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Faculty of Economic Sciences

**Proceedings of the 2018
International Scientific Conference**

**ECONOMIC SCIENCES
for AGRIBUSINESS
and RURAL ECONOMY**

Warsaw, 7–8 June 2018

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Agriculture, food economy, bioeconomy

Agricultural markets and prices

Social capital and regional development

Logistics in agriculture and food supply chains

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Warsaw University of Life Sciences Press
Nowoursynowska 166, 02-787 Warsaw
tel. 22 593 55 20 (-22, -25 – sell), fax 22 593 55 21
e-mail: wydawnictwo@sggw.pl
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Time schedule of the conference

Preparation of the proceedings and organisation: December 2017 – June 2018

Conference: 7–8 June 2018

Researchers from the following higher education institutions, research institutions, and professional organisations presented their scientific papers at the conference:

Agricultural Social Insurance Fund	Poland
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Ahi Evran University	Turkey
Aleksandras Stulginskis University	Lithuania
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Institute of Agroecology and Environmental Management NAASU	Ukraine
Institute of Rural and Agricultural Development of the Polish Academy of Sciences	Poland
Institute of Soil Science and Plant Cultivation (IUNG)	Poland
Krzemieńcucki National University of Mykhayla Ostrogradski	Ukraine
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Rzeszow University of Technology	Poland
School of Information Technology Center of Cyberforensic Operations	USA
Siedlce University of Natural Sciences and Humanities	Poland
State Agrarian and Engineering University in Podilya	Ukraine
State Higher Vocational School in Krosno	Poland
Sumy National Agrarian University	Ukraine
Szent István University	Hungary
College of Business and Entrepreneurship in Ostrowiec Świętokrzyski	Poland
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Office of the Marshal of the Mazowieckie Voivodeship in Warsaw	Poland
Polish Social Insurance Institution (ZUS)	Poland

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Warsaw University of Technology	Poland
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University of Life Sciences in Lublin	Poland
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Countries from which we hosted Conference Participants 2018

(Patrycja Feryńska elaboration)

Publication of Ethics and Malpractice Statement for the International Scientific Conference 'Economic Sciences for Agribusiness and Rural Economy'

While upholding the highest form of ethical correctness, the Editorial Board ensured that the authors included in the publication of the papers, adhered to the ethical standards established by the Programme Committee. Each author was obliged to sign and present an editorial statement on the originality of the paper, and not publish any part or the whole paper before. The statement prepared for the authors required indicating all authors of the submitted paper and confirming their contribution to the study submitted to the editorial staff. In addition, while ensuring the correct use of sources during the preparation of the paper, the authors confirmed the demonstration of all citations used in the paper. The entire publication was planned and prepared in accordance with the highest standards of: the European Charter for Researchers, ensuring compliance with ethical standards over national standards, Polish legislation, ensuring ethical standards for publishing at the national level of the editorial office and the publisher, as well as maintaining the highest ethical standards of the institution represented by the editors of the publication – the Faculty of Economic Sciences of the Warsaw University of Life Sciences – SGGW. Under the leadership of the Editor-in-Chief, the entire editorial team, the scientific and organisational committee, as well as reviewers and authors applied the best practices in terms of their duties and ethics. All editorial staff members were introduced to the Code of Conduct and Best Practice Guidelines for Journal Editors of the Committee on Publication Ethics (COPE). In accordance with the COPE Code of Conduct and the Strategic Plan of 2016–2018 promoting integrity in research and its publication, a list of responsibilities and responsibilities were drawn up, necessary to meet the highest standards of ethical behaviour for all parties involved in the act of publication. The Scientific Council and the Editors were responsible for the high level of substantive content, a high rate of internationalisation of publications, implementation of good and better practices in the editorial process and maintaining the highest possible publishing standards.

DUTIES OF EDITORS

Publications decisions

The editorial responsibilities under the direction of the Editor-in-Chief varied depending on the stage of publication. The editors were responsible for maintaining high standards from the point of receiving the articles all the way through to the publication of the study. In mid-2017, the Editor-in-Chief, guided by the *'summum bonum'* of the planned publication, appointed experts with vast scientific and professional experience, as well as achievements in the international field. Thus, the appointed Scientific Council of the publication, consisted of the highest ranking experts for the planned thematic sections of the conference and publication at the same time. The Editors and the Organising Committee were appointed based on the experience of their members, knowledge and acquired skills. A diversity of views was ensured by the appointment of the Editorial Board, consisting of renowned experts from abroad, representing highly-rated scientific institutions. In the decision-making field, it was crucial to appoint reviewers to direct the papers submitted by the authors to the relevant substantive and recognised reviewers. The professionalism of scientists and their unblemished reputation were used as a guideline during the selection process. After obtaining two independent reviews at the discretion of the Editor-in-Chief, the decision on accepting or rejecting the submitted paper remained, however the scale of responsibility for this decision varied depending on the opinions issued by the reviewers. In special cases, the decision of the Editor-in-Chief was addressed to a third, independent review. The editors were responsible for deciding about the need for the author to introduce corrections. The decisions made were comprehensive, considering the fact that 131 papers were sent to the Editorial Office. Since the beginning of work on the publication, editors have been guided by the principles of ethics and responsibilities resulting from current legal requirements regarding such aspects as defamation, copyright infringement and plagiarism.

Fair play

The Editor-in-Chief asked for an assessment of papers based on their substantive content regardless of the origin of the author, the institution represented by them, race, sex, sexual orientation, religious beliefs, ethnicity, citizenship or political philosophy. Total impartiality also concerned the selection of reviewers as well as members of the Scientific Council, the Organising Committee and the Editorial Board. The development of the Fair Play principle can be found below in the Confidentiality section.

Confidentiality

The Editor-in-Chief and every member of the editorial office could not disclose any information about the submitted report to third parties. In order to maintain the highest standard of the Editor's decision, the submitted articles were sent directly to one

person from the Editorial Office, which then removed the personal data of the authors before referral for review and further proceedings. Thus, only the Editor-in-Chief and a designated representative for personal data had knowledge of the personal data of the authors. The given report, with the personal data removed, was then submitted to the reviewers appointed by the Council, who possessed no knowledge about the authors of the paper and about each other. The results of the blind, double review were directed to the authors without the disclosure of the personal data of the reviewers.

Disclosure and conflicts of interest

The submitted papers are the intellectual property of the authors and co-authors before, during and after the publication. The members of the Editorial Staff and all persons related to publishing the publications have no right to use them under their own name. In the event of a possible conflict of interest, the Editor-in-chief issued preventive orders to protect and place the good of the author of the paper above others.

DUTIES OF REVIEWERS

After the deletion of personal data of authors and co-authors, each submitted report was referred for a double, blind review. In situations of contradictory reviews, by decision of the editor-in-chief, the paper was sent for a 'super' third review. The editors' policy was to refer the paper to the reviewer from another institution and, if possible, from another city. Referral of the submitted paper to reviewers working in the same unit as the author was forbidden. It was seen as good practice to provide one reviewer for each paper, from a country other than that of the author's. In situations of the third 'super' review, it was the decision of the Editor-in-Chief that the final choice be made by outright experts in a given field, often awarded with an honorary doctorate.

Contribution to editorial decisions

The Editor-in-Chief made decisions about the acceptance or rejection of a paper on the basis of two professional, blind reviews. In some cases the authors also recommended that the paper should be corrected, with the aim of protecting the best interests of the authors of individual papers as well as the good of the entire publication.

Promptness

A professional computer system, the 'Online Journal System' was set up by the Editor-in-Chief prior to the planned work on the publication. This enabled each reviewer selected by the Editor to be granted a request for a review and receive information about the date of acceptance or rejection of the review, as well as a date for its completion. If it was impossible to complete the review within the time frame of the deadline set by the Editorial Board, the request was rejected and the decision required justification. The designated reviewer had 5 days to agree to the review and then 14 days for its implementation. In the case of a reviewer's request for an extension to the deadline, the Editor-in-Chief, taking into consideration the good of the author, decided to extend the deadline for the review to up to 21 days.

Confidentiality

The reviewers were informed of the necessity to maintain confidentiality in the reviewing process and all dissemination of information about the report was forbidden. The reviewer could not show or consult the paper with anyone other than the Editor-in-Chief or the person indicated by him.

Standards of objectivity

Each paper was subject to an unbiased and objective review. No personal criticism of the reviewer was allowed. Every opinion, either positive or negative, had to be supported by arguments concerning the content of the paper. In the case of an unsatisfactory justification, the reviewer was requested to elaborate upon his comments so as to prevent any reservations of the Editor with regard the content and opinion of the review.

Acknowledgement of sources

In the interests of the highest good of science and its creators, reviewers were required to identify situations in which parts of the paper were taken from other sources without this being mentioned by the authors. Any use of the work of other authors should be accompanied by appropriate quotations, which the authors were informed about when completing the statement

prepared by the Editorial Board. The reviewer was obliged to draw the Editor's attention to significant similarity between the discussed paper and any other document or publication. It was seen as good practice to use the 'random' function in the database to draw a paper in a unbiased way, that would then be checked by the anti-plagiarism system.

Disclosure and conflict of interest

Each reviewer was obliged to immediately report any cases where the review could be related to the work of the reviewer, or give competitive advantage in any way associated with the reviewer or their work.

DUTIES OF AUTHORS

Reporting standards

All authors and co-authors were required to present original contents, not previously published in fragments or in their entirety. In the case of work based on own research, they were required to present in their research in detail, its time and place, justification for its implementation, and any successes and failures. In the case of a paper based on secondary research, all authors and co-authors were required to provide as detailed information as possible about the origin of the data, their availability and use. All work was required to be presented in detail, in a way that would allow other scientists to use it for the purposes of their future research. All dishonest practices were forbidden and it was part of the Editors' and reviewers' responsibility to identify and remove them with the consequences. In projects whose author was a participant and the paper was completed due to the researcher's participation in it, they were obliged to present information about the project in the section of the paper dedicated for such a purpose.

Data access and retention

All authors who based their papers on their own research are required to store a database of such data for a period of at least 5 years from the date of publication of the paper. It is a good practice for the authors to make the database available for research and educational purposes at the request of governmental and non-governmental institutions.

Originality and plagiarism

The authors and co-authors attested the originality of their works in consideration of the protection of intellectual property, good name of science and editorial policy. The statement of originality of the paper, the quotation and presentation of any sources used in the creation of the work were provided in the bibliography together with the content of the paper and sent to the Editor. In addition, papers were selected in a random manner using the 'random' function and checked by a special anti-plagiarism program. Every effort was made to verify the presence of sources for citations and their correctness.

Multiple, redundant or concurrent publication

By submitting a paper to the Editorial Board of the conference 'Economic Sciences for Agribusiness and Rural Economy', the author and co-authors have stated that they have not published, and are not in the process of intending to send the same paper or any part of it to any other editorial office. Publication of a paper based on the same data is considered unethical by the editorial office and is unacceptable.

Acknowledgement of sources

The authors, by drawing on other publications and sources in their papers, were obliged to display their utmost diligence in ensuring the correct quotation of the works that they used to create their own papers. The use of various sources to create own work is the basis for the development of the world of science, which is why the entire editorial team has made every effort to prevent unethical behavior. A specially prepared review sheet was used containing detailed questions about the correctness of citations and bibliography. Thus, all reviewers were obliged to do their utmost to verify all sources on this basis.

