do obiektów zbiorowego zakwaterowania, w efekty, takie jak (Y_1) liczba turystycznych obiektów zbiorowego zakwaterowania i (Y_2) PKB na mieszkańca w krajach UE. Do pomiaru efektywności zastosowano metodę DEA, wykorzystując modele CCR, BCC i NIRS. W wyniku czego stwierdzono, że znaczne podobieństwa w efektywności przekształcania wspomnianych nakładów w efekty występują jedynie w grupie krajów bogatszych (PKB > średniej dla UE) lub biedniejszych (PKB < średniej dla UE). Ponadto przeprowadzona analiza wykazała, że kraje bogatsze osiągają wyższą czystą efektywność techniczną (pure technical efficiency – PTE), a kraje biedniejsze osiągają wyższą efektywność skali (scale efficiency – SE).

Słowa kluczowe: graniczna analiza danych, Unia Europejska, efektywność, turystyka, zainteresowanie turystyczne

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COMPETITIVENESS IN THE ECONOMIC CONCEPTS, THEORIES AND EMPIRICAL RESEARCH

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Abstract. The objective of this study is to analyze the competitiveness through the prism of its theoretical background, methods of empirical estimation and influence factors. This paper contributes to the theoretical research on competitiveness not only by the synthesis of old and new writings as well as the findings of the exploratory studies, but also by concept synthesis of competitiveness. Since the concept of competitiveness can be reported to individual product/service, enterprise/farm, industry, economic sector, region, nation or international economic blocks, the attempts towards creating one common definition of competitiveness seem to be doomed to fail. Thus, our study does not answer the question which of the definitions proposed in the literature best capture commonly used notions of competitiveness, but our concern is about the ambiguity of those definitions which hampers the measurement and comparison of competitiveness. In order to mirror complexity of the aspects referring to the competitiveness we suggest using composite indicators to measure competitiveness. An important limitation of the empirical research on competitiveness is imperfect comparability of results across studies using different variables (features) describing competitiveness.

Key words: competitiveness, economic concepts and theories, measures and determinants, agribusiness

INTRODUCTION

The term of "competitiveness" is one of the most commonly used concepts in economics but it is not precise enough, what means that there is no generally accepted definition of competitiveness.

The term originated from the Classical Latin word "petere" meaning to seek, attack, aim at, desire, and the Latin prefix "con-" meaning together. At present, it is often used in different contexts, meaning dissimilar things to different researchers. The phrase was coined in the 70s of the twentieth century. It was then that American economists, under the evidence of severe trade battle between American and Japanese companies, undertook

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the first attempts to determine the degree of competitiveness between the rival economies [Wziątek-Kubiak 2003]. In line with other research sources, the oil crisis and the associated loss of comparative advantage by some industries in the developed countries triggered attention in this economic category [Lech 2001]. Although research on competitiveness has been popular for forty years, in recent time it appears to be flourishing as many economic phenomena are assessed according to whether they are competitive or non-competitive. Despite the fact that the competitiveness is an ubiquitous term in economic research, including agribusiness research, that is analyzed at different (macro- and micro-) levels, there are still troubles with understanding its meaning as well as with its measurement. Another research problem concerns the large variations in the competitiveness determinants over space and time. According to Porter and Rivkin [2012], the wide misunderstanding of the concept of competitiveness has dangerous consequences for political discourse as well as policy and corporate choices that are all also evident today. The main motivation for this study is to attract attention to those several points.

The rest of the article proceeds as follows. Section two introduces to the research methodology. In the next section, we look at different definitions, meanings, concepts and theories of competitiveness. After that, the measures of competitiveness most commonly used in the literature are presented. Then, review of research on determinants of competitiveness is presented. Conclusions from authors' analysis are drawn in the final section of the article.

MATERIAL AND METHODS

The main aim of this research is to review the definitions, measures and determinants of competitiveness as well as competitiveness-related economic concepts and theories. Authors do not answer the question, which of the proposed definitions best fit the used notions of competitiveness. Instead, their concern is about the ambiguity of those definitions which makes difficult the task of the discussing, estimating and comparing the competitiveness. A further goal is to present the issue of competitiveness from the perspective of empirical studies worldwide. Authors look at concepts and theories of competitiveness through the lenses of major strains of the economic thought. A critical assessment of the approaches and indicators used to measure competitiveness is also provided. The category of competitiveness is applied at macro, meso and micro levels. An extensive, conceptual study of the literature on the subject is the dominant research method for this study. The material was presented in tables and figures with a view to making it more practical and convenient for readers.

DEFINITIONS, ECONOMIC CONCEPTS AND THEORIES OF COMPETITIVENESS

Despite the argument by Krugman [1996] that "economists, in general, do not use the word competitiveness", the literature survey reveals a wide range of definitions of competitiveness applied by the researchers to clarify this term. After studying the literature on the subject, authors have chosen those definitions that appear to cover the spectrum of competitiveness dimensions (Table 1).

Table 1. Definitions of competitiveness according to various authors (presented in alphabetical order)

Author [year]	Definition
Adamkiewicz-Drwiłło [2002]	The competitiveness of a company means adapting its products to the market and competition requirements, particularly in terms of product range, quality, price as well as optimal sales channels and methods of promotion
Altomonte et al. [2012]	External or international competitiveness is the ability to exchange the goods and services that are abundant in home country for the goods and services that are scarce in this country
Ajitabh, Momaya [2004]	Competitiveness of a firm is its share in the competitive market
Barker, Köhler [1998]	Country's competitiveness is the degree to which it can, under free and fair market conditions, produce goods or services meeting the test of international markets, while simultaneously maintaining and expanding the real incomes of its population over the longer term
Bobba et al. [1971]	Competitiveness is the ability of nations, regions and companies to generate wealth being the precondition for high wages
Buckley et al. [1988]	A firm's competitiveness means its ability to produce and sell products and services of superior quality and lower costs than its domestic and international competitors. Competitiveness is a firm's long-run profit performance and its ability to compensate its employees and provide superior returns to its owners
Chao-Hung, Li-Chang [2010]	A firm's competitiveness is its economic strength against its rivals in the global marketplace where products, services, people and innovations move freely despite the geographical boundaries
European Commission [2001]	Competitiveness of a nation is the ability of an economy to provide its population with high and rising standards of living and high rates of employment on a sustainable basis
Flejterski [1984]	Competitiveness is the capacity of the sector, industry or branch to design and sell its goods at prices, quality and other features that are more attractive than the parallel characteristics of the goods offered by the competitors
Krugman [1990, 1994]	If competitiveness has any meaning, it is simply just another way to express productivity. The ability of a country to improve its living standard depends almost entirely on its ability to raise its productivity. Competitiveness is meaningless word when applied to national economies
Porter [1990]	The only meaningful concept of competitiveness at the national level is national productivity. Competitiveness is an ability of an economy to provide its residents with a rising standard of living and a high employment on a sustainable basis
Porter et al. [2008]	The most intuitive definition of competitiveness is a country's share of world markets for its products. This makes competitiveness a zero-sum game, because one country's gain comes at the expense of others
Scott, Lodge [1985]	National competitiveness is a country's ability to create, produce, distribute, and/or service products in international trade while earning rising returns on its resources
Tyson D'Andrea [1992]	Competitiveness is our ability to produce goods and services that meet the test of international competition while our citizens enjoy a standard of living that is both rising and sustainable
WEF [Schwab, Sala-i-Martin 2013]	Competitiveness is the set of institutions, policies, and factors that determine the level of productivity of a country
World Economic Forum – WEF [1996]	Competitiveness is the ability of a country to achieve sustained high rates of growth in GDP per capita

Source: Authors' own research based on the literature overview.

Competitiveness has been described by various authors as a theoretical, multidimensional and relative concept associated with the market mechanism. In here-presented analysis of its definitions, the concept may refer to different levels of aggregation: supranational, national, regional, local, industrial, sectoral, as well as to individual companies (or farms). In general, these can be described as the objects of competitiveness. Definitions are, however, usually applied to the best entities that are able to face market competition successfully. But in the marketplace, there simultaneously exist highly, medium and low competitive economic agents, so it seems that the competitiveness notion should be rather defined as a set of characteristics of one object with respect to comparable objects (benchmarks) on the market. Moreover, competitiveness reveals itself as confusing term which is often used almost interchangeably with other concepts like productivity, innovation or market share.

Review of the literature, made by authors, finds several concepts and theories of competitiveness. As Table 2 indicates, they range from those considering a nation's competitiveness from the macro-perspective to those concentrating on firms (or farms), i.e. looking at competitiveness in micro-economic terms.

Table 2. Selected concepts and theories related to competitiveness

Concept/Theory	Representative	Country	Main theses
1	2	3	4
Classical concepts and theories			
Concept of invisible hand	Adam Smith	Scotland	Each party involved in international free trade can gain benefits by specializing in the production of goods in which it holds an absolute advantage. So, let every country export those goods it produces at the lowest costs and import those goods it produces at the highest costs
Comparative advantage concept	David Ricardo	England	A country can benefit from foreign trade even if it lacks any absolute advantage over its trade partners in the goods' production. It only needs to have relative advantage in any good in order to sell it abroad
Heckscher-Ohlin trade theory (natural resource abundance theory)	Eli Heckscher Bertil Ohlin	Sweden	A country will specialize in producing and exporting those commodities which require relatively intensive use of locally abundant factors of production. Relatively capital-abundant country will export capital-intensive commodities while relatively labour-abundant country will export labour-intensive commodities
Neoclassical, Austrian and institutional concepts and theories of competitiveness			
Theory of effective (workable) competition	John M. Clark	USA	Competitive advantage is driven by innovations introduced by the company. Innovations motivate firms to compete aggressively in order to obtain competitive advantage, which in turn leads to technological progress and economic growth at the macro-level
Theory of marketing behaviour	Wroe Alderson	USA	There are six potential sources of a firm's competitive advantage: market segmentation, a way of communication (i.e. promotion and advertising) and reaching out to the customers (choice of distribution channel), product development, process improvement, and product innovations

Table 2 cont.

1	2	3	4
Austrian school theory	Ludwig von Mises	Austria	Market competition is an automatic dynamic process and not a specific market structure. The tendency towards market equilibrium is the result of entrepreneurial activity. An enterprise wins or loses in competition depending on the strength of its capabilities and the degree its offers match the market needs
Evolutionary economics	Joseph A. Schumpeter	Austria	Crucial to long-term survival of firms in the marketplace is their constant adjustment to changing environment, mainly due to searching out new innovative recombination of the garnered resources
Theory of entrepreneurship and innovations	Joseph A. Schumpeter	Austria	The company's ability to innovate is a key for achieving competitive advantage over its rivals. The ability to create new solutions and the predisposition to take risks associated with testing them in the market underline the competition process and entrepreneurship. Differences both in the level of innovative capacity and entrepreneurship result in differences in the competitive position of any economic agent
Institutional economics streams	Friedrich List Max Weber James Buchanan	Germany USA	In addition to economic factors, one's competitiveness is affected by social institutions such as public authorities, trade unions, financial institutions, socio-political organizations, ownership and organizational structures and mental habits, rules and codes of conduct
Contemporary concepts and theories of competitiveness			
Krugman's concept of competitiveness	Paul R. Krugman	USA	Productivity growth is the main driver of competitiveness. International competitiveness of countries is associated with their high standard of living
Porter's theory of competitiveness	Michael E. Porter	USA	Competitiveness depends on long run productivity, which increase requires a business environment that supports continual innovation in products, processes and management. The four underlining conditions driving the global competitiveness of country's companies include: factor endowments, demand conditions, related and supporting industries (clusters), and the firm's strategy, structure and rivalry

Source: Authors' own research based on the literature overview.

The classical approach focuses mainly on competitiveness at the macro-level (international, country, regional), whereas the neoclassical approach, respectively, on the micro--level. The first attempt to explain the reasons why countries engage freely in international trade originates from Adam Smith's theory of absolute advantages developed in 1776. There are also numerous modern concepts and theories of competitiveness, which include, in particular, the views of Paul Krugman (New economic geography theory) and Michael Porter (management theory).

The macro-level approaches to competitiveness very often refer to international trade and nations' comparative advantage in production of certain commodities which are the subject of foreign trade. There is also a set of theories and concepts directly addressing the relations between competitiveness and market structure (perfect competition, oligopoly,

monopoly). These are the classic approaches in which competitive struggle in the market is an indicator of the competitive position of the individual players. Additionally, there are single competitiveness theories that advocate state intervention in the market. Most of the theories of competitiveness argue that the competitiveness position of any country, region and company is decided by its productivity being, on one hand, considered as a major determinant of competitiveness, and, on other hand, equated with competitiveness.

An inspiring approach to the competitiveness is offered by Joseph Schumpeter in his theories of the entrepreneur and innovation that state that merely the capability to create innovations and owner's entrepreneurial activities determine the firm's competitive advantage. The game theory of John von Neumann and Oskar Morgenstern also contributed to the development of competitiveness theory, paying emphasis on the market competition as a game playing. Under this original approach, when looking from the perspective of all players in the market, to behave rationally means to cooperate, whereas for the single players to be rational is to refrain from the cooperation.

Summing up the development of concepts and theories of competitiveness (Table 2), it seems that the most influential and prominent are the following: the concept of the invisible hand of Adam Smith, the concept of comparative advantage of David Ricardo, the Schumpeter's theories of entrepreneur and innovation, the Porter's theory of competitiveness, and the Krugman's concept (criticism) of competitiveness. The first two explain an international trade system based on the principle of (absolute and comparative) advantages. Schumpeter's main focus is aimed at innovative activities as key determinants of competitiveness. Krugman contributed to the theory of competitiveness not only by demonstrating the relevance of productivity for nations' competitive advantages in international trade and improving population's living standards, but also by considering (denouncing) the sense of the debate on competitiveness between nations. As concerns the Porter's theory of competitiveness, particularly noteworthy is the four-factor model for the competitive advantage of nations called diamond model, which is frequently used by the researchers.

THEORETICAL APPROACHES TO COMPETITIVENESS AT AN ENTERPRISE LEVEL

The promotion of a country's productivity growth, and hence competitiveness improvement, needs to take focus on a-firm-driven nature of those processes. So, in this section some of the major theoretical approaches to competitiveness at a firm level are being introduced, namely those developed by Buckley et al. [1988], Man et al. [2002], and Ajitabh and Momaya [2004].

Buckley, Pass and Prescott [1992] conceptualize model for firm's competitiveness which comprises of three interrelated dimensions (competitiveness measures), namely competitive performance, competitive potential, and competitive process (Fig. 1). Competitive potential refers to the resources used to generate (superior) performance, while competitive performance is a performance outcome relative to that of competitors. Competitive process relates to the management (administration) of the company. The main argument offered by the authors is that no single measure of competitiveness can entirely

capture all relevant dimensions of competitiveness, therefore the measures of performance, potential and process should be examined together and in relation to a firm's rivals. They propose a set of different measures, such as: profitable market share (the performance dimension), technological development, long-run price and cost effectiveness (the potential dimension), and closeness to customer, investment strategy, commercialization of technology and management attitude to internalization (the process dimension).

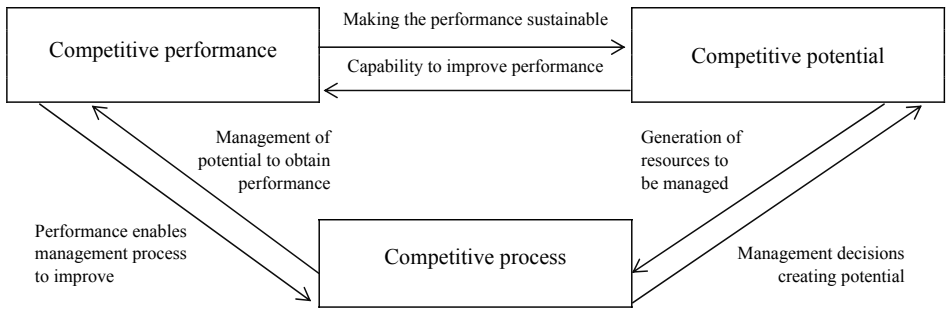

Fig. 1. Interrelationship of dimensions of firm's competitiveness
Source: Buckley et al. [1992]

Ajitabh and Momaya [2004] focus on the main competitiveness sources at a company level and classify competitiveness-related literature in the asset-processes-performance (APP) framework. Their approach includes two strategic levels: assets and performance, and processes. Authors suggest that an enterprise's competitiveness depends on the combination of tangible and intangible assets (e.g. human resources, material inputs, industry infrastructure, technology, reputation, trademarks) and processes within organization, which together provide competitive advantage and can be termed as sources of competitiveness. Competitiveness processes include those ones that help identify the importance and performance of core processes, such as strategic management processes, human resources processes, operations management processes, and technology management processes. Competitive performance is reflected in productivity, quality, costs, and financial, technological and international performance. The APP model can be helpful for firms in the identifying and pursuing useful action, if correlations between different competitiveness factors is accurately established.

Man, Lau and Chan [2002] have developed a theoretical framework for competitiveness of small-and medium-sized enterprises (SME) by drawing upon the concept of competitiveness at a firm level. They argue that SMEs are not scaled down versions of large corporations. Thereby, since the two types of firms differ in terms of their organizational structure, responses to the environment, managerial style and the ways of competing with other companies, the competitiveness analysis related to large corporations may not be applied straightforwardly to SMEs. Authors distinguish three key determinants of SME competitiveness: internal or firm-specific factors, external environment, and the entrepreneur's activity – the latter specific for SMEs. These determinants, in turn, have impact on a firm's long-run performance. Internal factors embrace financial, human and technological resources, productivity, innovation, quality, productivity,

organizational structure and system, image and reputation, culture, product variety, and customer service. Entrepreneurship factors (entrepreneur attributes), like, for example, experience, knowledge, skills and goal orientation, are perceived by the authors as the most critical for the competitiveness of SMEs. In sum, the model of Man et al. considers three dimensions of a firm's competitiveness (potential, process, performance) in addition to four attributes (long-term orientation, controllability, relativity, dynamism). The process dimension includes entrepreneurial competencies while the potential dimension involves a firm's competitive scope and organizational capabilities. The model suggests that in order to achieve long-term competitiveness of SMEs, decision-makers should focus on building entrepreneurial competencies referring to managerial skills and abilities to gather resources and to exploit opportunities.

COMPETITIVENESS ESTIMATION

A challenging task in the study of competitiveness is its empirical measurement. In the light of evidence that the competitiveness concept lacks an universally accepted definition, researchers has proposed a variety of approaches to estimate competitiveness, as the literature overview shows (Table 3). Competitiveness is found to be measured at different levels of economic analysis: mega-(global), macro-(nations, regions), meso-(economic sectors and industries) and micro-(firm's) level. Research studies employ one-dimensional, two-dimensional and multidimensional measures. A good example of the latter is the global competitiveness index (GCI) which comprises of such dimensions, as: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication, innovation. Competitiveness measures can be also classified into two categories: static (assessing competitiveness level at any point of time), and dynamic (assessing the changes in competitiveness over time).

Table 3. Applied measures of competitiveness at different levels of economic activity

Author/Institution	Measures of competitiveness
1	2
Macro-and mega-perspective	
Barrell et al. [2005]	Equilibrium exchange rate
Dollar, Wolff [1993]	Productivity
Esty, Porter [2002]	GDP per capita; Economic growth; Current Competitiveness Index; Environmental regulatory regime
Fagerberg [1988]	Growth in market shares for exports and imports; Relative Unit Labour Costs (RULC); Growth in 'terms of trade' for country; Technological competitiveness (private spending on R&D)
Kaldor [1978]	Growth in Relative Unit Labour Costs (RULC); Growth in market shares for exports
Lipschitz, McDonald [1991]	Real exchange rates
Markusen [1992]	Real income; Index of productive efficiency
Mulatu et al. [2004]	Net exports

Table 3 cont.

1	2
IMD [1994]	Economic Performance; Government Efficiency; Business Efficiency; Infrastructure
Schwab, Sala-i-Martin [2013]	The Global Competitiveness Index
Sharpe, Banerjee [2008]	Country's share of global Foreign Direct Investments (FDI)
Cornell University, INSEAD, WIPO [2013]	The Global Innovation Index
Meso-perspective	
Banterle, Carraresi [2007]	The net export index (NEI); The Grubel-Lloyd index
Buckley et al. [1988]	Trade balance
Carbon Trust [2004]	Profitability (operating profit)
Carraresi, Banterle [2008]	Revealed comparative advantage (RCA); Relative export advantage (RXA); Relative import advantage (RMA); Net export index (NEI), Export market shares (EMS)
Copeland, Taylor [2004]	Environmental outcomes (pollution levels), comparative advantage (in dirty-industry and clean-industry output and exports)
DeCourcy [2007]	Balance of trade
Jaffe, Palmer [1997]	Environmental and R&D expenditures; Patent applications
Lanoie et al. [2011]	Productivity of production factors
Leiter et al. [2009]	Environmental standards and Foreign Direct Investments flows
Misala, Siek [2012]	Region's comparative advantage in resource endowments and economic development
Neef [1992]	Unit labour costs
Peterson [2003]	Changes in sectoral output and share of market
Van Rooyen et al. [1999]	Balassa Revealed Comparative Advantage index for agro-food chains
Zhang et al. [2012]	Industry balance of trade; Relative Unit Export Price (RUV); Relative export growth; Mandeng's K
Micro-perspective	
Altomonte et al. [2012]	Firm-level productivity measures: Total factor productivity (TFP), Labour productivity (LP) and Unit labour costs (ULC)
Balassa [1965]	Revealed Comparative Advantage (RCA) – market share
Bruno [1965]; Gorton et al. [2001]	Domestic Resource Cost (DRC)
Buckley et al. [1992]	Multidimensional indicators
Durand, Giorno [1987]	Price ratio (price competitiveness)
Helleiner [1991]	The relative price (relative to one or more foreign competitors); Product-specific real effective exchange rate
Jorgenson, Kuroda [1992]	Price competitiveness
Krugman, Hatsopoulos [1987]	Changes in market share
Porter [1990]; Siudek et al. [2013]	Multidimensional (composite) indicators
Siggel, Cockburn [1995]	Total (full) unit costs
Swann, Taghavi [1992]	Price/product attribute
Turner, Golub [1997]	Relative Unit Labour Costs (RULC)

Source: Authors' literature review.

A further distinguishing characteristic of the competitiveness measures is their positive or normative nature. Positive indicators are based on observable evidence, thus they reflect actual performance. Normative indicators, on the contrary, involve value judgments. Closely related to this distinction is the one between ex post and ex ante measures. An ex post competitiveness is given, for example, by measures of trade (e.g. market share) and current-account balance, both based on the past information, so with limited power to assess potential competitiveness. A potential (ex ante) competitiveness demonstrates a capacity to compete and lies on indicators of technology, prices and costs. Good example is real (effective) exchange rate which can be calculated by using export prices, import prices and unit labour costs. Moreover, when assessing competitiveness, it is also important to determine if a measure represents the source or the outcome of competitiveness. For instance, low price, cost and high productivity are causes of a firm's strong competitiveness, while market share, RCA index, and trade balance represent the effects of the international competitiveness.