Authorship of the paper

The author who sent the paper was obliged to present all the people who contributed to the creation of the work and list them as co-authors. All co-authors had to sign a statement attached to the paper. The statement contained information about the requirement to list all those who significantly contributed to the creation of the paper and agreed to send it to our editorial staff. It was perceived as good editorial practice to send the collected reviews to both the authors and co-authors.

Hazards and human or animal subjects

In cases when research involved the use of chemical compounds, behaviors or equipment associated with a possible threat to the health or life of animals or people, the author was obliged to clearly identify this threat in the paper.

Disclosure and conflicts of interest

Financial support for creating a paper resulting from cooperation with or membership of a project group should be demonstrated in a specially prepared section of the paper. Regardless of any conflict of interest, the authors preparing the papers were obliged to present the full truth to prevent the spread of unethical behaviour in the world of science.

Fundamental errors in published works

In the case of finding any error, every author and co-author of the submitted and published paper is obliged to immediately contact the Editor-in-Chief in order to withdraw the publication and correct it. Editors also give third parties the right to report errors or any ambiguities in the published publication. Any information about a possible error has always been, is and will be considered with respect to the good of science.

Editor-in-Chief *Jarosław Gołębiowski*

Foreword

On 7–8 June 2018, at the Faculty of Economic Sciences of the Warsaw University of Life Sciences, an International Scientific Conference was held under the title ‘Economic Sciences for Agribusiness and Rural Economy’. The conference was attended by 410 people from 27 countries, from 4 continents, including 88 different scientific institutions. 118 presentations were given in thematic sessions and 12 speeches in plenary sessions. In addition, a special panel for young scientists was organised ‘Challenges of Contemporary Economy in the Perspective of Research of Young Scientists’, organised for the fourth time by the Faculty of Economic Sciences. To include students in the organisation of this great event, the organisers added to the conference an overview of Scientific Circles organised for students working in science clubs at universities. The scientific articles presented as part of the conference were published in accordance with the scientific issues discussed during the conference session, in two volumes:

No 1

- Adaptation processes of enterprises for implementing the principles of sustainable development
- Policy towards agriculture and rural areas
- Innovation of the national economy, with particular emphasis on agribusiness
- Impact of the financial sector on agriculture, the food industry and rural areas

No 2

- Transformations in agriculture and food economy in European countries
- Agricultural markets in the era of integration and globalisation
- Importance of social capital in local and regional development
- Logistics as a factor in economic development

In total, 105 scientific articles were published in conference proceedings, which positively went through a double, blind review made by 210 reviewers from around the world. 18% of scientific articles sent to the conferences failed to be reviewed successfully. In 12% of cases the Editor-in-Chief asked for a third, conclusive review. The Editorial Board gathered 16 top experts in the field of economics from 9 countries: Latvia, Italy, Poland, Germany, the USA, Ukraine, the Czech Republic, Hungary and Finland. In connection with the significance of the event, six sponsors agreed to financially support this exceptional event for the development of science. In addition, the Association of Agricultural and Agribusiness Economists – SASEA (Polish Association of Agricultural and Agribusiness Economists) was the patron of the conference proceedings. This large-scale association operating for 25 years has been gathering economists in agriculture and agribusiness interested in current economic problems in the world. In light of the scale of the event in Warsaw, the association chose to become its patron.

The conference proceedings contained scientific articles of the highest quality, which gave an accurate description of economic reality. A number of theories were presented, a whole range of methods was applied and the most professional language was used to describe the variety of problems that the economy is facing today. The scientific knowledge presented brought to the event new ideas that are worth disseminating. The effects of the verification of results in science observed so far were also discussed. Due to the specificity of economics as a science which is inseparable with other fields, elements of other subjects such as sociology, politics, mathematics or natural sciences, were presented in the Conference Proceedings, which further confirm the Warsaw event as a solid foundation for the development of modern science. This year the topic of the conference included the most important contemporary issues, starting with the changes that are already occurring or will have to occur in enterprises with the current promotion of sustainable development. Issues related to food economy were also discussed, which since the beginning of humanity has invariably been the most important aspect for the functioning of the economy. In addition, sessions on integration and globalisation were presented, in light of the speed of these phenomena in the world. Observations regarding policy in many countries of the world, especially concerning agriculture and rural areas, were exchanged. By organising a session about the importance of social capital in local and regional development, the essence of human development was emphasised, and in consideration of the need for development, a session on innovations was formed, which, in the organisers’ opinion, constitutes an inseparable element of improving the world’s economies. A session on financial issues in agribusiness and logistics was also prepared, considering their immense significance for today’s everyday economic life in Europe.

The presentations were attended by scholars from many countries. It is worth emphasising, however, that the Faculty of Economic Sciences hosted many scientists from all over Eastern Europe, namely, Latvia, Ukraine, Russia, the Czech Republic, Slovakia, Lithuania and Hungary. This gathering of scientists from the same part of Europe made it possible to share and gather knowledge from research conducted in countries that have much in common. In fact, the countries of Eastern Europe are influenced by a similar history and now have the same problems and advantages associated with their economy and political aspirations. The two-day Warsaw Conference was therefore an ideal moment to meet and discuss current problems, create new ideas aimed at the development of neighbouring countries, and share insights regarding economic everyday life of this region of Europe. Bearing in mind the high rate of internationalisation of conferences and at the same time scientific articles submitted, the Editorial Board used the services of an English translator to provide hosts with the most commonly used language of publications. The Conference Committee and the Editorial Board are open to any comments and recommendations regarding the preparation of future conferences and the release of subsequent volumes of Conference Proceedings.

Acknowledgements

The Editorial Board would like to thank all participants of the conference 'Economic Sciences for Agribusiness and Rural Economy' for delivering papers, the sent scientific articles and attendance in lectures on 7–8 June 2018 at the Faculty of Economic Sciences of the Warsaw University of Life Sciences – SGGW. In addition, we would like to thank the entire Scientific Committee and the Organising Committee for preparing this great event, as well as the reviewers for the performance of the task entrusted by the Editorial Board.

On behalf of the conference organisers
Jarosław Gołębiewski
Associate Professor of Faculty of Economics Sciences
Warsaw University of Life Sciences – SGGW

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PART 1

**TRANSFORMATIONS IN AGRICULTURE AND FOOD
ECONOMY IN EUROPEAN COUNTRIES**

FAMILY FARM INCOME AND THEIR PRODUCTION AND ECONOMIC DETERMINANTS ACCORDING TO THE ECONOMIC SIZE IN THE EU COUNTRIES IN 2004–2015

Roma Ryś-Jurek, PhD¹

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The aim of this research is to present the family farm income and production and its economic determinants according to the economic size of farms in the EU countries in 2004–2015. Research is based on European Farm Accountancy Data Network (FADN), which includes information about average farms according to the economic size in the EU-28. In this article an attempt is made to use the panel models to evaluate the production and economic determinants of family farm income. The Gretl program is used to evaluate fixed effect models and random effect models. The production and economic determinants of family farm income depending on the farm's size are indicated, such as: utilised agricultural area, crop and livestock production, net investment and cash flow and inputs.

Key words: economic size of farm, family farm income, production

JEL codes: Q10, Q14

INTRODUCTION

The FAO defines a family farm as 'an agricultural holding, which is managed and operated by a household and where farm labour is largely supplied by that household'. Family farms are by far the most common type of farm in the European Union (EU). There is a wide range of agricultural holdings starting from small, semi-subsistence farms with only family workers and farms, which have to rely on other activities in order to diversify sources of income, ending with larger, more productive farms, which nevertheless pursue family management (Eurostat, 2016). The support of family income of these farms (by direct payments) remains an essential part of the

Common Agricultural Policy (CAP) in line with EU Treaty obligations (European Commission, 2017).

Taking into account abovementioned considerations, as well as the primary aim of CAP to support incomes in agriculture, the purpose of the paper is to examine the production and economic determinants of family farm income. According to the hypothesis of research, determinants affecting income vary depending on the economic size of the farm.

THEORETICAL BACKGROUND

Family farm net income results from the agriculture economic production during the operating year in which the agricultural goods are produced. It rep-

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, rysjurek@up.poznan.pl, +4861 848 71 17

resents the return to owner's equity, unpaid labour, management and risk (AAFC and Statistics Canada, 2000).

Growth in farmers' incomes is fundamental to economic and social development and to farmers' ability to reinvest in their farms (Sustainable Food Lab, 2017). The most commonly mentioned characteristics of family farms include the combination of home and business life. The tendency for a greater proportion of family living and farm production cost items to be raised on the farm makes the predominant role of the operator and his family in labour and management (Scoville, 1947).

According to the household socio-economic point of view, the aim of the household is to maximize income from crop and livestock activities under certain circumstances (Nibbering and van Rheenen, 1998). Farming is a risky business because forces beyond the control of farmers, such as weather, affect their income. Therefore, farm income stability has been one of the goals of agricultural policies both in the US and the EU (Severini et al., 2016)², as well as the farms' income³. Making a satisfactory income and safeguarding it for the future are the main goals of farmers (Gasson, 1973; Cary and Holmes, 1982; Berbel and Rodriguez-Ocaña, 1998; Solano et al., 2001).

It should be emphasized that there is a great divergence in the incomes of farmers obtained even in al-

most identical farms. No size of farm is large enough to ensure a profit. Therefore, some level of management must be specified in an 'adequate income' concept. Proper size of family farms according to any income concept would vary with changes in prices and costs (Scoville, 1947).

The structure of the paper takes into account above-mentioned considerations as well as the main research. Therefore, section 3 gives the methodological background of the research. Section 4 presents the results of the econometric analysis. Section 5 concludes.

MATERIALS AND METHODS

Research is based on the data obtained from Farm Accountancy Data Network (FADN), because only the professional farms (i.e. the farms which are large enough to provide a main activity for the farmer and a level of income sufficient to support his or her family) are included in FADN. The FADN has developed a detailed methodology for calculating the family farm income (Fig. 1). The FADN data enable a detailed presentation and analysis of the production and economic determinants of the family farm income (FADN 2018).

These data include basic information about economic situation of ca 1680 production types according to the economic size in the EU in the years 2004–2015⁴. FADN data has a character of the panel

² The long tradition of widespread support for farm income is unique in agriculture as compared to other sectors (Frawley et al., 2000). Income policy has a number of different purposes, namely: forming desired income relations, shaping the level of income, stabilising income over time, i.e. mitigating fluctuations in income from year to year and reducing income inequalities between different agricultural population groups. Changes in agricultural income are mainly due to fluctuations in agricultural production, which depend on natural (mainly weather factors) and economic factors. The effects of fluctuations in production on income may be offset by changes in prices and compensation under the production risk insurance (Pawłowska-Tyszko, 2014).

³ Farmers are continuously making decisions concerning how they allocate their resources of land, labour, capital and entrepreneurial ability. Such behaviour is motivated by the desire to maximise levels of satisfaction or utility. Most studies that have modelled farmer decision-making have, however, assumed a single objective of profit maximisation as the motivation for decision-making behaviour. Therefore, a farmer may be interested in increasing gross margin, reducing indebtedness, avoiding risk, expanding the business, improving family living standard, achieving sufficient leisure time, etc., but not necessarily in that order (Wallace and Moss, 2002).