The heterogeneity of competitiveness variables and measures across the empirical studies may, regrettably, hinder the comparison of their findings. In view of the abundance of available measures used for assessing competitiveness, special caution is needed in choosing the right ones. It seems that in order to reflect the complexity of competitiveness, the most relevant approach is to use composite indicators capturing various components of this concept. In the case of the agricultural sector, particular attention should be taken with regards to unpaid inputs, such as, for example, input of unpaid labour given to family farm.

DETERMINANTS OF COMPETITIVENESS

As Table 4 presents, the competitiveness can be driven by many factors, understanding of which has occupied the minds of economists for more than two centuries, beginning with the seminal work by Adam Smith [1776]. A great deal of the empirical research refers to the determinants of competitiveness at the enterprise level, probably due to the conviction that firms, not individual nations, compete in international markets, as also Porter [1990] argues. According to Hollensen [2010], national circumstances create an environment in which businesses can gain international competitive advantages but it depends on the firm whether it grabs the opportunity to gain competitive advantage or not. Also McGahan [1999] suggests that external factors are more or less uniform for all competing companies and it is a firm's characteristics and action that determine its profitability.

Based on the literature review, authors identified micro- and macro-economic sources of firm's competitiveness. Microeconomic factors, having a direct impact on company competitiveness include: sophistication of firm's operations and strategy, quantity and quality of production factors, technology and innovations as well as supporting or related industries and clusters. Macroeconomic environment (monetary and fiscal policy, the rule of law and the quality of social and political institutions) sets general conditions creating opportunities for higher corporate competitiveness.

Table 4. Determinants of competitiveness found in empirical research

Determinants	Authors
1	2
Division of labour, specialization	Classical economics: Smith [1776]
Investment in physical capital	Neoclassical theories: Schumpeter [1950]; Swan [1956]
Assets (resources)	
Size of agricultural holding	Nivievskyi, von Cramon-Taubadel [2008]
Human resources	Horne et al. [1992]
Technology	Khalil [2000]; Mehra [1998]
Trust and trustworthiness	Barney, Hansen [1994]; Carney [1998]; Barney et al. [2001]
Social responsibility	Zhang [2013]
Processes	
Strategic management processes	
– competencies and quality	Sushil, Kak [1997]; Loch et al. [2008]; Hitt et al. [2012]
– corporate competitive strategy	Porter [1990]; Grupp [1997]
– flexibility and adaptability	O'Farrell, Hitchens [1988]; Reeves, Deimler [2011]
– internalization strategies	Altomonte, Ottaviano [2011]; Delgado et al. [2012]
Human resources process	
– design and deploy talents	Smith [1995]
– brain drain and brain gain	Buga, Meyer [2012]; Oishi [2013]
– workforce mobilization	Delgado et al. [2012]
Technological processes	
– innovations	Reeves, Deimler [2011]; Atkinson, Andes [2011]; Forsman et al. [2013]
– information and communication technology	Ross et al. [1996]; Atkinson, Andes [2011]; Ollo-López, Aramendía--Muneta [2012]
Operational processes	
– manufacturing	Kanter [1993]
– quality, design	Dou, Hardwick [1998]; O'Farrell, Hitchens [1988]
Marketing processes	
– marketing	Corbett, van Wassenhove [1993]; Dou, Hardwick [1998]
– advertising	Notta, Vlachvei [2010]
– managing relationships	Hammer, Champy [1993]; Porter [1998]
– persuading power	Chaharbaghi, Feurer [1994]
Firm's (farm's) performance	
Productivity	Bosma et al. [2011]; Mullen, Keogh [2013]
Firm entry and exit	Bosma et al. [2011]
Share of market	Mehra [1998]
Product differentiation and range	Buckley et al. [1988]; Dou, Hardwick [1998]; Dangelico, Pujari [2010]
Efficiency and profitability	Schwalbach [1991]; Porter [1990]
Prices and costs	Porter [1990]; Pace, Stephan [1996]; Scott, Lodge [1985]
Creation of value	Dou, Hardwick [1998]
Customer satisfaction	Porter [1990]; Suchanek et al. [2011]
Development of new products	Hammer, Champy [1993]; Man et al. [2002]; Dangelico, Pujari [2010]
Supporting and related industries and clusters	
Production sharing	Altomonte, Ottaviano [2011]
Supplier quantity and quality	Delago et al. [2012]
State of cluster development	Ketels et al. [2012]; Delago et al. [2013]
The experience of cluster manager	Ketels et al. [2012]

Table 4 cont.

1	2
Inter-organizational relationships	Chaddad, Rodriguez-Alcalá [2010]; Boonzaaier, von Leipzig [2009]
Institutions and government policies	
Nation's culture	Gulev, Dukaric [2010]
Farm subsidies	Nivievskyi, von Cramon-Taubadel [2008]; Bezlepkina et al. [2005]
Regulatory quality	Brunet [2012]
Restrictions of capital flows	Delago et al. [2012]
Government spending and taxation	Vietor, Weinzierl [2012]
Exchange rate	Schmitz et al. [2012]; Gulati et al. [2013]
Interest rates	Andrén, Oxelheim [2002]

Source: Authors' compilation based on literature review.

As concerns agriculture and agro-food sectors, the literature [Australian Government 2005, Ball et al. 2010, Herath 2013] shows that productivity enhancement and innovations are central drivers of their international competitiveness, at least if it comes to the developed economies. The study of agribusiness in Canada identified thirty facets of competitiveness including production costs, cycle time, scale, flexibility, product enhancement, new products and process technologies, marketing and organization [Westgren, van Duren 1991]. The competitiveness of Greek food and beverage manufacturing firms is shown to be determined by total and television advertising [Notta, Vlachvei 2010]. In South Africa, the competitiveness both of small-scale and resource poor farmers as well as small-scale agricultural manufacturers is improving through the clustering, integration and linkages of farmers, suppliers, processors, marketing agents, and supermarkets [Boonzaaier, von Leipzig 2009].

CONCLUSIONS

1. The last several years have witnessed a growing academic and political debate over better ways to conceptualise and measure competitiveness. The evolution of this debate has traditionally oscillated around four ideas: division of labour and specialization, market share, costs/prices, and productivity. While the classical theory of comparative advantage has long dominated thought about international trade, nowadays it is recognized as an incomplete explanation for the competitive advantage of firms under modern (agro)business environment. Advances in technology and innovations as well as environmental and resource-scarcity concerns have created both new opportunities for and constraints in gaining, maintaining and improving competitiveness against the rivals in increasingly complex, globalized economy.
2. While a firm-related factors, such as tangible and intangible assets, processes, performance and networks, effectively determine and facilitate the competitiveness, it is also affected by a range of government policies as well as formal and informal institutions. Public spending and taxes, exchange rates, interest rates, and government

regulatory activities are examples of key macroeconomic determinants of competitiveness.

3. Developing government policies to improve the business competitiveness requires an understanding the major factors that facilitate or impede firms' ability to compete. These factors can, however, differ depending on a country, region or industry. The literature suggests that for the least-developed countries one of the main obstacle for reaching competitiveness is difficulty in opening up their economies to global competitiveness forces.
4. Since the competitiveness is a complex concept determined by a multiplicity of factors, it seems that the most appropriate way to estimate the level of competitiveness is by using multidimensional or composite indicators (indexes) of competitiveness. Construction of composite indicators could, however, be associated with the dilemma of selecting appropriate variables (individual indicators) and weights representing their relative importance (priority) as well as of choosing an aggregation method.
5. Further research on the competitiveness of nations, regions, sectors, industries and individual enterprises or farms is desirable as it can help to reveal the competitive position of relevant objects and track changes of their performance over time. Such information can be useful in the formulation and implementation of future competitiveness-fostering policies by firm managers and governments at different levels.

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KONCEPCJE I TEORIE EKONOMICZNE ORAZ BADANIA EMPIRYCZNE POJĘCIA KONKURENCYJNOŚCI

Streszczenie. Praca ma charakter teoretyczny. Głównym jej celem jest przegląd definicji, koncepcji i teorii ekonomicznych, mierników i czynników konkurencyjności zidentyfikowanych w badaniach empirycznych. Trudności w zdefiniowaniu pojęcia konkurencyjności wynikają z tego, że badana jest ona na poziomie makro, mezo i mikro. Ze względu na to, że pojęcie konkurencyjności jest stosowane wobec poszczególnych produktów/usług, przedsiębiorstw/gospodarstw rolnych, branży czy sektora gospodarki, regionu, kraju lub międzynarodowych bloków gospodarczych, próby stworzenia jednej wspólnej definicji konkurencyjności wydają się być skazane na niepowodzenie. W badaniach konkurencyjności powinno wykorzystywać się wielowymiarowe syntetyczne wskaźniki, ponieważ pojęcie konkurencyjności dotyczy wielu aspektów i obszarów działania. Istotnym problemem w badaniach konkurencyjności jest ograniczona porównywalność wyników ze względu na różne zmienne (cechy) wykorzystywane przez badaczy.

Słowa kluczowe: konkurencyjność, teorie i koncepcje ekonomiczne, mierniki, determinanty, agrobiznes

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COMPETITIVE CHANGES OF FOOD PRODUCTION IN BULGARIA*

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Abstract. Agri-food sector is one of the traditionally well-developed sectors in Bulgaria. The export picture of Bulgarian food industry has been changed after the full EU membership of the country in 2007. Thus, the food import exceeds the food export more than twice nowadays. The aim of the paper is to reveal why Bulgarian food producers have lost their competitive advantages so fast, what kind of factors drives the food producers to worsen their production in comparison with other food-market players? The analyse showed that the food producers do not use efficiently inter-business competitive factors (technology development and transfer as well as package design and service development). On the sectorial level, the food producers focus on to the resource management and they miss to enlarge their competitiveness by cooperation with suppliers, consumers or other food processors.

Key words: food and beverage industry (FBI), food production's competitiveness, agri-food competition

INTRODUCTION

Food industry is one of the most important industrial sectors as it is connected to one of primary needs such as hunger. Thus, the world history has shown that nothing is greater than bread. But which is important characteristic of change for the Bulgarian food production for the last few years? The answer is that the most common characteristic of Bulgarian food industry is "decrease". To identify what happens behind the figures of change we had to explore how important food industry for Bulgarian economy is.

Why food industry has been declining for the last 5 years?

There are a lot of reasons, but we had to give the most important ones as follows:

1. The food production is dependent on development stage of food resources. The production of basic food resources from agrarian sector has been declining for the last

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20 years as many Bulgarian agri-food specialists show [Mishev et al. 2003a, Mishev et al. 2003b, Noev 2003, Ivanov 2009]. Therefore, the level of quality and quantity of food resources' supplies continuously drops down as a result of changing agrarian structures in Bulgaria[1].

2. The food producers had to fulfil the increasing requirements of food safety as well as enlarging numbers of food quality standards. It is good for the consumers, but it is not good for producers as they are not prepared for such high standards. Just for example, many producers were pushed up to implement requirements of ISO 9000 as well as HACCP standards in the beginning of 2007. The negative effects (resp. bankruptcy or economic breakdown) of implementation of these standards are most obvious for food specializations as follows [Kopeva et al. 2011]: production of milk and dairy products; production of meat and meet products; and processing vegetables etc.
3. Food producers are mostly small and medium enterprises (SMEs) as a result of low entry and exit barriers of the food and beverage industry. Therefore, researchers report on worsening conditions of doing business as in the next:
   - Poor cooperation inside the agri-food sector and respectively between agriculture and food industry in Bulgaria. Many connections between food producers and their basic resources were terminated as results of structural changes in Bulgarian agriculture as well as result of structural changes in Bulgarian food industry;
   - Worsening the logistics of food supplies beside the small size of food producers. This is a result of poor cooperation between food producers as a result of worsening the competition in the food sector as many managers reported;
   - The small size of the entities does not allow changing the older investment equipment with newer one. Furthermore, the small size takes out the food producers as beneficent from different investment measures for improving their competitiveness;
   - The small size is a barrier for the consumer markets as the consumer behaviour in Bulgaria has changed during the last 10 years. The most of food purchases are done in the biggest shopping centres. But a small food producer could not meet the requirements of the biggest retail chains. Just for example, as a final result the import of food supplies overlaps the Bulgarian food production twice for 2011.
4. At last, but not least, the food producers have to fight with worsen nation infrastructure as follows:
   - worsen structurally and technologically production infrastructure, including worn out and outdated equipment as well as obsolete production technologies;
   - significantly worsen road infrastructure (incl. old vehicles; poor and relatively slow national road system, etc.);
   - slowly increasing labour productivity and hence increasingly lagging wages.

There are a lot of research papers that warn about the increasing problems in the food industry. But it is important to look out the figures and to made some basic conclusions:

1. The most of the indices show worsening the situation of food production in Bulgaria. The trend of decreasing number of entities as well as decreasing number of employees in food industry for the last 4 years since 2007 is observed.

[1]See: MAF, http://www.mzh.government.bg/mzh/Documents/reports.aspx

2. The overall number of food producers has gone down with more than 10–15% for 2009 in comparison with 2001. This is a result of the huge drop down of dairy and meet processing entities. But just the last ones bear the connection between Bulgarian food production and Bulgarian agriculture.
3. The number of employees has dropped with 8% for the last few years as result of the global crises. But employees' reduction is not equal for all of the food producers as the biggest entities have been reducing their employees less that the SMEs have been doing it. Thus, even though there is a great decrease of number food processors, the number of their employees has not dropped so fast.
4. The greatest negative trend is found out for the labour productivity as the indices of the turnover per employee had moved less than the total production value had increased. In addition, the average salary has overlapped the food productivity growth after 2003, since 2010. Thus, the labour force in the food industry had produced less production that the labour costs had enlarged.

Why does the growth look like limited?

As the figures of variance of labour productivity shows, Bulgarian food producer has lost some of their competitive advantages that are connected to the cheaper labour force in Bulgaria. Thus, there will be not enough food producers that bring out competitive advantages to push up the growth of Bulgarian food industry [Kopeva et al. 2011, Blagoev et al. 2012].

To answer the question we had to develop deeply the change of Bulgarian food market and respectively to set the competitive changes inside it.

STATE OF ART

In the basics of the modern concept of competitiveness stand works of huge number of economists. Considering only on the most popular names among them we can mention: A. Smith, D. Ricardo, J.S. Mill, J. Robinson, J.M. Keynes, J. Shumpeter, P. Heine, F. Hayek, F. Knight, K. McConnell, S. Brew, M. Porter [Porter 1996, McConnell et al. 2011].

For better understanding of the problem of competitiveness and competitive changes we had to give some basic definitions as follows:

1. Just from the born of the classical economic theory a necessary to define the competition appears. The basics of this concept can be announced to the thesis of A. Smith [1933 , p. 329] that "...In general, if any branch of trade, or any division of labour, be advantageous to the public, the freer and more general the competition, it will always be the more so". Thus, competition is recognized as a major driving force in the market, especially for long periods.

   Another significant contribution of A. Smith [1933, p. 456] is determining the relative competitive advantages (comparative advantage). He linked these benefits to the costs saying that "...It is the maxim of every prudent master of a family, never to attempt to make at home what it will cost him more to make than to buy...".

2. Economists from the neo-classical school as D. Ricardo, J. Mill and others developed furthermore the theses about A. Smith's competition. Here we see the main forms of contemporary competition as follows: perfect competition, oligopoly and monopoly. After that the competition is understood as J.M. Keynes defined perfect competition as "a situation in which a single seller cannot influence price" just in terms of demand. Thus, perfect competition is "a situation in which a single seller cannot make more than normal profits" [Robinson 1933].
3. Contemporary importance of competition is presented by M. Porter [1988]. However, Porter [1996] connected competition with the ability to freely enter or exit the market. Thus, according to him, profitable markets yield high returns and they will attract new entities. Unless the entry of new entities can be blocked by incumbents, the abnormal profit rate will trend towards zero (perfect competition). Porter develops the concept of competitive advantage by defining that the basis of competitive advantage is specialization [Warf, Stutz 2007].

   In summary, the competitiveness is relative category and has many dimensions:
   - potential for intensive sustainable growth with its inherent three pillars – economic, social, and environmental;
   - productivity of factors of production;
   - factor cost per unit of finished product, quality (technical level) of the products, availability of products and services;
   - structural characteristics of the economy in the broadest sense;
   - imitation and innovation potential of the economy.

The concept of competitiveness is summarized in a number of publications in which competitiveness is connected to extent to which any nation or entity can produce products and services that satisfy the test of foreign competition in the context of an open market, while increasing real GDP. This understanding is the basis of the report of the World Economic Forum [Schwab 2011], which also gives an indication of the competitiveness of the nations.

When the definition of the competitiveness is set to micro-level, respectively individual entity, we could not miss position of M. Porter [1996] that competitiveness is look like an ability of companies, industries, regions and countries to create a relatively high level of income and wages and to be open to international competition.

Diversity in the understanding of competitiveness, as well as various positions for its creation, evaluation and improvement can be represented at Table 1.

The understanding of competitiveness helps us to explore entity's competitiveness as its internal capability to present better than competitors in international markets. This is in the core of the next methodology.

METHODOLOGY

For better understanding of competitive changes of Bulgarian food production we need to present two different competitiveness' models respectively at macro- and micro--level. Although, there is no consensus on the classification of the environmental factors that determine the competitiveness, the most widely adopted practice in the classification of the factors of international competitiveness is given by M. Porter:

Table 1. Terms of competitiveness

Authors	Content of "competitiveness of the entity"
P.N. O'Farrell, D.W.N. Hitchens [1988]	Competitiveness of the firm is given by the competitiveness of the products. So, the assessment of competitiveness is done through individual quality indicators or performance indicators of the company, the efficiency of its production, marketing experience and lower administrative costs
W. Skinner [1985], R.H. Hayes, S.C. Wheelwright, K. Clark [1988]	They adopt the definition of O'Farrell and Hitchens as comparison between competitiveness and return on assets
P. Geroski, A. Jacquemin [2001]	They mix the concept of competitiveness of companies and their efficiency and efficiency. Thus, competitiveness is reduced to a single indicator of the economic result in a high return on their assets or high productivity of their resources. All this is provided that the firms' production costs per unit of output are equal to or lower than those of competitors
R. Kaplan, D. Norton [2000]	Competitiveness of the firm is defined as long-term efficiency of their activities
P.B. Crosby, K. Ishikawa in A.R. Martínez-Lorente, F. Dewhurst, B. Dale [1998], J.V. Saraph, P.G. Benson, R.G. Schroeder [1989], and others	Firm competitiveness is assessed by the quality of the overall activities of the company including for total quality management
E.R. Bruning, L. Lockshin [1995], and others	Competitiveness is a complex category that refers to the internal capacity of the company for achieving high performance for a long-term period

Source: Own work on the literature review.

1. The macro-level: Porter [1990] gives a consistent set of factors built on the perception that the competitive advantages of companies and industries depend on the conditions of the country in which they operate their business. Porter also offers a system of factors so-called "the diamond of the determinants of national advantage" (Fig. 1).

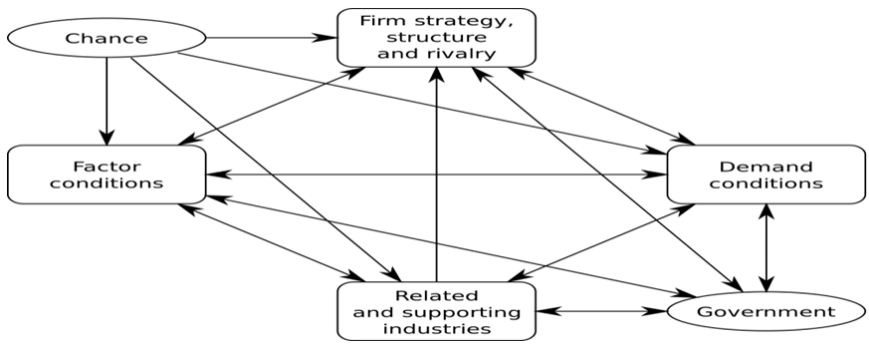

Fig. 1. Porter's diamond of competitive advantages
Source: M.E. Porter 1990. The competitive advantage of nations. Free Press, New York.

The evaluation of these national advantages' factors is connected to the industrial policy in the agri-food sector and it is done with 10-degrees indices that indicate the level of Bulgarian government support as the next:

1 – requires immediately exit of sector; 2 – greatly hamper the agri-food business; 3 – strongly hamper the agri-food business; 4 – little difficult for the agri-food business; 5 – neutral effect; 6 – marginal assist for the agri-food business; 7 – strongly assist for the agri-food business; 8 – greatly assist for the agri-food business; 9 – slight sector protection; 10 – strongly sector protection.

2. The micro-level, respectively single entity. Porter [1996] considers competitiveness as a collection of assets and processes that successful performance on the open market. This model is well known as the "value chain" (Fig. 2).

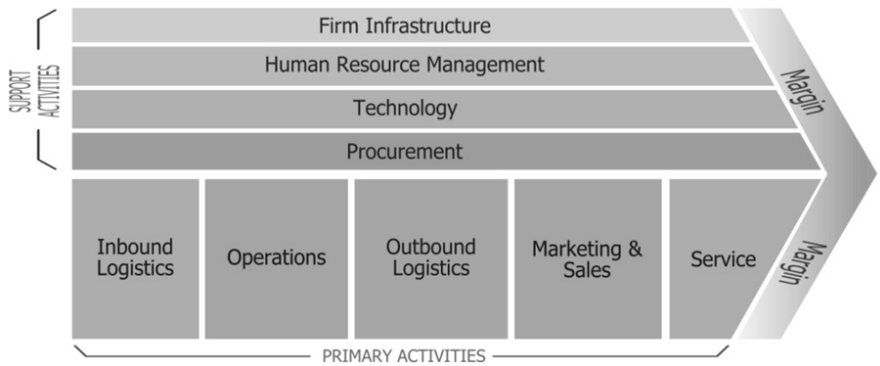

Fig. 2. Value chain
Source: M.E. Porter, 1996. What is strategy? Harvard Business Review, November–December, pp. 61–78.

The evaluation of these value chain competitive factors is done by 10-degree indices that indicate the factors implementation as follows:

1 – uses traditionally decision; 2 – follow competitors just in basic decisions; 3 – follow competitors in main decisions; 4 – follow competitors in all decisions; 5 – modify just basic decisions; 6 – modify main market decisions; 7 – modify all decisions; 8 – leads (innovates) in basic decisions; 9 – leads (innovates) in main decisions; 10 – leads (innovates) above customer expectations.

The comparison between these two layers of competitiveness for the Bulgarian food industry is done by data analysis at business level. The analysis is done on two stages: intra-factors correlation analysis and between-factors correlation analysis.

Intra-factors correlation analysis. As the correlation refers to independence of any two or more random competitiveness factors (variables), we use it to reveal the relationship between these factors. Thus, we use as parametric correlation (measured by Pearson's correlation coefficient) as well as non-parametric correlation (measured by Spearman's correlation coefficient). For example see Table 2.

Between-factors correlation analysis. According to the explanation of correlations, we use to reveal the strength of relationships between different competitiveness factors as parametric correlation (measured by Pearson's correlation coefficient) as well as non-parametric correlation (measured by Spearman's correlation coefficient).