⁴ The economic size of farms is one of the criteria used to classify agricultural holdings according to the Community typology for agricultural holdings. In line with Commission Regulation (EC) No 1242/2008, the economic size of an agricultural holding is measured as the total Standard Output (SO) of the holding expressed in euro. The Standard Output is the average monetary value of the agricultural output at farm-gate price of each agricultural product (crop or livestock) in a given

Total output, including: crops output, livestock output and other output
+ Balance current subsidies and taxes arising current productive activity
– Intermediate consumption
= Gross farm income
– Depreciation
= Farm net value added
– Total external factors, including: wages paid, rent paid and interest paid
+ Balance subsidies and taxes on investments, not arising from current productive activity
= Family farm net income

Figure 1. Calculation of the family farm net income according to the FADN methodology
Source: own work based on FADN 2018.

data⁵. A particular production type according to the economic size is an aggregate unit. This average volume is calculated on the basis of many individual farms with the same production direction and economic size in each country in the EU. A whole database consists of 28 countries⁶.

Next, the most general formulation of a panel data model may be expressed by the following equation (Baltagi, 2005):

$$y_{i,t} = \alpha_i + X'_{i,t}\beta + u_{i,t} + \varepsilon_{i,t} \quad (1)$$

with i ($i = 1, \dots, N$) denoting individuals, t ($t = 1, \dots, T$) denoting time periods, and $X'_{i,t}$ denoting the observation of K explanatory variables in country i and time t . It should be noted that α_i is time invariant and accounts

for any individual-specific effect not included in the regression equation. Two different interpretations may be given to the α_i , and, consequently, two different basic models may be distinguished. If the α_i 's are assumed to be fixed parameters to be estimated the model expressed in the equation (1) is termed Fixed Effect Panel Data Model (FEM). Conversely, if the α_i 's are assumed to be random, the Random Effect Panel Data Model (REM) is generated (Arbia and Piras, 2005)⁷.

In order to choose between Random and Fixed Effect Model, the Hausman test is used⁸. The null and alternative hypotheses of Hausman test are (Adkins, 2014):

$$H_0: \text{Cov}(x_i; e_i) = 0, \text{ against } H_a: \text{Cov}(x_i; e_i) \neq 0. \quad (2)$$

region. According to the Farm Accountancy Data Network, the Standard Output is calculated by Member States per hectare or per head of livestock, by using basic data for a reference period of 5 successive years. Among 6 classes of economic size, some further subclasses of farms can be distinguished: from EUR 2,000 to 8,000 – very small farms, from EUR 8,000 to 25,000 – small farms, from EUR 25,000 to 50,000 – medium-low farms, from EUR 50,000 to 100,000 – medium-large farms, from EUR 100,000 to 500,000 – large farms, and above EUR 500,000 – very large farms.

⁵ A panel data (or longitudinal data) set consists of a time series for each cross-sectional member in the data set over a time period. Panel data can also be collected on geographical units (Wooldridge, 2013). Panel data models allow us to construct and test more complicated behavioural models than purely cross-section or time-series data (Baltagi, 2005).

⁶ The Farm Accountancy Data Network website <http://ec.europa.eu/agriculture/rca> [Accessed 05.05.2018].

⁷ Fixed Effect Model is particularly indicated when the regression analysis is limited to a precise set of individuals, firms or regions; random effect, instead, is an appropriate specification if we are drawing a certain number of individuals randomly from a large population of reference (Arbia and Piras, 2005).

⁸ The idea is that one uses the random effects estimates unless the Hausman test rejects. In practice, a failure to reject means either that the RE and FE estimates are sufficiently close so that it does not matter which one is used, or the sampling variation is so large in the FE estimates that one cannot conclude practically significant differences are statistically significant (Wooldridge, 2013).

Also, the Variance Inflation Factors (VIF) is used to measure how much the variance of the estimated coefficients is increased over the case of no correlation among the independent variables. If $VIF = 0$ there is no multicollinearity, but if $VIF \geq 0$ there is multicollinearity (Ergün and Göksu, 2013). If the value of VIF test of variable exceeds 10.0, then there is evidence of a collinearity problem (Adkins, 2014).

RESULTS AND DISCUSSION

The first stage of empirical research is to present a family farm net income and chosen economic characteristics according to the economic size of farms in 2004 and 2015 (Table 1). In 2015, the average family farm net income in the EU-28 was equal to EUR 17.5 thousands from 34 ha, EUR 72.0 thousands of output and about EUR 339 thousands of assets. In the same time, the average liabilities of farm was equal to

EUR 54.5 thousands and total obtained subsidies to about EUR 11.7 thousands. As compared to 2004, the output and assets increased about 20% and liabilities about 30%. The subsidies have increased only by 5%. Meanwhile, income, area and the labour input has slightly decreased. The larger the economic size of the farm was, the higher value was derived by income and other variables. For example, in 2015 the smallest farms achieved only EUR 2 thousands of income, EUR 6 thousands of output and about EUR 40 thousands of assets at the area of 4.5 ha. While the largest farms reached about EUR 150 thousands of income, EUR 1.1 million of output and almost 1 million EUR of assets at the area of the 292 ha (Table 1).

The main target of research is to obtain the model that characterizes production and economic determinants of the family farm income according to the economic size of farm. In order to specify the model, a set of variables presented in Table 2 is used. Using

Table 1. Family farm net income and chosen economic characteristics according to the economic size of farms in 2004 and 2015

Details	UAA	Family farm net income	Output	Assets	Labour input	Liabilities	All subsidies
	ha	EUR thous.			AWU	EUR thous.	
2004 EU-25, in detail (EUR):	35.08	17.94	60.63	276.85	1.66	41.59	11.00
(1) 2 000–< 8 000	7.83	4.60	8.88	68.85	1.11	0.68	2.18
(2) 8 000–< 25 000	15.43	9.07	18.15	128.88	1.34	4.52	4.55
(3) 25 000–< 50 000	34.06	17.32	41.68	259.45	1.54	20.35	10.60
(4) 50 000–< 100 000	57.51	25.89	74.33	393.42	1.74	50.09	18.59
(5) 100 000–< 500 000	94.46	49.80	196.00	789.99	2.61	170.03	31.47
(6) \geq 500 000	290.1	125.97	887.82	2192.65	11.58	668.46	82.98
2015 EU-28, in detail (EUR):	34.05	17.48	72.10	338.61	1.53	54.54	11.65
(1) 2 000–< 8 000	4.56	2.04	5.97	40.29	1.02	0.30	1.07
(2) 8 000–< 25 000	14.51	8.52	19.14	160.95	1.19	4.18	5.26
(3) 25 000–< 50 000	30.34	15.63	41.93	319.99	1.43	19.15	11.23
(4) 50 000–< 100 000	54.98	26.56	82.09	502.33	1.69	50.92	18.71
(5) 100 000–< 500 000	104.84	53.37	234.31	997.36	2.49	199.20	35.38
(6) \geq 500 000	292.24	150.58	1 107.77	3 157.14	8.99	1 066.46	101.98

AWU – annual work unit, full-time person equivalent.

Source: own work based on FADN database.

Table 2. The characteristic of potential variables used in panel models

Symbol	Variable name	Variable characteristic
Y	Family farm income	Remuneration to fixed factors of production of the farm (work, land and capital) and remuneration to the entrepreneurs risks (loss/profit) in the accounting year (EUR thous.).
X01	Total utilised agricultural area	It consists of land in owner occupation, rented land and land in sharecropping (remuneration linked to output from land made available). It includes agricultural land temporarily not under cultivation for agricultural reasons or being withdrawn from production as part of agricultural policy measures. Does not include areas used for mushrooms, land rented for less than one year on an occasional basis, woodland and other farm areas, e.g. roads, ponds, non-farmed areas (ha).
X02	Total labour input	Is expressed in annual work unit – full-time person equivalent (AWU).
X03	Unpaid labour input	Refers generally to family labour and is expressed in the family work unit – family AWU (FWU).
X04	Total output crops and crop production	Is equal to: sales + farm use + farmhouse consumption + (closing valuation – opening valuation) (EUR thous.).
X05	Total output livestock and livestock products	Is equal to: livestock production + change in livestock value + animal products (EUR thous.).
X06	Taxes	Farm taxes and other dues (not including VAT and the personal taxes of the holder) and taxes and other charges on land and buildings (EUR thous.).
X07	Total inputs	Is equal to: specific costs + overheads + depreciation + external factors. Costs linked to the agricultural activity of the holder and related to the output of the accounting year without the personal taxes of the holder (EUR thous.).
X08	Balance current subsidies and taxes	Is equal to: farm subsidies + VAT balance on current operations – farm taxes (EUR thous.).
X09	Balance subsidies and taxes on investments	Is equal to: subsidies on investments + premiums for the cessation of dairy farming – VAT paid on investments (EUR thous.).
X10	Total fixed assets	Agricultural land and farm buildings and forest capital + buildings + machinery and equipment + breeding livestock (EUR thous.).
X11	Total current assets	Non-breeding livestock + circulating capital (stocks of agricultural products + other circulating capital) (EUR thous.).
X12	Total liabilities	Value at closing valuation of total of (long-, medium- or short-term) loans still to be repaid (EUR thous.).
X13	Equity	Total assets without the liabilities (EUR thous.).
X14	Gross investment	Is equal to: purchases – sales of fixed assets + breeding livestock change of valuation (EUR thous.).
X15	Net investment	Gross investment without the depreciation (EUR thous.).
X16	Cash flow	Is equal to: receipts – expenditure for the accounting year, not taking into account operations on capital and on debts and loans (EUR thous.).

Source: own work based on FADN 2018.

the Gretl program, forward stepwise variable selection is introduced. As a result, the RE and FE Models are obtained. Results of the estimation of its parameters are presented in Table 3.

In the obtained models, all variables are characterized by level of significance about 0.05. Five variables have positive and statistically significant influence on dependent variable, namely: agricultural area, crop and livestock output, net invest-

ment and cash flow. This means that the higher the values of these variables, the higher the value of family farm net income. The highest positive influence on a dependent variable is exerted by cash flow. Family farm net income is also negatively impacted by variable inputs. Overall correctness of classification is high (between 67.29 and 96.12%). The values of VIF test for all variables are below 10.0 (Table 3).

Table 3. Panel models for family farm income according to the economic size of farm

Details		Class of economic size					
		1	2	3	4	5	6
Hausman test		$\chi^2(6) = 9.1655$ (0.1645)	$\chi^2(5) = 8.4854$ (0.1314)	$\chi^2(5) = 10.3524$ (0.0658)	$\chi^2(6) = 12.0654$ (0.0605)	$\chi^2(6) = 16.8168$ (0.0010)	$\chi^2(5) = 12.6614$ (0.0778)
Model's type		REM	REM	REM	REM	FEM	REM
(FEM) LSDV R ²	(REM) theta	0.7126	0.7408	0.7871	0.7514	0.9612	0.6729
(FEM) within R ²	(REM) corr(y.yhat) ²	0.9476	0.8938	0.8710	0.8960	0.9009	0.9334
Variables in model							
const		-0.105781 (0.6694)	-0.897052 (0.0718)*	-5.003070 (0.0000)***	-1.750070 (0.1886)	-6.660050 (0.0263)**	-107.77000 (0.0000)***
X01 – Total utilised agricultural area		0.056522 (0.0001)*** [1.934]		0.047421 (0.0003)*** [1.076]	0.020078 (0.0363)** [1.655]	0.037118 (0.0000)*** [4.1919]	
X04 – Total output crops and crop production		0.394979 (0.0000)*** [4.461]	0.214592 (0.0000)*** [1.290]	0.235930 (0.0000)*** [1.228]	0.273229 (0.0000)*** [2.018]	0.409354 (0.0000)*** [5.609]	0.249140 (0.0000)*** [4.662]
X05 – Total output livestock and livestock products		0.653605 (0.0000)*** [2.245]	0.143545 (0.0000)*** [2.568]	0.239659 (0.0000)*** [1.871]	0.229103 (0.0000)*** [2.281]	0.359042 (0.0000)*** [3.944]	0.292166 (0.0000)*** [5.515]
X07 – Total inputs		-0.498078 (0.0000)*** [1.522]	-0.198257 (0.0000)*** [2.736]	-0.228355 (0.0000)*** [1.737]	-0.292394 (0.0000)*** [2.062]	-0.375233 (0.0000)*** [5.116]	-0.260336 (0.0000)*** [9.326]
X15 – Net investment		0.086705 (0.0000)*** [1.171]	0.162161 (0.0000)*** [1.284]		0.109576 (0.0000)*** [1.370]	0.143888 (0.0000)*** [1.521]	0.143658 (0.0005)*** [1.708]
X16 – Cash flow		0.677099 (0.0000)*** [2.919]	0.849730 (0.0000)*** [1.296]	0.822875 (0.0000)*** [1.194]	0.789176 (0.0000)*** [1.418]	0.651911 (0.0000)*** [1.710]	1.011470 (0.0000)*** [1.294]

The levels of significance in round brackets. The value of VIF test in square brackets.