Table 2. Example for correlation between levels of fulfillment of one primary competitiveness factors

Specification	Correlation	Observation fulfillment	Leaders fulfillment	Rivals fulfillment	Followers fulfillment	Niches fulfillment	Consumer expected fulfillment	Consumer importance
Observation fulfillment	Pearson Correlation	1	.628**	.561**	.542**	.507**	.440**	0.18
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.114
Leaders fulfillment	Pearson Correlation	.628**	1	.687**	.510**	.386**	.425**	0.099
	Sig. (2-tailed)	0.000		0.000	0.000	0.002	0.000	0.462
Rivals fulfillment	Pearson Correlation	.561**	.687**	1	.671**	.577**	.350**	0.028
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.003	0.830
Followers fulfillment	Pearson Correlation	.542**	.510**	.671**	1	.727**	.444**	–0.103
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.458
Niches fulfillment	Pearson Correlation	.507**	.386**	.577**	.727**	1	.425**	–0.243
	Sig. (2-tailed)	0.000	0.002	0.000	0.000		0.001	0.096
Consumer expected fulfillment	Pearson Correlation	.440**	.425**	.350**	.444**	.425**	1	–0.016
	Sig. (2-tailed)	0.000	0.000	0.003	0.000	0.001		0.894
Consumer importance	Pearson Correlation	0.18	0.099	0.028	–0.103	–0.243	–0.016	1
	Sig. (2-tailed)	0.114	0.462	0.830	0.458	0.096	0.894	

**Correlation is significant at the 0.01 level (2-tailed).
Legend: strong correlation (Pearson's coefficient > 0.500); moderate correlation (0.499 > Pearson's coefficient > 0.300); poor correlation (0.299 > Pearson's coefficient). The evaluation is done with significance coefficient $\alpha < 0.05$.
Source: Own calculation.

To analyse between-factors correlations we transform the intra-factors correlation tables (Table 2) into 4-degree indices of dependency as follows:
++ – high dependency (most of intra-factors variable strongly correlate each other); + – medium dependency (most of intra-factors variable moderate correlate each other); – – partial dependency (few of intra-factors variable moderate or poor correlate each other); – – – lack of dependency (few of intra-factors variable poor correlate each other or most of them are independent). For example, the correlation table could be transform to degree high dependency (++) as most of intra-factors variable strongly correlate each other (Table 3).

Table 3. Example of dependency matrix of support competitive factors

Specification	Level of fulfillment	Management personnel	Technical staff	Machinery and equipment	Technologies	Funds	Brand name	Customer loyalty
Management personnel	7.31	++						
Technical staff	6.87	++	++					
Machinery and equipment	6.46	+	+	+				
Technologies	5.93	– –	–	+	+			
Funds	5.80	– –	+	+	+	–		
Brand name	6.67	– –	– –	+	+	+	+	
Customer loyalty	7.27	+	+	+	+	–	+	++

Legend: ++ high dependency; + moderate dependency; – partial dependency; – – no dependency.
Source: Project data and own calculations.

DATA ANALYSIS

Analysis of competitive changes of Bulgarian food industry is based on business data from 138 food processors. The data is collected by interviews with their executive managers and/or their owners.

The observation[2] sample includes almost 3% of Bulgarian food entities (compared to their number in 2010) in six major food specializations that are very important for Bulgarian food industry as follows: a) processing and preserving of meat and production of meat products; b) manufacture of dairy products; c) manufacture of grain mill products, starches and starch products; d) manufacture of bakery and farinaceous products; e) processing and preserving of fruit and vegetables; f) manufacture of other food products.

The biggest share in observation is given on the most important food products' specializations, such as bakery and confectionery (other food products), as well as on dairy and meet processing entities. The distribution of observation by their food specialization is given in Table 4.

The competitive analysis is done on two stages:

1. Factor analysis by identifying competitive profile at two levels:
   – enterprise level: covers basic factors of value chain (Fig. 3);
   – sectorial level: covers basic factors of Porter's diamond (Fig. 2).
2. Factor analysis by identifying importance of competitive factors to firms' development.

Analysis of profile of enterprise competitiveness

The next analysis reveals what happened behind the firms' strategies. Thus, the importance of intra-firm competitive factors is divided by their relation to the production processes and respectively to basics of consumer behaviour.

[2]Data is collected by research on project INI DMU 02 – 24/2009.

Table 4. Number of enterprises and their share in total of observed food processors

Specification	Number of enterprises (for 2010)	Share (%)	Number of enterprises of observation	Share of observation (%)
Manufacture of food products	4 829	100.0	138	2.9
Processing and preserving of meat and production of meat products	491	10.2	19	3.9
Processing and preserving of fruit and vegetables	329	6.8	5	1.5
Manufacture of dairy products	296	6.1	12	4.1
Manufacture of grain mill products, starches and starch products	155	3.2	10	6.5
Manufacture of bakery and farinaceous products	2 652	54.9	48	1.8
Manufacture of other food products	583	12.1	44	7.5

Source: Eurostat: SBS, http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/data/database and own calculations.

The first group cover 13 primary competitive factors that are directly connected to the primary processes from the value chain as follows: physical characteristics; chemical characteristics; reliability; durability; aesthetics (beauty of design); prestige manufacturer; price of a product; name of the product; packaging design; versatility of the pack; complexity of complementary services; total quality of the main product; total quality of complementary services.

The evaluation of the primary competitiveness factors is done by 2 indices as follows:

1. Level of fulfilment that indicate factors' implementation in the next 10 degrees: traditionally decision; [1-2-3-4-5] modified traditional decision; [6-7-8-9-10] innovative (unique) decision.
2. Level of importance that indicate the degree of consumers' perception of the factor by value [0; 1] or percentage [0.0%; 100.0%].

There are enough statistical evidences that there is high correlation between level of importance and level of fulfilment for all of these 13 primary factors. Thus, according to enterprise data, these primary factors could be grouped in three groups by their level of importance for the consumers as well as the level of fulfilment:

- very important factors (2): price of product; total quality of the main product;
- average important factors (6): physical characteristics; chemical characteristics; reliability; durability; prestige of manufacturer; aesthetics (beauty of design);
- less important factors (5): the last five factors.

The analysis of the support factor covers seven support competitive factors that are indirectly connected to the management processes from the value chain (Fig. 3) as follows: management personnel; technical staff; machinery and equipment; technologies; funds; brand name; customer loyalty.

The evaluation of the support competitive factors is very similar to the evaluation of the primary ones and it is done with indices of the level of fulfilment that indicate factors' implementation in the next 10 degrees: absence; [1-2-3-4] medium for the market; [5-6--7-8] excellent for the market, [9-10] unique for the market.

These support factors could be grouped in three groups by their fulfilment level, according to enterprise data:

- well-developed factors (3): quality of managers; quality of technical staff; customer loyalty;
- average developed factors (2): brand name; machines and equipment;
- not-well-developed important factors (2): technology; funds.

In comparison with market players, there is a great difference in management decisions for the support competitive factors between observed entities and market leaders. The observed sample is too far behind leader(s) by technical support and quality of equipment. Their competitive advantage is just connected to the customer's loyalty.

The analysis of competitiveness at sectorial level starts with analysis of 10 business strategy's competitive factors that are directly connected to the Porter's diamond (Fig. 2) as follows: quality of material resources; favourable geographical location of the entity; technology level; qualification and experience of staff and managers; long-term contracts with suppliers; access to financial resources; long-term agreements with key customers; long-term contracts with distributors; cooperation with research organizations and universities; participation in a cluster.

The evaluation of the business strategy's competitiveness factors is done with indices of level of fulfilment that indicate business strategy's implementation in the next 10 degrees: absence; [2-3-4] medium for the market; [5-6-7-8] excellent for the market; [9-10] unique for the market.

According to the observations' data, these business strategy's factors could be grouped in three groups by their fulfilment level:

- well-developed factors (3): quality of resources; quality of technology; quality of management;
- undeveloped factors (3): agreements with suppliers; agreements with customers; agreements with sellers;
- worse-developed factors (2): cooperation with universities; cooperation within competitors (market clusters).

Finally, analysis covers 12 ouside business strategy's competitive factors that are directly connected to the Porter's diamond (Fig. 2). They could be devided into two groups.

The evaluation of the factors of conditions is connected to the industrial policy in the agri-food sector and it is done with indices of level of support that indicate government factors' support in the next 10 degrees: absence; [1-2-3-4] neutral effect; [5-6-7-8] positive effect; [9-10] protection.

These market condition's factors are not well developed as their highest indices value is not upper than 5.52 (from maximum 10). Even more, just four of them are government supported with positive effect (indices value is up 5.00) and the others do not effect of the market as their level of support is neutral (indices value is 3.88).

In summary, we have well-developed firms' management factors as primary ones as well as support factors with average value of fulfilment 6.64–6.93. In controversy, the conditions factors are too worse developed as well as related industries' factors are evaluated with indices of support 4.63–4.69. Between then are stated business strategy's factors with fulfilment level 5.37 (Fig. 3).

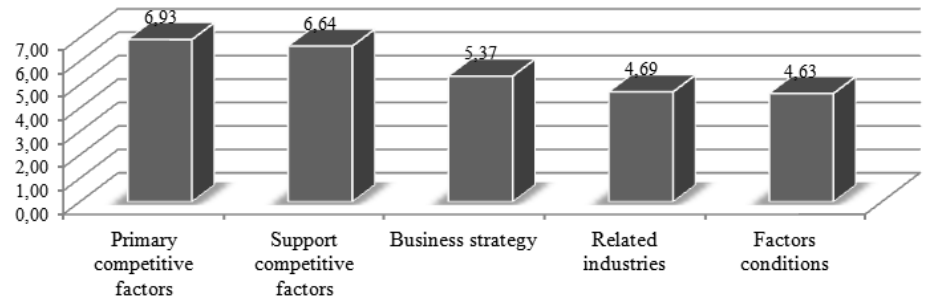

Fig. 3. Competitive factors by their level of fulfilment (support) at observed entities
Source: Project data and own calculations.

Factor analysis

The next factors' analysis reveals how different competitive factors related each other. These relations are important for identifying the necessary competitive improvement of food producers in Bulgaria.

The first analysis covers the correlation analysis on the degree of dependency of the observed 13 primary competitive factors. The correlation analysis of the degree of dependency allows identifying three groups of factors as follows:

- Independent factors (insignificant correlation coefficients in $\alpha > 0.05$) (4): durability; name of the product; beauty of product design; package design;
- Partial-dependent factors (significant poor correlation coefficients below 0.300 in $\alpha < 0.05$) (2): complexity of complimentary service; total quality of complimentary service. The correlation is found with factors as prestige of manufacturer, and total quality of the main product;
- Fully-dependent factors (significant strong correlation coefficients upper 0.500 in $\alpha < 0.05$) (4): price; total quality of main product; physical as well as chemical characteristics.

The second analysis covers the correlation analysis on the degree of dependency of the observed seven support competitive factors. Correlation analysis of data in the dependency matrix allows identifying three groups of support factors as follows:

- personnel factors (2): quality of management; quality of technical staff;
- equipment factors (2): quality of assets; customer loyalty;
- finance factors (3): funds; technology; brand name strengths.

Groups do not depend on the value of the competitive factors for observed sample.

Finally, the analysis covers the strength of relations between different competitive factors. It is done by parametric correlation analysis (measured by Pearson's correlation coefficient) as well as by non-parametric correlation (measured by Spearman's correlation coefficient). According to the correlation matrices, the next conclusions could be done:

1. Three of support factors could directly enlarge competitiveness if they are improved as follows: managerial staff, technology and machinery. Thus, the food production

could perform better when improve quality of its managerial staff and used techniques and technologies.
2. The most effective used business strategies are connected to the resources as material resources, financial access, and managerial and technical staff. But the strategies that could bring better competitiveness are the next ones: long-term agreements with key customers or with distributors as well as cooperation with research organizations and universities or cooperation in a market cluster.
3. The EU-membership of the country is not enough used to enlarge the competitiveness of the food business, but the admission of production factors, such as financial system, research system as well as infrastructure, are the most important factors conditions.

CONCLUSIONS

Bulgarian food industry becomes weaker and weaker years by years in the last decade in comparison with other EU-countries. It is a result of not enough good management as well as the factors conditions of Bulgarian food industry and Bulgaria as a whole.

Some main reasons had to be marked:

- Food producers do not use efficiently inter-business competitive factors. As the analysis shows, the Bulgarian food processors rely on product quality and price, and also on the quality of their managerial staff as the prime competitive factors. The less developed competitive factors are as follows: technology development and transfer as well as package design and service development;
- On the sectorial level, the focus on the food producers is set to the resource management and they miss to enlarge their competitiveness by cooperation with suppliers, consumers or other food processors. Furthermore, the conditions factors are not well developed and it is very pity that the most undeveloped factors are factors of related industries;
- In addition, the qualitative primary competitive factors do not rely on development of business strategies or even more to development of conditions factors. Thus, these qualitative factors as product name as well as product and package design could be found as factors with competitive potential;
- The most important support competitive factors are personnel factors as well as technology equipment factors. But they are not equally developed. The factors conditions are oriented to develop staff factors but business strategies are needed to be developed equipment factors. In addition, the cooperation with research institutes as well as national innovation support is one of the most undeveloped factors conditions.

Finally, the process of decreasing competitiveness of Bulgarian food production could be stopped just in cooperation between business entities and government. There is a lack of national support instruments that develop food producers' competitiveness and the final result is a weak Bulgarian food industry on the European scene.

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PRZEMIANY W SYTUACJI KONKURENCYJNEJ PRODUKCJI ŻYWNOŚCI W BUŁGARII

Streszczenie. Sektor rolno-żywnościowy jest jednym z tradycyjnie dobrze rozwiniętych sektorów w Bułgarii. Obraz eksportu bułgarskiego przemysłu żywnościowego zmienił się po uzyskaniu pełnego członkostwa kraju w UE w 2007 roku. Celem niniejszego artykułu jest odkrycie, dlaczego bułgarscy producenci żywności stracili tak szybko swoje przewagi konkurencyjne, jakie czynniki spowodowały pogorszenie się produkcji producentów żywności w porównaniu z innymi uczestnikami rynku żywnościowego? Z przeprowadzonej analizy wynika, że producenci żywności nie stosują efektywnie takich środków poprawy konkurencyjności, jak rozwój i transfer technologii, rozwój wzornictwa opakowań czy usług. Na poziomie sektora producenci skupiają się na zarządzaniu zasobami, a nie dostrzegają możliwości poprawy konkurencyjności poprzez współpracę z dostawcami, konsumentami czy innym przetwórcami.

Słowa kluczowe: produkcja żywności i napojów, konkurencyjność produkcji żywności, konkurencyjność rolno-spożywcza

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FOREIGN TRADE OF GEORGIAN AGRICULTURAL PRODUCTS AND EXISTING POTENTIAL OF EXPORT TO THE EUROPEAN UNION MARKET

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Abstract. This paper attempts to describe the high importance of the agricultural sector and export potential of agricultural products for Georgian economy, while presenting historical evidence and overview of recent trends. Georgian agriculture is primarily in very bad situation with small market surpluses and low productivity. According to World Bank surveys, approximately 83% of Georgia's rural population is entirely dependent upon their farms for subsistence and they consume approximately 73% of what they produce and remaining products which are supposed for export, are facing lots of difficulties for gaining appropriate success and outcomes. For reaching alternative markets of the United States or the European Union countries, will be needed structural reforms for strengthening Georgia's sustaining growth, attracting investment and improving overall productivity for further export diversification and sector development. Using statistical data it becomes more obvious who are the main export partners, which market segments and destinations are better for rising overall export potential and how export of Georgian agriculture products is changing over years – decline of agriculture's contribution to overall trade from 28% in 2000 to 18% in 2012 leaves a clear perspective for further development, improvement and better contribution to country's economy.

Key words: agricultural sector, export of agricultural products, existing and potential export markets, EU standards and regulations, FTAs, structural reforms

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INTRODUCTION

Georgia is a small (67.9 km^2), strategically located South Caucasus middle-income country of 4.5 million people, with a level of GDP per capita, which is considered as low by European standards.

Georgia is considered to be a country of rich and one of the oldest agricultures on the earth. Starting from the ancient times, Colchis people cultivated different grain, oil and fiber crops, harvested hazelnuts, walnuts, laurel and chestnut trees [Ketskhoveli 1957].

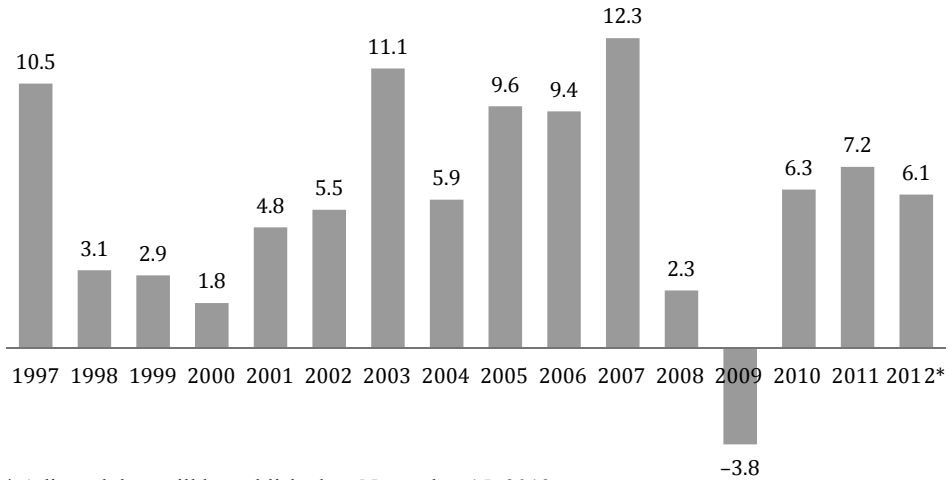
But nowadays Georgia is satisfying its demand on food at the expense of import (80%). The high dependence on import is increasing permanently. And all this happens in circumstances when price on food is continuously rising in the world markets with predictions about worsening of existed food problems [FAO 2012]. According the United Nations Food and Agriculture Organization, in conformity with provision of food to society among developing countries divided into seven groups, Georgia moved from the fifth to the sixth group, standing near poor African countries, while having resources to feed 10–12 million people [Koguashvili et al. 2011].

During the Soviet period of time Georgia was a leading agricultural country, providing up to 10% of the highest quality food in the inter-republic trade. After gaining independence in 1991, Georgia's economy suffered immensely during transition from planned to market economy, followed by the wars in 1991–1993 in the South Ossetian Autonomous Region and the Abkhazian Autonomous Republic. The country's agricultural sector was much affected during this period as well. Beginning in the mid of 1990s it started to recover, there were good increasing tendency till Russian embargo in 2006 imposing a ban on Georgian wine and mineral water, with reason that this products do not meet Russian quality standards and as a result eliminated over 90% of export markets for Georgian wine industry, which despite positive rehabilitation changes and rising tendencies of Georgian total export has not fully recovered yet. Then August 2008 war, rising energy prices, financial crisis and a declining economy in many countries to which Georgia exported or planned to export its food products affected Georgian agriculture sector a lot.

But despite various problematic issues until 2008 the economy of Georgia was expanding, experiencing continuous growth in real GDP till 2008 (Fig. 1), which was supported mainly by continual growth of the industrial and construction sectors, trade services, transport and communication sectors, while agriculture slightly contributed to the GDP growth. According statistical data of 2012, the largest shares of GDP by activity were held by trade services – 17.2% and industry – 16.9%, followed by public administration – 12.7%, transport and communication services – 9.4%, construction 8.8% and agriculture – 7.7% (Table 1).

MATERIAL AND METHODS

The purpose of this paper is to address specific problems existing in the Georgian agricultural sector, providing background, analysis, recommendations and perspectives, trying to evaluate possible changes and important steps towards positive outcomes.



* Adjusted data will be published on November 15, 2013.
Fig. 1. Real growth rates of gross domestic product in 1997–2012* (percentage)
Source: National Statistics Office of Georgia (http://www.geostat.ge/).

Table 1. Structure of gross domestic product in 2006–2011 (percentage)

Specification	2006	2007	2008	2009	2010	2011	2012*
Agriculture	12.8	10.7	9.4	9.4	8.4	8.8	7.7
Industry	17.0	16.5	15.5	15.4	16.1	17.1	16.9
Construction	7.9	7.8	6.4	6.5	6.1	6.7	8.8
Trade services	15.6	14.8	16.2	16.8	16.8	16.9	17.2
Transport and Communication	13.2	12.1	11.0	11.2	11.5	10.5	9.4
Other branches	33.5	38.1	41.5	42.4	41.1	39.9	40

* Adjusted data will be published on November 15, 2013.
Source: National Statistics Office of Georgia (http://www.geostat.ge/).

Based on the statistical data, using qualitative and quantitative analysis along with existing literature, reports and results of surveys conducted and reviewed by government agencies, donors, international organizations etc. on Georgia's overall economic performance, as well as studies carried out in agriculture sector, this paper enables to clearly see high importance of agriculture for Georgia's economy, the theoretical aspects of strategy for its further development and existing potential of the sector, despite numerous problems that require appropriate attention.

RESULTS AND DISCUSSION

General performance of agricultural sector

Agriculture has rich and distinguished history in Georgia, possessing favorable conditions for production of a wide range of agricultural products and has always been one

of the key sectors of the Georgian economy and the largest employer as well. It employs more than half of the country's workforce and 60–70% [CASE 2008] of the Georgian population depend on this sector despite the fact that since 1996 the share of agriculture in GDP is declining each year (Fig. 2). According to data from the National Statistics Office of Georgia (NSO), despite the fact that real value added from 1996 to 2006 was steady, share of agriculture in GDP fell from 34.1 to 12.8% and in 2011 reached 8.8%. But still share of agribusiness in the output of total economy is about 20% (Fig. 3).

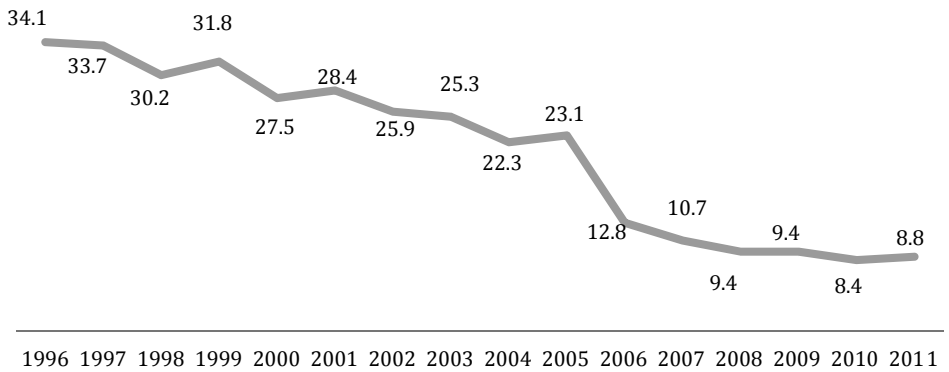
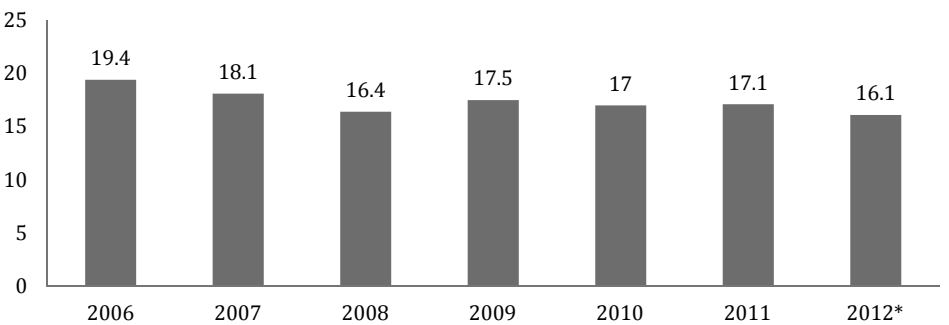


Fig. 2. Share of agriculture in gross domestic product in 1996–2011 (percentage)
Source: National Statistics Office of Georgia (http://www.geostat.ge/).