Source: own calculations.

The influence of independent variables on a family farm income is the strongest among the smallest farms. In this class of farms, the highest impact on the family income is exerted by the type of production and the amount of costs, and the lowest – by net investments. However, in the group of very large farms, the importance of the type of production is lower than the cash flow, and the area is irrelevant (Table 3). Therefore, obtained results allow to reject the hypothesis of research, according to which determinants affecting income were vary depending on the economic size of the farm.

CONCLUSIONS

Family farm income is a remuneration to work, land and capital of the farm and remuneration to the entrepreneurs' risks. The larger the economic size of the farm, the higher are the values of farms' income and area, output, assets, liabilities, etc.

On the basis of panel models, the article presents the family farm incomes and their economic and production determinants, such as: agricultural area, crop and livestock output, inputs, net investment and cash flow. The preliminary hypothesis of research, that determinants affecting income were vary depending on the economic size of the farm, may be rejected. Instead, one can observe that incomes in very small farms are highly dependent on the values statistically significant independent variables, and in very large farms the cash flow is the most important determinant of the income level.

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ROLE OF POULTRY INDUSTRY IN PUBLIC FOOD SUPPLY

Alesia Efremova, Msc, PhD student¹

Graduate School of Public Administration (GSPA), Lomonosov Moscow State University

ABSTRACT

Within the framework of implementation of overarching national tasks, special attention is paid to the food production and the matter of keeping up with the consumer demand for quality food, which is of national significance. The poultry industry is able to make its fairly considerable contribution into solving the problems of the consumer demand for valuable healthy food products; and to create conditions for the national food security owing to this industry economic growth based on its production potential development and strengthening. The domestic and foreign practice clearly demonstrates that it is possible to provide the population with quality food within a relatively short term, primarily due to the increase of egg and poultry meat production. The poultry industry is not only the most dynamic and fast-growing branch of the livestock farming, but also it has the most intensive production methods. The aim of this article is to determine the influence and the role of the poultry industry on providing the population with food supplies in present-day conditions in the world.

Keywords: livestock, poultry industry, poultry meat, egg, food supplies

JEL code: Q13

INTRODUCTION

The dynamic development of the humankind sets rather complicated tasks. One of them is how to solve an issue of providing the world population with food supplies, in particular, with foods of animal origin. It is a global problem, which requires considering a combination of different overlapping factors – demographic, economic, social, political, technological ones.

Within the past few decades, we can observe the growth of the livestock production. This growth both in developed and developing countries is due to the increase in the poultry production where modern intensive production methods, achievements in genetics, disease control and biological safety precautions

strengthening take place; as well as due to the growth of population and urbanization.

The poultry industry and poultry processing industry are very efficient branches of economy that provide the population with valuable meat and eggs. The poultry products contain protein and micronutrients, such as B vitamins, iron and zinc, which make an important contribution to the health and nutrition of consumers. The share of poultry products in the total volume of animal protein is more than 40%.

THEORETICAL AND METHODOLOGICAL BACKGROUND

Theoretical and methodological background to the research is works of domestic and foreign academic

¹ Corresponding author: Leninskie Gory 1, building 61, Moscow, Russia, alesya-efremova@yandex.ru, +7(903) 022 17 78

economists on the most topical issues and trends of the poultry industry development in Russia as well as on key directions of government control of the industry in Russia and countries abroad.

In tackling certain tasks and reasoning the fundamental concepts of the research, abstract logical and graphical methods have been used. Several practical proposals have been elaborated using statistical methods of processing economic data on totality of coverage and SWOT analysis.

RESULTS AND DISCUSSION

The poultry industry is specialized, large-scaled and dynamically developing. It includes a set of interrelated organizational, economic and social units.

In the world food culture, a tendency has already been formed to understand that poultry meat, eggs and products of their processing are one of the cheapest sources of high-grade protein (FAO, 2013). Especially, it refers to the protein of chicken eggs which is taken as a standard of nutrition and biological value.

In many countries, the poultry industry is the only livestock sector that has managed to be successfully adapted to the market economy conditions. The governments of many developed countries strongly supported the industry during this period (Dankvert, 2002). The growth of the poultry meat and egg production was ensured not only by the increase in poultry population, but also by the transfer of the industry to an intensive industrial basis.

FAO experts reasonably believe that the poultry meat will be the main product of the planet. This meat consumption growth will occur in key regions of the world; and within 8–10 years it will make 40% (Semin, 2014).

The poultry meat market includes the following kinds of meat: chicken, turkey, waterfowl meat, guinea fowl meat, quail and other poultry meat.

The most common and the cheapest type is broiler chicken meat, the production of which makes up more than 82% in the world. The competitive advantage of the broiler chicken production is the fact that it is the most effective 'converter' of fodder protein into meat protein.

The production of turkey is growing, mainly in Europe and North America, as well as the production of duck meat in China.

World meat consumption, according to OECD and FAO projections is expected to average 34.4 kg by 2020, an increase of 0.9 kg compared with 2010. Poultry meat consumption is 13.9 kg.

Increases in poultry consumption are primarily linked to four key factors namely population growth, improvements in incomes, chicken prices relative to those for competitive meats and dietary preferences.

For many millennia, the leading types of meat in the human diet were beef and lamb. But in a short period of time there happened something which had seemed impossible before. The demand for meat in economically developed countries grows; beef as the main food has given the way to pork and poultry meat. Changes in the structure of all types of meat production affected the development of grain industry and its structure.

Currently, there is clearly a tendency to replace beef, pork, lamb meat with poultry meat. In the world structure, the production of poultry meat is slightly inferior to pork production and is ranked second (FAO, 2015). Nevertheless, the dynamics of recent years indicates a high rate of growth of the poultry meat production and its further rising in the world structure of production of all types of meat.

The world production of meat is steadily growing: as of from 1990 to 2017, it has increased by 83% (Table 1), including beef production – by 30%, pork meat production – by 63% (FAO, 2015). During this period, the poultry meat production has demonstrated the most intensive increase – it has tripled (OECD/FAO, 2015).

In 2017, as compared to 2010, the poultry meat production has increased by 17% and made up 118.1 million tonnes (Table 2). The production increase is mainly due to its growth in four countries (the USA, China, Brazil, and Russia); it makes about 50% of the world's total poultry production or 59.3 million tonnes (OECD/FAO, 2018). The increase in production in the above-mentioned countries is due to the steady growth of domestic demand in China, as well as the development of export in the USA, Brazil and Russia. Moreover, the increase in production in China

Table 1. Structure of world production of main types of meat in dynamics (%)

Specification	1990	2000	2010	2015	2017	2020*
Poultry	23.0	30.0	34.8	37.3	36.8	37.0
Pork	39.0	37.0	37.8	37.3	36.8	36.6
Beef	30.0	25.6	22.8	21.7	21.8	21.7

* Forecasts.

Source: FAO (2018).

Table 2. Poultry meat production in the world (million tonnes of slaughter weight)

Specification	1990	2000	2010	2015	2017	2020*
World	41.0	68.5	101.0	114.3	118.1	122.5
USA	10.8	16.2	19.3	20.5	21.3	21.7
China	3.7	11.9	16.6	18.4	19.2	20.2
Brazil	2.4	6.1	12.6	13.5	14.0	14.4
Russia	1.8	0.8	2.8	4.5	4.9	5.5

* Forecasts.

Source: FAO (2018).

and Brazil is also due to the fact that these countries have huge reserves of important components for the poultry industry development — corn and soybean (Fisinin, 2016).

According to OECD forecast, in 2020, the world production of poultry meat will be 122.5 million tonnes (OECD/FAO, 2018). Starting from 2017, the annual increase will make up 1.3%. Experts believe that the increase in production will take place due to the intensive development of the industry in China and Brazil (5 and 3% respectively).

The USA remains to be the world's largest producer of poultry meat; its share in the world's total production is about 18%. Such leadership will be kept in future, but rather volatile dynamics should be noted.

Over a ten-year period, the share of Russia in the world production of poultry meat has changed: from 2.8% in 2010 up to 4.5% in 2020. This has become possible due to a set of measures taken by the government to stabilize the poultry production and create a basis for the dynamic development of the industry. A key event in the development of the poultry industry

in Russia was the priority national project Development of the AIC (2006–2007). The State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Foodstuffs Market for 2008–2012 also enabled to significantly improve the poultry industry and reach the threshold of food security for poultry meat in 2011 (87%).

Beside the poultry production, the poultry industry includes the production of eggs. A chicken egg is natural and valuable food.

Over the past few years, the production of eggs in the world has reached new milestones. The world production of eggs increases by 2–3% yearly. According to the latest data, in 2017, 1,526.9 million of eggs were produced in the world, which is by 18% more compared to 2010 (FAO, 2018). This growth became possible mainly due to the development of poultry industry in developing countries (Table 3).

The volume of the world production will increase with the same growth rates. According to forecasts, by 2020 egg production will grow by 7% and will make up 1,626.7 million pcs. Asian countries are leading in production of eggs with a large margin. The largest

Table 3. Egg production in the world (billion pcs)

Specification	1990	2000	2010	2015	2017	2020*
World	682.5	1 019.6	1 288.6	1 441.8	1 526.9	1 626.7
China	156.1	429.0	533.4	579.1	625.5	659.2
USA	68.1	84.7	91.8	97.2	104.7	113.5
India	21.1	36.6	61.4	78.5	87.3	101.6
Mexico	20.2	35.6	47.6	53.1	56.0	61.0
Brazil	25.0	31.2	41.7	49.8	50.8	56.3
Russia	47.5	35.3	40.6	42.6	44.5	47.7

* Forecasts.

Source: FAO (2018) and Russian Poultry Union.

producer of eggs in both Asia and the world is China, whose production amounts to 625.5 million pcs (it is 41% of the world total production), which is due to large-scale investments in the industry (FAO, 2018). It is worth noting that almost all the products are consumed by the domestic market, only less than 0.3% of the total volume is exported.

The world's second biggest producer of eggs is the USA, whose annual production output is six times less than in China. Nevertheless, the United States is steadily increasing its production volumes at an average rate of 2% per year (FAO, 2018).