* Adjusted data will be published on November 15, 2013.
Fig. 3. Share of agribusiness in the output of total economy in 2006–2012 (percentage)
Source: National Statistics Office of Georgia (http://www.geostat.ge/).

During the Soviet era, agriculture was characterized by state ownership of all agricultural land and concentration of production in large-scale collective farms [USAID 2009]. In 1992, the government began to privatize rural land. The government allocated 1.25 hectares to each rural family from the holdings of the collective and state farms. As a result more than one million plots were distributed, what created the situation that nowadays "most of the holdings are not run for commercial purposes, but for subsistence farming. Land used for agricultural production is composed of highly fragmented 4 million pieces of land, which are small and rarely exceed 1 hectare" [The Inter-Agency

Working Group..., 2009–2010]. What reduces effectiveness and consequently the majority of household production became oriented towards self-sufficiency [Economic Policy Research Centre 2011].

"Agriculture in Georgia relies mainly on small-scale farming with low production efficiency. On average 0.88 ha of arable land is owned by one farmer. These small farms produce more than 80 per cent of the total production. Only 8–10 per cent of this production goes to the market. Large-scale farms produce about 10 per cent of the total agricultural production and almost all is destined for the market. At present small farms dominate the agricultural sector. They operate mainly for domestic consumption. In addition, the share of farms that have privately owned farming equipment and agricultural machinery is a little more than 20 per cent. In fact, in Georgia on average 53.2 tractors and 0.4 harvesters were employed per 1000 ha. Until 2005, 75 per cent of agricultural land and 2.5 million hectares of forests were under state ownership. In 2005, the Law on Privatization of State-Owned Agricultural Land was adopted in order to promote efficient use of land through private ownership and thus increase efficiency in the agricultural sector. Forests and other natural resources are being transferred more actively to private hands under long-term tradable licenses" [UNDP Georgia 2011].

According the information from the Ministry of Agriculture of Georgia, lands remaining state-owned are comprising 80,000 ha (22%), while 280,000 ha (78%) are already privatized. 44% of Georgia's total area is considered to be agricultural land, which consist of approximately 3 million hectares: residential 1%, arable land 27%, perennials crops 9%, pastures 63%.

The climate creates favorable conditions for the production of diverse agricultural products, including viticulture, cereal production, and a wide range of vegetables, fruit, nuts, livestock, dairy foods, citruses and tea.

Georgian agricultural sector plays an important role for country's economy in terms of possible GDP contribution, net foreign exchange earnings, employment generation and importance for poverty reduction, but nowadays this sector is experiencing a range of different problems.

Existing problems and trade tendencies for georgian agricultural products

Since the crisis of 1990s export of Georgian agricultural products (Table 2) had rising or declining tendencies through years till 2008, after what it has steady growing trend [USAID Georgia 2011]. While agricultural imports have stable growing shift through each year. But what is worth to mention is that if before agricultural imports were approximately twice more than exports, after 2006 agricultural imports exceeded agricultural exports three times. All this shows a decline of agriculture's contribution to overall trade from 28% in 2000 to 18% in 2012 and leaves a clear perspective for further development, improvement and better contribution to country's economy.

And as 60% of Georgian agricultural products were usually taken to Russian markets, numerous companies have been hurt by the embargo, especially those exporting wine, mineral water, fruit and vegetables. Thus, today, the Georgian agricultural sector is struggling to adapt to a radically different world than the one in which it operated prior to 2006.

Table 2. Agricultural trade in comparison to the total trade in 2000–2012

Item	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exports	m $	91.8	78.9	95.9	146.9	167.4	330.9	266.2	249.3	250.5	286.9	297.8	316.5	436.7
Imports	m $	161.9	155.6	154.4	182.9	367.5	433.7	561.7	762.1	942.1	737.3	920	973.3	1 198.7
Total exports	m $	323.9	317.2	345.7	461.3	646.9	865.5	966.4	1 232.1	1 495.3	1 133.6	1 677.5	2 189.1	2 377.5
Total imports	m $	709.5	752	794.7	1 139	1 844.3	2 487.5	3 674.8	5 212.2	6 301.5	4 500.2	5 257.1	7 057.8	7 842.1
Share in total exports	%	28	25	28	32	26	38	28	20	17	25	18	14	18
Share in total imports	%	23	21	19	16	20	17	15	15	15	16	18	14	15

Source: National Statistics Office of Georgia (http://www.geostat.ge/).

Georgian agriculture is primarily in very bad situation with small market surpluses and low productivity. According to World Bank surveys, approximately 83% of Georgia's rural population is entirely dependent upon their farms for subsistence and they consume approximately 73% of what they produce and remaining products which are supposed for export, are facing lots of difficulties to gain appropriate success and outcomes.

Traditionally, the main exporting products of Georgia are agricultural products (such as mineral waters, wine, nuts, fruit, alcohol and non-alcohol beverages and citruses) and industrial products (ferroalloys, copper ores, scrap metal, fertilizers, gold, ores, and vehicles).

The biggest growth potential for exports is in the citrus, tobacco, and wheat sectors. With substantial investment in technologies and infrastructure, Georgian agricultural sector will have significant potential to export soy, cooking oil, corn, nuts, tea, and herbs. Georgian agricultural sector needs to improve productivity, use all naturally gained opportunities and with appropriate support it will be possible to reach desired outcomes.

According to the 2011 data of the National Statistics Office of Georgia (NSO), the export of agricultural products was $310 million and imports – $957 million. Share of major commodity positions by exports was: live animals 15%, cereals 3%, edible fruit and nuts, peel of citrus/melon 32%, residues from food industries, animal feed 2%, beverages, spirits and vinegar 42%, accounted for 94% of total exports. And share of major commodity positions by imports was: meat and edible meat offal 11%, animal or vegetable fats 7%, cereals 21%, sugar and sugar confectionary 15%, tobacco and manufactured tobacco substitutes 10%, amounted 63% of total imports (Fig. 4a and b).

Since the Russian embargo, the other CIS countries have dominated as destinations for Georgian agro products. The main export markets are: Ukraine, Kazakhstan, Azerbaijan, Belarus and the EU countries (Fig. 5a and b). Ukraine is the first exporter country of agricultural products to Georgia, followed by Russia, Turkey, Brazil and Kazakhstan. To ensure Georgia's continuous economic growth and development, diversification of its export markets is essential. This implies expansion of its exports volume to strategically important markets like European Union, United States of America, China, India etc.

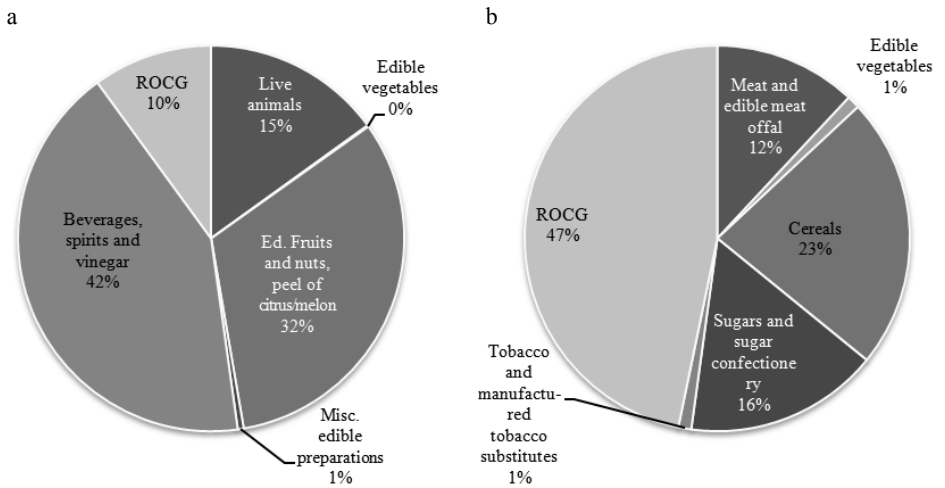


Fig. 4. Exports by commodity groups (2011) (a), imports by commodity groups (2011) (b)
Source: National Statistics Office of Georgia (http://www.geostat.ge/).

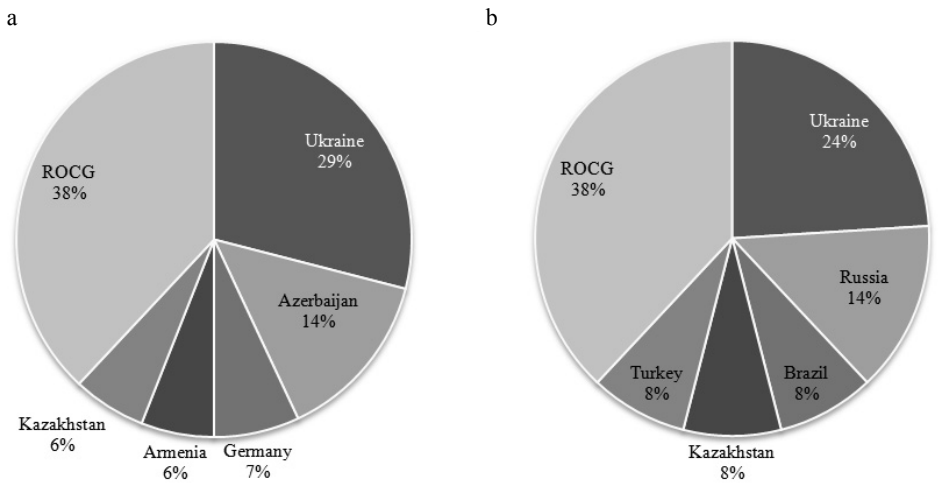


Fig. 5. Exports by countries (2011) (a), imports by countries (2011) (b)
Source: National Statistics Office of Georgia (http://www.geostat.ge/).

To diversify exiting export markets after 2004, the country started elimination of tariff and non-tariff barriers to trade. These contributed to the creation of more competitive market conditions and improvement of the business environment, diversified international trade and made country more integrated to the world economy. The Ministry of Agriculture of Georgia adopted a number of technical regulations in the field of pesticides and agrochemicals, in particular, the rules of marking, testing and registration, storage, transportation, placement and use. The regulations are broadly in line with international standards and the EU rules, but still, lack of modern agricultural equipment and infrastructure, insufficient level of agricultural producer's knowledge about potential

markets, outdated drainage and irrigation systems, underdeveloped livestock feed and seed production, as well as shortage of post-harvest handling facilities like storage, packing, sorting, are existing obstacles to production and further exports. Country is facing lack of financial resources and not enough investment, important for further development [USAID Georgia, EWMI, EI-LAT 2012].

For further improvement of trade, all earlier-mentioned problems must be overcome and as the rural economy is very important for Georgia's future growth as well as employment generation leading to poverty reduction, appropriate actions from government and private sector together in cooperation must be done.