There is a significant increase in production in Mexico, which has grown by 18% since 2010. However, according to FAO, in 2012, compared to 2011 there was a decline in production caused by outbreak of highly pathogenic avian influenza. It became possible to restore the previous production volumes as early as in 2013.

During 5 years, top ten world producers of eggs have increased production volumes by 20%. Their share in the world production has grown from 70% in 2010 to 71.6% in 2017. This was mainly due to a significant increase in egg production in China, as well as in the USA, India, Mexico and Brazil (FAO, 2018). It is predictable that the world's three largest egg producers will continue to provide more than half of the world's egg production in the coming years. The share of Russia in the world production is 2.8%, it is ranked the sixth.

The predictable increase in life expectancy in Asian countries will increase the demand for eggs and egg products.

According to experts, the production of eggs and egg products can play an important role in providing the world's population with valuable protein foods. Moreover, there is a growing demand for a wide variety of egg products to meet the demand and significantly save labour costs. The increase in demand for convenient food has led to increased sales and transportation of eggs in a liquid and a dried form, which meets the demands on the part of food industry entrepreneurs and provides greater opportunities for disease prevention and hygiene compliance (USDA AMS, 2017). Pasteurization, daily quality control of products, ensuring compliance with market criteria enable to obtain a safer and more convenient product than just eggs in the shell.

Furthermore, production of egg products with improved functional properties, including their binding ability of whipping, nutritional qualities, is predicted. This will lead to the further growth of the foodservice sector.

Peculiarities of the poultry industry, its intensive development and increased demand for poultry products allowed the countries to actively develop the exports. In 2017, compared to 2010, the export of the poultry meat has increased by 18% and amounted to 12.4 million tonnes (ITC, 2018).

Brazil, the world's largest poultry exporter, has supplied 4.4 million tonnes (35.7% of total poultry

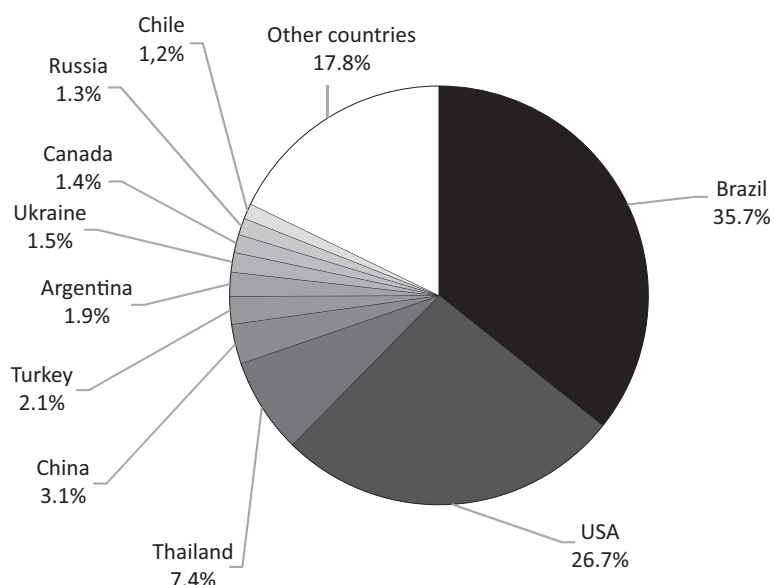


Figure 1. Structure of poultry meat exports by countries in 2017

Source: OECD/FAO (2018), ITC (2018).

exports) (ITC, 2018). The significant growth of the poultry meat exports in Brazil is mainly due to the growth of the world's demand for Brazilian meat, especially in connection with avian influenza in a number of countries. The poultry industry in Brazil features low feed prices due to bumper crop of corn and more stable raw material prices. The bumper corn and soybeans crops significantly reduced feed costs in 2017, as corn and soybeans account for more than 70% of the cost price of broilers. All these factors make Brazilian poultry more competitive in the world market.

Currently, the USA is ranked second in the poultry meat exporters' rating. At the same time, in 2017, its share in the poultry meat exports declined due to the loss of the Russian market of 138 thousand tonnes as a result of the prohibitive measures in 2014. Brazil occupied some part of this vacated market. Moreover, the United States lost another two important consumers of American chicken meat – China and South Korea because of the detected strain of avian influenza H5N8.

In total, Brazil and the United States occupy 62.4% of the world poultry meat market. Nevertheless, the share of each country in the structure of the world exports declines.

The trade may be affected by the emergence of new players in the market. For example, Thailand is gradually restoring its export opportunities after a significant decline caused by avian influenza.

Russia's share in the export of poultry meat is still insignificant. However, Russia has every opportunity to develop this business line. Russia has been increasing production volumes for several decades, and by 2020 it may increase exports to 360,000 tonnes, which will enlarge the share of Russia in the world exports to 2.7% (Karlsson, 2014).

The world trade in edible eggs has been developing rapidly since the 2000s. In 2017, about 33.1 million pcs of edible eggs were exported, which is 2.7% more than it was in 2016. (ITC, 2018). The main exporters of edible eggs are the countries of Europe (more than 65% of world exports) and Asia (about 25%).

The largest exporter of edible eggs is the Netherlands. In 2017, the country exported 7,585 million pcs of the edible egg worth USD 556.7 million, which is 7% more than it was in 2016. (ITC, 2018). It is expected that the Netherlands will keep the first position in export of edible eggs in 2020, increasing it by 23% to 9,319 million pcs. The Netherlands mainly supplies to Germany (75% of the total export of

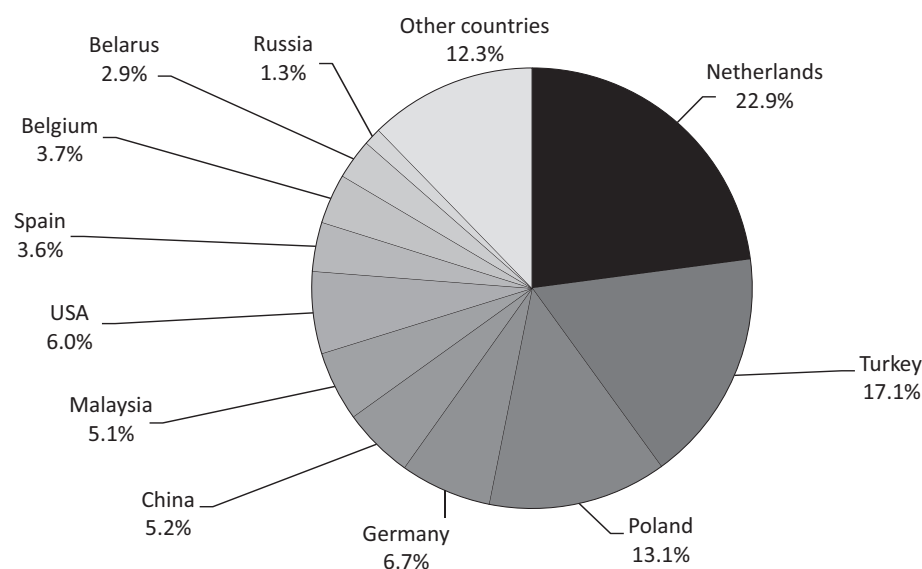


Figure 2. Structure of exports of edible eggs by countries in 2017

Source: OECD/FAO (2018), ITC (2018).

edible eggs from the Netherlands), Belgium (10%), and Switzerland (4.5%).

Malaysia also plays a significant role in the trade in the East Asia. The production of eggs and egg products is growing rapidly in Malaysia, which makes this industry one of the leading agricultural industries in the country and allows for active export of edible eggs. In 2017, Malaysia exported 1,163 million pcs of eggs worth USD 110.9 million (ITC, 2018). The largest importer of eggs from Malaysia is Singapore, where about 1,439 million pcs were exported. (85% of Malaysia's total egg exports).

The largest exporter of edible eggs to the countries of the Middle East and the second exporter in the world is Turkey, which delivered to the market 5,663 million pcs of edible eggs worth USD 248.1 million in 2017. Main supplies are made to Iraq (87% of Turkey's total egg exports), Syria (5%), UAE (3%), and Saudi Arabia (1.5%).

During recent years, the share of Russia in the world export of edible eggs has grown and amounted to 1.3%. According to the Federal Customs Service of the Russian Federation, in 2017, Russia export-

ed 423 million pcs of edible eggs, which is almost 2 times more than in 2016 (+198 million pcs)². Nevertheless, the geography of supplies is still limited: Ukraine (28%), Mongolia (28%), and Tajikistan (20%). However, currently, Russia is actively developing its exports to the countries of the Middle East; and since 2017 has been supplying edible eggs to the UAE (12% of the total Russian export of edible eggs) due to significantly low price and high quality.

In the immediate future, the demand for poultry products will continue to increase, primarily in developing countries (China, India), which is caused by the growth of population, customers' incomes and consumer preferences in these countries. This will be an incentive for increasing exports.

Success in the poultry industry is a fundamentally new and to some extent an unexpected trend in the world and domestic agriculture. It can be called a 'poultry-farming revolution', which has embraced and continues to encompass the whole world and which is characteristic not only for developed, but also for developing countries.

² Federal Customs Service of Russia website <http://stat.customs.ru/apex/f?p=201:2:3937097560654130::NO> [Accessed 05.04.2018].

The key aspects of the world poultry industry development were the use of the achievements of scientific and technological progress of the 20th century in the field of genetics, nutritional science, veterinary science, technology of stock-keeping, etc.

Besides, in many economically developed countries, the government played an important role, it developed and implemented the state policy to support poultry producers, including locating production sites taking into account natural and climatic conditions and social & economic development.

Moreover, some countries (North America, Europe) changed the structure of the land use and crops cultivation in favour of forage crops of intensive type; created large fodder bases with significant investments, material and labour resources.

Many countries still continue to direct huge financial resources to increase the production capacity of feed manufacturers for the industry, install processing equipment and conduct training for workers at farms.

The poultry products can reasonably be called consumer goods, which is confirmed both by retail prices and data on the availability of these products to various strata of population.

Compared to other agricultural branches, such a rapid development of the poultry industry is also ensured by its beneficial peculiarities, as follows:

- the ability to increase the output of production within a few months after investing in it, i.e. the rapid industry payback, including a quick return on feed (it is required to spend twice as much of fodder grain per 1 kg of pig's weight gain compared to per 1 kg of poultry weight gain, and the feeding of cattle livestock is even more expensive) (Kelemetov, 2009).
- less dependence on natural environment and climatic conditions;
- relatively low retail and consumer prices for poultry meat as compared to pork and beef meat prices. This is due to lower costs of resources (labour, financial);
- industrial type of production, R&D and dynamics intensity of the industry sector;
- wide range of products made of poultry and eggs, which became possible due to the high technical,

technological and organizational level of production;

- healthy properties of poultry meat;
- absence of religious and cultural restrictions among the population in terms of consumption of poultry meat and eggs;
- less harmful impact on the environment in comparison with other livestock husbandry, and utilization of less amount of water.

CONCLUSIONS

Agriculture and food industry aim at providing population with high-quality food products, which is one of the government's tasks. Poultry industry is able to contribute to meeting population's needs in nutritious and healthy foods at the same time helping to increase food security through the development and strengthening of the industry's production capacity. Poultry industry is one of the few very specialized branches of agro industrial complex that was created as a complex integrated system providing all processes from poultry reproduction to selling the final products: meat, eggs, etc. The choice of poultry industry development direction takes into consideration international tendencies, scientific achievements and advanced experience. The important factor providing the branch's industrialization is its early maturity and short payback period of investments. It is hard to imagine what the current balance of meat, the world market and the quality of nutrition of the world population, in general, could be, if in the past half a century there had not been such an unprecedented growth of the poultry meat and egg production. The development trends of the poultry industry in Russia and abroad pose challenges to the government in terms of changing the industry development course from imports to exports.

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UNFAIR INFORMATION PRACTICES RELATED TO MEAT AND MEAT PRODUCTS IN POLAND

Aleksandra Kowalska, PhD¹

Faculty of Economics, Maria Curie-Skłodowska University

ABSTRACT

The aim of this paper was to recognize the scale and types of the food adulteration practices associated with meat and meat products from Poland. The vulnerability of food supply chains to fraud/adulteration is growing as a result of globalisation, which is expanding the scope and scale of the incidence of food fraud/adulteration. Both the intentional and unintentional adulteration of food can lead to a public health threat, and cause severe economic consequences. Meat and meat products are the most common targets for adulteration in Poland and the EU. Since meat and meat products hold a key position in food production and consumption in Poland, it is in both the industry's and government's interests to eliminate adulteration in the meat supply chain. The methodological approach was to first review the literature to define and outline the challenge of food adulteration, and then to build a database on the basis of IJHARS decisions regarding adulterated meat and meat products, and to analyse them in detail. An analysis of the data revealed that most cases infringed Article 7.1(a) of Regulation (EU) 1169/2011 on the provision of food information to consumers concerning fair information practices.

Keywords: food adulteration, mislabelling, meat and meat products

JEL codes: D40, E23, F19, F69, M21, L66

INTRODUCTION

Even though fraudulent food has been around for thousands of years, only within the last 200 years, during the industrial revolution and the rise of the 'anonymous consumer' concept, has a real explosion of this phenomenon occurred (Kowalczyk, 2015). The vulnerability of food supply chains to fraud/adulteration is growing as a result of globalisation, long food supply chains, the growing anonymity of the food market, market pressure to reduce food prices, incoherent food laws within countries, ineffective

sanctions imposed, the ineffective actions of food control institutions, and so on (Spink and Moyer, 2011; Kowalczyk, 2015; Marvin et al., 2016). As long as food fraud/adulteration is profitable to perpetrators, consumers, trade competitors and authorities will continue to tackle this problem. Furthermore, globalisation is extending the scope and scale of food fraud occurrences (Spink et al., 2017). Food fraud can lead to a public health threat and pose potentially catastrophic economic impacts. The goal is not to catch food fraud but to prevent it (Moyer, DeVries and Spink, 2017). Spink and Moyer (2011) claim that

¹ Corresponding author: pl. Marii Curie-Skłodowskiej 5, 20-031 Lublin, Poland, aleksandra.kowalska@umcs.lublin.pl, +4850 594 40 06

although it is governments' responsibility to lay down clear legal conditions, it is the responsibility of the industry to mitigate food fraud risks. However, such measures are not yet widely being adopted in food safety management systems (Silvis et al., 2017).

EU food law is not defining food fraud and/or adulteration, but is certainly covering the problem. Protecting consumers' health and life, and their economic interests, are major concerns of this law (Korzycka and Wojciechowski, 2017). Article 8.1 of Regulation (EC) 178/2002, in laying down the general principles and requirements of food law [...] states that food law shall aim... at the prevention of fraudulent or deceptive practices, the adulteration of food, and any other practices which may mislead the consumer. Article 9.1(b) of Regulation (EU) 2017/625 on official controls and other official activities, established to ensure the application of food and feed law [...] states that competent authorities shall perform official controls on all operators regularly, on a risk basis, and with the appropriate frequency, taking account of [...] any information indicating the likelihood that consumers might be misled, in particular as to the nature, identity, properties, composition, quantity, durability, country of origin or place of provenance, or method of manufacture/production, of food. Regulation (EU) 1169/2011 on the provision of food information to consumers provides a basis for consumers to make informed choices and to make safe use of food. Article 7.1(a) of Regulation 1169/2011 on fair information practices states that food information shall not be misleading, particularly as to the characteristics of the food, and, in particular, as to its nature, identity, properties, composition, quantity, durability, and so on.

THEORETICAL BACKGROUND

The European Commission has developed four key operative criteria to distinguish whether a case listed in the EU Food Fraud Network and the System for Administrative Assistance & Food Fraud (EU FFN & SAAFF) should be considered as food fraud, or another form of non-compliance, namely (1) the violation of EU law, (2) the intention, (3) economic gain, (4) the deception of customers (European Com-

mission, 2016). Food fraud includes the subcategory of economically motivated adulteration (EMA), i.e. deception for economic gain using food products, ingredients or packaging, including activities such as substitution, unapproved additions or enhancements, misbranding or misrepresentation, tampering, counterfeiting, using stolen goods, and others (Spink and Moyer, 2011; Manning and Soon, 2014; Manning, 2016). The U.S. Food and Drug Administration (FDA) defines EMA as the fraudulent, intentional substitution or addition of a substance in a product for the purpose of increasing the apparent value of the product or reducing the cost of its production, i.e. for economic gain (Spink and Moyer 2011).

The definitions of adulterated foodstuffs in Poland are not in step with other definitions, in which intent is an inherent aspect of adulteration. The Polish legislator concentrates on mislabelling, particularly regarding product composition. Both intentional and unintentional actions are considered as adulteration (Supreme Administrative Court, 2013). Under Article 3 of the Act on Safety of Food and Nutrition (2006) (Food and Nutrition Safety Act, hereinafter: FNSA), adulterated foodstuff is determined as a foodstuff whose composition or other properties have been changed without informing the consumer, or a foodstuff altered in order to conceal its intrinsic composition or other properties, and affecting its safety. Under Article 3 of the Act on the Commercial Quality of Agricultural and Food Products (2000) (hereinafter: ACQAFP), an adulterated agricultural and food product is described as a product whose composition does not comply with the provisions of regulations regarding the commercial quality of individual foodstuffs, or a product altered (including mislabelling) in order to conceal its intrinsic composition or other properties, as long as the non-compliances violate consumer interests. An operator which produces, packs and/or places adulterated food on the market, carries legal liability for the action. FNSA has introduced legal sanctions imposed for adulteration which harms consumers' health and life, and ACQAFP has introduced sanctions imposed due to the infringement of consumers' economic interests. Thus, two separate procedures might be opened in the case of one adulterated food product (Voivodship Administrative Court, 2010).

Meat-derived products are the most common targets for adulteration in Poland and the EU. The 2016 annual report of the EU FFN & SAAFF shows that the most food fraud cases listed in the system concern meat and meat products, including poultry (26.7% of all 176 food fraud cases identified) (Kowalska, 2017). An analysis of the 427 IJHARS (Main Agricultural and Food Products Quality Inspection, Poland) administrative decisions regarding adulterated agri-food products from 2013–2017 show that the most irregularities occurred in meat and meat products (32% of the decisions), flour, cereal and bakery products (19%), and delicatessen products (11%)². Meat and meat products are important staple foods in the EU. These products hold a key position in food consumption in Poland, as the average yearly per-capita consumption of meat and meat products is fifth, after the consumption of milk and milk products, vegetables, cereals and bakery products, and potatoes (GUS, 2017). Moreover, the consumption of meat-derived products has been systematically growing (it has increased from 2005 to 2016 by 8.9%) (GUS, 2017). A study by Kosicka-Gębska et al. (2017), based on a nationwide online survey conducted in 2015 on a sample of 1,000 Polish consumers, showed that over 40% of respondents ate meat several times a week, and 34% consumed it every day. Rising wealth is causing the growth of meat products' consumption in both developing and highly developed countries. This is unjustifiable while the overconsumption of meat leads to many health problems, e.g. cardiovascular disease, diabetes, overweight and obesity (Chechel-ski, Kwasek and Mroczek, 2016).

Meat production is one of the most important agricultural sectors in the EU, with four major meat-product categories – pigs, poultry, bovine, sheep and goat meat being produced, consumed and traded (Janiuk, Jarosiński and Ribberink, 2015). Animal production – covering the output of animals and animal products – accounts for about 43% of the total EU-28 agricultural output (Eurostat, 2015) and 36% of the total Polish agricultural output (98% of it can be attributed to bovine, pig and poultry meat) (GUS, 2016; Stańko and Mięka, 2016). Pork and poultry dominate

meat consumption in Poland. Poland is a net importer of pig meat, but a net exporter of bovine meat and poultry meat (around 80% of domestic production of these types of meat is exported) (Stańko and Mięka, 2016).

Recently, the European Common Agricultural Policy (CAP) has been modified so as to stimulate the production of qualitative, nutritious, and affordable meat, i.a. through the 'greening' of agricultural systems (Eurostat, 2015). The EU is one of the leading meat producers worldwide, accounting for more than 16% of the total meat production, and around 15% of the meat trade worldwide. China, the US and the EU are respectively the first-, second- and third-ranking meat producers in the world economy (Pawlonka, 2017). Poland ranks among the 10 top exporters of meat in the EU (Janiuk, Jarosiński and Ribberink, 2015). The main EU producers and processors of meat are Germany, France and Spain. The Netherlands, Belgium and Italy are marked by especially high work efficiency in the meat industry. However, Ambroziak (2016) assumed in his study that the Polish meat industry reached its strongest competitive position within all the Member States (MS) in 2008–2012. Mroczek (2015) stated that the Polish meat industry, and the poultry industry in particular, made good use of the opportunity for dynamic development and expansion into foreign markets which opened in 2004. Polish meat-processing plants are quite modern across the EU, but the comparative advantages of the Polish meat industry are slowly decreasing. Mroczek (2015) proposes an increase in capacity utilisation and labour productivity, to optimise production costs, and to foster innovation and modern sales channels. Small enterprises dominate among meat-processing plants in Poland, and about 60% of livestock holdings own herds smaller than 50 animals (Gozdowski, 2017). Vertical and horizontal integration in the meat sector would help to face seasonal price fluctuations for raw meat and other emerging risks (Milan, 2017).

Meat and meat product adulteration undermines the reputation of Polish meat industry, and influences its competitive position. Although luxury-food items

² Main Agricultural and Food Products Quality Inspection website <http://www.ijhar-s.gov.pl>.

(olive oil, honey, herbs and spices) are perceived to be more likely to be targeted by fraudsters (Moore, Spink and Lipp, 2012; Silvis et al., 2017), there is potentially a greater risk of cumulative financial and personal harm from foods which are purchased more often, and in larger amounts. This forms the research rationale for why meat and meat products are the focus of this research.

MATERIALS AND METHODS

The aim of the paper was to recognize the scale and types of the food adulteration practices associated with meat and meat products from Poland. The discussion was mainly based on the analysis of data on the prevalence of food adulteration in meat and meat products (including poultry) drawn from the IJHARS site. The material comprised IJHARS administrative decisions regarding adulterated agri-food products, issued between 30.11.2015 and 30.04.2018, since IJHARS is obliged to make all the decisions public in November 2018. Decisions available as PDF documents were used to build a database in MS Excel. Such a decision contains the number and release date of the decision, the name of the adulterated product, the number of the production batch and the date of production, the batch volume, the confirmed irregularities, and the name of the business operator which produced or placed the adulterated food on the market.

The analyses were supplemented with information coming from the EU-reporting level. Since the

2017 annual report of the EU FFN & SAAFF was too general, the author requested data from the EC, Directorate General Health and Food Safety in Brussels, Belgium, regarding alleged violations involving meat and poultry, and received them in May 2018.