Accessing the EU market

"Relations between the EU and Georgia started in 1992 just after Georgia regained its sovereignty in the wake of the break-up of the Soviet Union. The main legal framework of the EU-Georgia relations is the Partnership and Cooperation Agreement (PCA) (in force since July 1999). In 2004, Georgia was included in the European Neighbourhood Policy (ENP) and in 2006 was adopted the ENP Action 5 years plan to fulfil provisions of the PCA and support Georgia's further integration in the social and economic structures of the EU. In 2009 the EU launched Eastern Partnership (EaP) to support socio-economic and political reforms in Georgia and further integration. In 2010 were launched negotiations for the EU-Georgia Association Agreement, signed the Visa Facilitation and Readmission Agreements and the Common Aviation Agreement, initialized, bilateral agreement on Mutual Protection of Geographical Indication of Agricultural Products (wine, spirit) and other Foodstuff. Georgian authorities are committed to timely conclude this agreement. And nowadays, the European Union and Georgia have been engaged in an ambitious process towards reaching a Deep and Comprehensive Free Trade Area (DCFTA). To access the EU market is not an easy task. Despite somewhat favorable trade conditions with Europe (a number of positive preconditions for achieving better results are already in place, namely, GSP+ etc.) trade between the EU and Georgia remains limited, with a clear need for diversification, especially when it comes to Georgian export" [Taralashvili 2012].

As Georgia is a member of the World Trade Organization (WTO), it avails low rates on agricultural products, what can be clearly seen below (Fig. 6). The final bound duties as well as the most favored nation (MFN) duties are mostly the same 10–15% for nearly 70% of agricultural import values. Remaining 30% of products are varying between duty free, lower and the higher duties, which are set on imports of beverages and tobacco.

The very few remaining import tariffs on the EU side are not the main impeding factor for Georgian exporters, but the main reason of limited and not diversified Georgian exports is that the EU has very complicated trade related regulations and standards as well as legislative acts established by the EU member states. The EU non-tariff barriers, such as technical, sanitary and phyto-sanitary standards (SPS) as well as production, transportation, labeling (so-called Euro standards) and storage requirements etc. mainly cause serious impediments and make it harder for Georgian products to reach the EU single market [SACAC 2009].

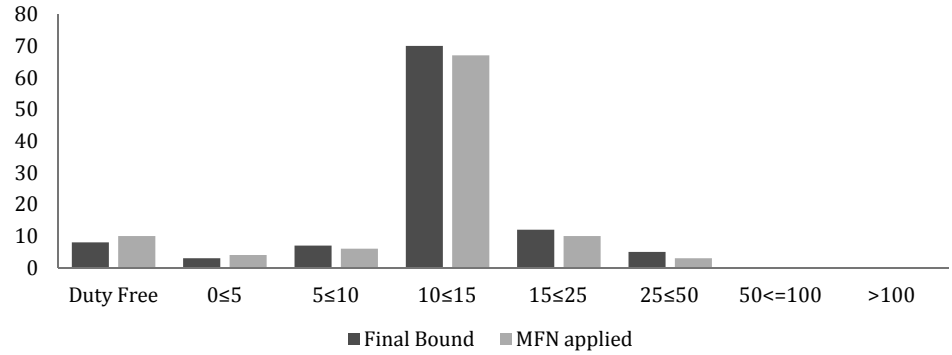


Fig. 6. Final bound duties and import values for agricultural products (percentage)
Source: World Trade Organization (http://www.wto.org/).

So, better access to the EU markets will mostly depend on how well and quickly Georgian exporters will adopt the EU standards and regulations, as while Georgia does not have a diversified export-oriented economy, adoption of the EU standards will surely help to establish new product lines, which might become competitive on the European markets.

The overall situation started to change after the Rose Revolution [UNDP Georgia 2008], followed by the range of reforms with the aim to promote new trends of economic development based on further integration of the country into the global world, by establishing international cooperation through free trade agreements (FTA) with Turkey and the nations of the Commonwealth of Independent States (CIS), and the Generalised scheme of preferences (GSP) agreements with the European Union and the United States.

In addition, Georgia is poised to establish Deep FTAs with the EU and US which would lead to the adoption of the EU regulations and quality standards, the export potential of Georgian agro-food products could improve and allow some products to seize larger market shares within the EU, which is the biggest market for agricultural products supplied mostly by developing countries.

In recent years trade with the EU member states gradually enlarged and the share of the EU countries in Georgia's total trade turnover is increasing year by year.

In the total EU imports about 25% of products are agricultural ones. The main products that Georgia exports to the EU are: fresh and dried hazelnuts, waters (pure mineral, with added sugar, sweetener or flavor), walnuts, vinegar, apple juice and fruit preparations, wine and non-alcoholic beverages. For the first time since 2007, Georgia has exported greens, honey and eucalyptus brooms to the EU.

At the same time, despite being an agricultural country, Georgia is unable to export other food and agricultural products, because Georgian producers cannot meet the SPS and requirements of the EU countries. What means that it is very important to found new approaches to attract potential investors, identify and adapt appropriate technology to provide farmers intellectual and physical tools, which they will need to meet existing standards, become more productive and profitable in competitive markets.

SWOT analysis

When share of agriculture in GDP amounts 8.8%, while historically have higher potential, it means that there are serious problems that need to be detected, investigated and eliminated. Table 3 presents the SWOT analysis will help to get clearer image about strengths, weaknesses, opportunities and threats of Georgian agricultural sector as a short result of research.

Table 3. SWOT analysis of Georgian agricultural sector

Strengths	Weaknesses
– Favorable natural resources and climate conditions – Strategically location on the "Silk Road" between Europe and Asia – Well established distribution networks to core CIS and EU markets – Existing preferences in trade with US and the EU countries and the WTO membership – Experienced and low cost labor – Recognition from government as a high priority sector	– Low productivity and weak competitiveness (inefficient use of resources) – Lack of modern agricultural equipment – Outdated drainage and irrigation systems – Low level of agricultural education – Limited knowledge and access to information about potential markets – Low export and sales experience – Lack of long-term and cheap credits – Not fulfillment of SPS standards to export to EU markets – Lack of promotion abroad and domestically – Lack of investment
Opportunities	**Threats**
– Developing new competitive strategy for agro-food export – Upgrading agricultural equipment and improving infrastructure – Improving quality of higher agriculture education – Developing system to improve access to information – Strengthening agricultural research – Attracting potential investors – Increasing accessibility to cheap and long-term credits – Increasing market shares domestically and capturing new markets	– Existing barriers to enter foreign markets – Low level of investment – High competition in global markets – High price competition of foreign products in domestic markets – Macroeconomic threats – High dependence on external energy sources – Demographic problems (ageing population, migration causing reduction of labor resources) – Political instability – Climate related problems

Source: Own elaboration.

CONCLUSIONS

The global population is growing and as a result of significant urbanization more than half of the world's population lives in urban areas, what is affecting agricultural resources, land use and food distribution as a result raising demand for agricultural commodities.

Georgia traditionally is considered as an agrarian country. Its diverse climatic conditions and natural resource endowment allow production of a wide variety of agricultural products and favor competitive development of the sector, vital for country's further maturation.

The loss of the main export market had an appalling impact on the whole agricultural sector. To overcome still existed negative effect, Georgian agricultural sector must substantially expand its export performance in global markets and became more diversified.

The potential for growth and diversification is very real as Georgia has good opportunities in this sector and comparative advantage within competitors, having good quality products plus low wage costs and strategically location. Georgian agro-food exports growth is obvious in nearest future, if appropriate improving changes will be done. It is important to develop a competitive strategy for exporting agro-products to international markets, where countries have different quality, taste, and food safety standards to those with which the Georgian industry was accustomed during long period of time.

For further, long-term prosperity Georgia needs to overcome existing weaknesses in the sector, develop effective strategy, attract potential investors, study the world market, be oriented on its requirements and extend demand of Georgian agricultural products abroad.

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HANDEL ZAGRANICZNY GRUZIŃSKIMI PRODUKTAMI ROLNYMI I POTENCJAŁ ICH EKSPORTU NA RYNEK UNII EUROPEJSKIEJ

Streszczenie. Niniejszy artykuł jest próbą wskazania znaczenia sektora rolnego i potencjału eksportowego produktów rolnych dla gospodarki gruzińskiej poprzez zaprezentowanie wyników historycznych oraz przegląd obecnych trendów. Rolnictwo gruzińskie jest w bardzo złej sytuacji, wykazuje małe nadwyżki oraz niski poziom produktywności. Jak wynika z badań Banku Światowego, około 83% populacji na obszarach wiejskich Gruzji jest zależne od gospodarstw socjalnych i konsumuje około 73% produkcji, a pozostałe produkty, które mogłyby stać się przedmiotem eksportu, napotykają liczne utrudnienia uniemożliwiające im sukces i przychody. Dla pozyskania nowych rynków alternatywnych, takich jak Stany Zjednoczone czy kraje Unii Europejskiej, niezbędne będą reformy strukturalne zapewniające wzmocnienie w Gruzji zrównoważonego wzrostu, zainteresowania inwestorów zagranicznych oraz poprawy ogólnej produktywności w sektorze, zmierzającej do dywersyfikacji eksportu oraz rozwoju sektora. Przy wykorzystaniu danych statystycznych możliwe jest zidentyfikowanie głównych partnerów eksportowych Gruzji, znaczenie poszczególnych sektorów i krajów docelowych z punktu widzenia całkowitego potencjału eksportowego oraz zmiany eksportu gruzińskich produktów rolnych na przestrzeni lat. Spadek udziału handlu rolnego w handlu ogółem z poziomu 28% w 2000 roku do 18% w 2012 roku pozostawia jasną perspektywę dalszego rozwoju, poprawy i większego wkładu do gospodarki krajowej.

Słowa kluczowe: sektor rolny, eksport produktów rolnych, obecne i potencjalne rynku eksportowe, standardy i regulacje UE, strefy wolnego handlu, reformy strukturalne

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CONTENTS
SPIS TREŚCI

INSTRUCTIONS TO AUTHORS

The journal *Acta Scientiarum Polonorum – Oeconomia* features original scientific articles related to all aspects of environmental processes.

General and technical requirements for the elaboration of papers:

1. **Size of the research paper** including tables, figures and photographs should not exceed 12 pages of A-4 format.
2. **Materials to be published** in *Acta Scientiarum Polonorum* should be prepared in accordance with the rules of the publishing process binding at the publishing office of a given series of the Journal.
3. **Style of documents** – the text of the paper should be typed with Times New Roman font 12 points, 11 of space between the lines, setting parts of the text in special typeface is allowed, e.g. italic or bold, but without underlining letters, words and sentences.
4. **Size of tables and figures** cannot exceed B-5 format (12.5 cm × 19.5 cm); descriptions of tables should be typed with Times New Roman 9 points, content of tables 8 points, single space, if possible without vertical lines, table format – doc. or rtf.

The following paper setting is binding:

1. **Title of the article** in Polish (or in English if the whole paper is in English; the same refers to the summary and key words).
2. **First name and surname** of the author (-s).
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4. **Key words** – 6 words useful when indexing and searching.
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7. **Address** of the author's (authors') place of work – post and e-mail address.
8. **Titles of tables** and their content, and captions of figures and legends must be provided in Polish and in English, while the numbers of tables and figures – with Arabic numerals.

Units and spelling – the international SI system is binding, e.g. $g \times dm^{-3}$ (and not g/dm^3).

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Turski W., 1972. Projektowanie oprogramowania systemów liczących. Mat. Konf. Projektowanie maszyn i systemów cyfrowych. Warszawa 2–5 czerwca 1971. PWN, Warszawa, 132–139.

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