RESULTS AND DISCUSSION

Publicly available IJHARS administrative decisions, comprising 244 adulterated meat and meat products (including poultry) marketed by 127 operators located in all voivodships of Poland, were analysed in this study. Half the items were reported in 2016, 40% in 2017, and only 10% in 2015 and 2018. The large majority of the products were sausages ($n = 160$) (Fig. 1), including 'classic' medium minced sausages (106), snarlors (23), coarse minced sausages (18), weisswursts (7), meat sticks (5), and frankfurters (1). Ham (15) and tenderloin (6) dominated in the adulterated premium cold-meat products category ($n = 30$). Canned meat (6) was the major category in adulterated cold meat in the lower-price segment ($n = 16$). The main categories within adulterated fresh/frozen meat and offal ($n = 21$) were mincemeat (8) and chicken breast (5). Kebabs (12) were the most commonly adulterated ready-to-eat product. Not surprisingly pork-derived products were the most commonly adulterated items (Fig. 1) since the products were the most popular amongst Polish consumers (Stańko and Mikula, 2016).

95% of the IJHARS decisions regarding adulterated meat-derived products were issued under Article

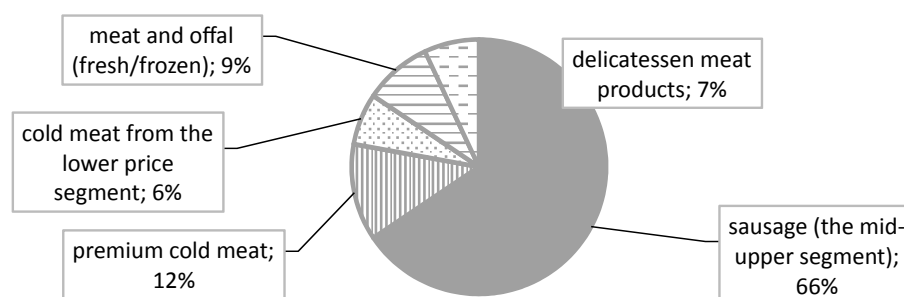


Figure 1. The categories of reported-on meat and meat products in Poland within IJHARS administrative decisions concerning adulterated agri-food items (30.11.2015–30.04.2018)

Source: own elaboration based on IJHARS data.

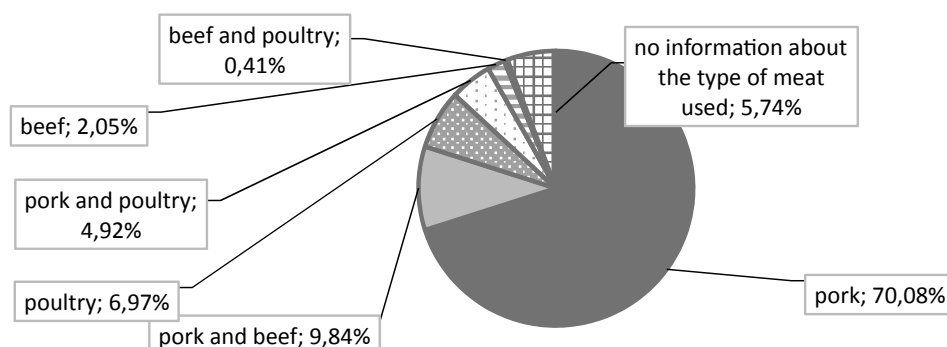


Figure 2. The structure of adulterated meat and meat products reported on by IJHARS per type of meat (30.11.2015–30.04.2018)

Source: own elaboration based on IJHARS data.

40a ACQAFP, in which financial penalties for food adulteration were established. The producers of the remaining 12 items were banned from placing food on the market, and/or were obliged to destroy or re-process it, etc. (Article 29.1 of ACQFP). The idea was to make adulteration of food unprofitable and to contribute to the state budget.

The large majority of adulterated meat and meat products (95%) were reported on due to violation of Article 7.1(a) of Regulation 1169/2011 concerning fair food-information practices and simultaneously Article 3.10 of ACQFP concerning (a) product changes designed to conceal its intrinsic composition or other properties, (b) misnomers, (c) incorrect and misleading information with regard to composition, country of origin or place of provenance, durability, net content or commercial quality class. The most common violations were:

- mislabelling: composition (197; 80.2% of all the cases) – missing items in the list of ingredients (135; 55.3%); no/incomplete information on the composition of the compound ingredient (56; 23%); the incorrect indication of the meat content (39; 16%); the declaration of ingredients not used in the production process (38; 15.6%); the incorrect indication of the added-water content (34; 13.9%); the presence of an undeclared type of meat (33; 13.5%); no/incorrect information about the type of sausage casing (22; 9%); the incorrect indication of the fat content (17; 7%); a lack of information on potential allergens (17; 7%);

misleading information about the presence of mechanically separated meat (16; 6.6%);

- mislabelling: misnomers (59; 24.2%) – incorrect/incomplete (descriptive) name of the product, e.g. the unfounded claim ‘country sausage’ (15; 6.1%);
- mislabelling: the falsification of shelf life (15; 6.1%).

The types of mislabelling have been differentiated by product. Composition is the major area of non-compliance in respect of cold meat and delicatessens. The most reported-on alleged violations for fresh meat were: (1) the product did not meet the requirements as to water content, and (2) the unauthorised extending of the life of the meat product.

The data received from the EC regarding food-fraud cases (AAC FF) and other non-compliance cases (AAC AA) exchanged in the EU FFN & SAAFF in 2017 revealed that most violations for meat, poultry and their products were associated with mislabelling (Fig. 3). It can be expected that the kinds of alleged violations would vary among different types of meat used (Fig. 3). The most reported-on AAC FF 2017 for poultry-derived products were associated with: water content, unapproved establishment/cold stores, the falsification of shelf life, and illegal trade. The most reported-on AAC FF 2017 for meat-derived products (other than poultry) were: the substitution of beef by other species/the falsification of ingredients, the falsification of equine passports/documents, mislabelling

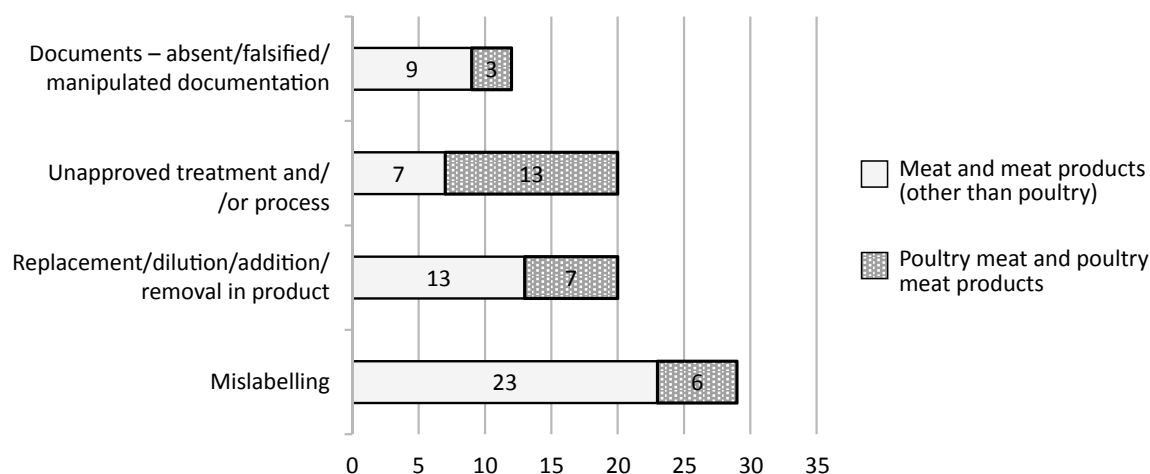


Figure 3. AAC FF and AAC AA for meat and poultry listed in 2017

Source: unpublished data received from the European Commission in May 2018.

(e.g. the indication of fat content incompatible with the meat denomination), the illegal export of pork meat (to third countries), unauthorised veterinary drugs, the unauthorised use of additives, unhygienic practices/expired consumption dates. The overall data of 2017 coming from the EU FFN & SAAFF showed that 45% of all the violations were connected with mislabelling, 28% – replacement/dilution/addition/removal in product, 18% – unapproved treatment and/or process, and 9% – documents.

The limitation of this study is that the numbers coming from the EU FFN & SAAFF are not exhaustive, as the use of the system by the MS to report non-compliances is not compulsory. There is a problem when attempting to compare non-compliances detected by IJHARS and reported to the EU FFN & SAAFF. Above all, Polish food-control institutions deal with food adulteration and the EU system deals with food fraud and other non-compliances with a cross-border impact. However, a common tendency is to consider mislabelling as the most frequent problem.

CONCLUSIONS

As Poland is one of the top producers and exporters of meat and meat products in the EU, there is further potential for marketing and exporting a variety of

Polish meat-derived products. As the food chain becomes more global, it is crucial that IJHARS remain vigilant in ensuring the safety and legality of food products, especially with regard to product labelling. In Poland, mislabelling is the most common problem when it comes to meat and meat products adulteration, and it is in line with the non-compliances reported on by the MS to the EU FFN & SAAFF. Mislabelling is in the unfair-information-practices spectrum, and impinges on the economic interests of consumers and meat-industry customers. Since all the administrative decisions regarding adulterated agri-food products have only been publicised on the IJHARS site since the end of 2015, it is hard to say whether the scale of meat and meat products adulteration has been growing in Poland. Nevertheless, globalisation is definitely expanding the scope and scale of food adulteration. As IJHARS decisions regarding adulterated food are publicised, it is probably just a question of time until the buyers of Polish meat and meat products will become aware of the problem, and the competitive advantage of the Polish meat industry will start to decline. Greater consumer knowledge about food-adulteration issues might undermine their trust in food. Rising awareness of the emerging risks should also lead to the increased use of management systems regarding food fraud/adulteration.

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AGRICULTURE MODELLING IN THE EUROPEAN UNION

**Aleksandra Rizojeva-Silava, MSc¹; Sandija Zeverte-Rivza, PhD²;
Irina Pilvere, PhD³**

Faculty of Economics and Social Development, Latvia University of Agriculture

ABSTRACT

Agriculture is an important sector of the national economy. Modelling in agriculture is extensively used to evaluate and simulate the development of this industry. There are two main purposes for the development of agricultural models: to develop a scientific understanding of a particular system and obtain information in order to justify agricultural policy decisions and predict their implications. The purpose of this study is to analyse the models used in agriculture in the European Union (EU). To reach these purposes, the following research tasks were set: (1) to analyse the theoretical aspects of simulation modelling; (2) to explore the key agricultural simulation models employed in the EU. The research found that simulation modelling is often used in agriculture by policy makers. There are eight key models of different complexity which are being used to predict the development of the agricultural sector in the EU.

Keywords: agriculture, simulation, models, system

JEL codes: C50, Q10

INTRODUCTION

Agriculture is a significant sector of the national economy, which is aimed at the acquisition of food products of plant and animal origin and/or the extraction of other raw materials for industrial purposes. Since 1962 the agricultural sector in the EU has been governed by a Common Agricultural Policy (CAP). There are two main purposes for the development of agricultural models. The first general aim is to develop a scientific understanding of a particular system. This allows for the assessment of the elements of the agricultural sector system or

the interconnectedness between individual elements and the whole system. The second general aim is to obtain information in order to justify agricultural policy decisions and predict their implications. The key advantage of these models is the presentation of reliable information (Zeverte-Rivza, Nipers and Pilvere, 2017).

The purpose of the present research is to analyse the models used in agriculture. To reach the purpose, the following research tasks were set: (1) to analyse the theoretical aspects of simulation modelling; (2) to explore the key agricultural simulation models employed in the EU.

¹ Corresponding author: Liela 2, LV-3001 Jelgava, Latvia, aleksandra.rizojeva@gmail.com, +371 267 035 31

² Corresponding author: Liela 2, LV-3001 Jelgava, Latvia, sandija.rivza@llu.lv, +371 263 872 78

³ Corresponding author: Liela 2, LV-3001 Jelgava, Latvia, irina.pilvere@llu.lv, +371 292 178 51

THEORETICAL BACKGROUND

Simulations are very important because they are able to prevent catastrophic failures in the system. A simulation model is developed to study the functioning of a system (Sharma, 2015).

The system dynamics theory is based on testing associations between a system's behaviour and system structure. The term system is defined as a collection of components that frequently interact over time to form a unified whole. The term dynamics pertains to change over time. System dynamics provides a common communication tool connecting many academic disciplines (Martin, 1997). In agricultural economics, simulation models that forecast the functioning of separate decision-makers are usually based on mathematical programming methods (Berger, 2001). System dynamic modelling is widely used in agricultural modelling.

The type of modelling approach chosen depends on the purpose under analysis and the question of interest. For example, partial and general equilibrium models are primarily applied to evaluate trade policies or the market impact of coupled domestic cost support policies. Regarding individual types of farms, these models are used to define 'representative farms' and to represent the behaviour and characteristics of a group of farms (Happe, Balmann and Kellermann, 2004).

The general equilibrium theory represents the economy as a selection of economic agents making

delivery and demand decisions over goods, labour types and assets, in order to further interests (Bryant, 2010). These kinds of models are used extensively in policy analysis. Such models have been developed for countries and are suitable in many settings, ranging from the world to disaggregated regions within a country (Lofgren, Harris and Robinson 2002).

Partial equilibrium models represent particular sub-sectors or groups of agricultural sectors, and are applied in the detailed analysis of both sides of an equation, namely delivery and demand or policy impact, etc. Partial equilibrium models are often based on regression analysis and are frequently used to model the agricultural sector (Kotevska, Dimitrievski and Erjavec, 2013).

The basic units of agent-based models are 'agents'. Agents can be anything from cells to biological entities, from individuals to social groups and can also be composed of other agents. (Richiardi, 2012). Agent-based models of agricultural structures enable the conduct of computer experiments that allow a better understanding of agricultural systems, structural changes and endogenous adjustment responses that arise in response to changes in politics (Happe, Balmann and Kellerman, 2004).

Hybrid models are created by combining advantages inherent in system dynamic models and agent-based models. Such models are usually generated from individual modules that include data obtained from agent-based simulations and exogenous data on the specific system (Zeverte-Rivza, 2017).

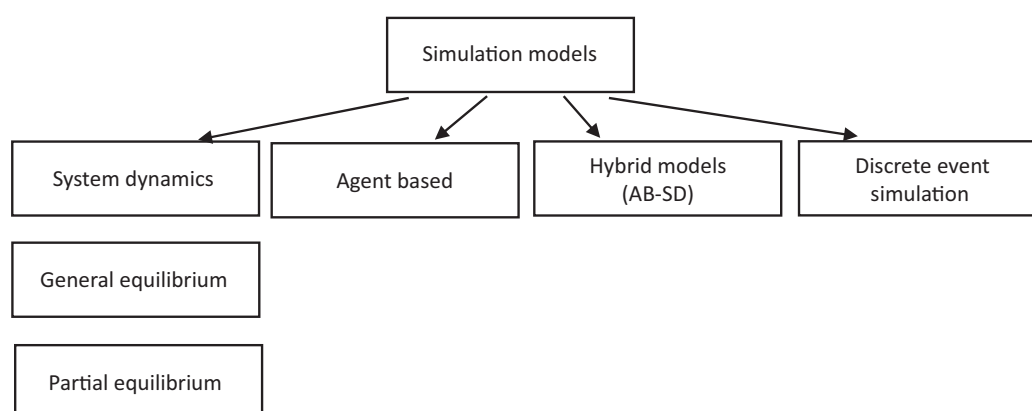


Figure 1. Classification of simulation models

Source: authors' construction based on Zeverte-Rivza, Nipers and Pilvere (2017).

MATERIALS AND METHODS

To execute the research tasks, the authors of this study used scientific literature review and methods of analysis and synthesis, namely the logical and constructive methods as well as induction and deduction analysis methods.

RESULTS AND DISCUSSION

There are several simulation models that are used for projecting the agricultural sector in the EU; authors of this study attempted to identify the most significant models and classified them according to the classification system shown in Figure 1.

General equilibrium models

GEM-E3 is a recursive dynamic calculable general equilibrium model that covers the interplay between the energy system, economy and the environment. This model represents 28 European Member States (EU Science Hub, n.d.). The objective of GEM-E3 in supporting policy analysis is the consistent assessment of distributional effects (Paroussos, Fragkos and Capros, 2016). The GEM-E3 model is widely used as a tool of policy analysis and impact assessment (European Commission, 2013). The model uses GTAP and EUROSTAT databases (EU Science Hub, n.d.).

The main objective of MAGNET is to ensure a globally applied general equilibrium modelling framework. It has been used to simulate the impacts of agricultural, trade, land, and bioenergy policies on the global economy (MAGNET, 2015). The list structure of MAGNET has been designed to make it easy to find base data, scenarios created, policies accomplished as well as outcomes and tools to analyse output (Woltjer and Kuiper, 2014).

Partial equilibrium models

Aglink is a comprehensive partial equilibrium model for global agriculture, and is used to generate projects for many OECD-FAO countries. This model is an important tool for analysis of domestic and trade poli-

cies (Aglink-Cosimo, 2015). Since its establishment, Aglink has played a significant role in the medium-term outlook activity of the OECD. It has the ability to develop alternative scenarios and is used by the OECD Secretariat and collaborating countries to develop a forward-looking policy analysis (Adenauer, 2008). In 2004, it was decided to increase the number of developing regions and countries included in the Aglink project and develop an annual medium-term forecast in cooperation with the FAO, and the new element which was appended to the model called COSIMO (Adenauer, 2008). Currently, the Aglink model is used to predict the development of the EU agricultural sector.

The AGMEMOD model is an econometric and dynamic model with which it is possible to make projections and simulations assessing agricultural support instruments, programmes and policies at an EU level and at an individual Member States level⁴. The AGMEMOD model allows certain country models to reflect diversity in agro-climatic conditions, agricultural structures and agricultural output that exists between EU Member States. Using the bottom-up approach, the purpose is to better assess heterogeneity in the EU's agricultural sector (Chantreuil, Salputra and Erjavec, 2013). AGMEMOD includes all EU Member States and individual non-EU countries, such as Turkey, Russia and the Ukraine (AGMEMOD, 2012). Currently, the AGMEMOD model is used to predict the development of the EU agricultural sector.

CAPRI is a comparative static partial equilibrium model for the agricultural sector. The CAPRI system consists of specific databases, methodology, software implementation and researchers. The main purpose of the model is to evaluate the impact of common agricultural policy instruments in the EU, its Member States and also on a transnational level (Britz and Witzke, 2014).

CAPRI is designed to evaluate the impact of policies and markets from global to regional and farm levels (Frank et al., 2014). The database includes about 50 primary agricultural and processing products in the EU, as well as regional data, from farm level to global level coefficients (Britz and Witzke

⁴ AGMEMOD website <http://www.agmemod.eu/> [Accessed 16.01.2018].

et al., 2014). Currently, the CAPRI model is used to predict the development of the EU agricultural sector.

ESIM is a multi-country model of agricultural production, use of agricultural products, and some first-stage processing activities. With ESIM, only the agricultural sector is modelled, so macroeconomic variables such as revenue or exchange rates are exogenous. ESIM is a world model and it includes all countries, though in highly varying degrees of disaggregation. In the current version of ESIM covers 25 EU Members, Belgium and Luxembourg summarized as one region, Turkey and the US as well as the Western-Balkans (Grethe and Atavia et al., 2012). Currently, the ESIM model is used to predict the development of the EU agricultural sector.

GLOBIOM-EU is a global recursive dynamic partial bottom-up model of the forest and agricultural sectors (Frank et al., 2016). Partial means that the model does not contain the whole range of economic sectors of the country or region, but specializes in the production of agricultural and forestry products, as well as the production of bioenergy. GLOBIOM is

used to analyse competition for land use between agriculture, forestry, and bioenergy (GLOBIOM model, 2012). The aim function calculates the balance of agriculture and forestry in the global market considering different activities such as land use and product processing activities (Frank et al., 2014).

Agent-based model

AgriPoliS is a model of regional agricultural structures. AgriPoliS is based on an understanding of the regional agricultural structure as a complex and developing system (Happe, Kellermann and Balmann, 2006). The aim of the model is to understand how farm structures change within a region in response to different policies, including the assessment of the influence of CAP on agricultural landscapes, biodiversity and ecosystem services (Brady, n.d.).

Each model has its own advantages, but it depends on the purpose of their use. These models allow policy makers to model different development scenarios and can be used as a tool for decision making (Table 1).

At present, CAPRI, Aglink-Cosimo, AGMEMOD and ESIM models are being used to predict the devel-

Table 1. Models comparison

Model	Type of model	Model specific	Application
GEM-E3	general equilibrium model	covers the interactions between the economy, the energy system and the environment	EU
MAGNET	general equilibrium model	models the impacts of agricultural, trade, land, and bioenergy policies on the global economy	EU
Aglink-Cosimo	partial equilibrium model	important tool for analysis of domestic and trade policies	OECD countries
CAPRI	partial equilibrium model	is designed to evaluate the impact of policies and markets from global to regional and farm levels	EU
AGMEMOD	partial equilibrium model	aims to make projections and simulations to assess agricultural support instruments, programmes and policies	EU
ESIM	partial equilibrium model	use of agricultural products, and some first-stage processing activities	25 EU Members and the rest of the world
GLOBIUM-EU	partial equilibrium model	used to analyze competition for land use between agriculture, forestry, and bioenergy	EU and 25 regions outside the EU
AgriPoliS	agent-based model	is based on an understanding of the regional agricultural structure as a complex and developing system	EU

Source: authors' construction based on Zevrte-Rivza, Nipers and Pilvere (2017).

opment of the agricultural sector in the EU (EU Agricultural Outlook, 2015). General equilibrium models (GEM-E3 and MAGNET) are comprehensive, their prevalence is globally applicable and can be adapted to analyse specific problems. Aglink-Cosimo is applied in OECD countries and allows to make medium and long-term annual agricultural forecasts by the OECD. This model is one of the most important OECD instruments for policy forecasting. The main task of the CAPRI model is to assess the impact of agricultural policy in the EU and the market, from a global to regional level, not only at an EU level but also transnationally. AGMEMOD is another model which is used to evaluate EU agricultural policy and anticipate the development of the EU agricultural sector. The ESIM model is only used to model the agricultural sector in 25 EU member states and ROW. The main objective of GLOBIOM-EU is to forecast the demand for agricultural and forestry products in 53 regions of the world (28 EU Members and 25 regions outside the EU). AgriPoliS is a model of regional agricultural structure that reflects the changing structure of agricultural sector in regions as a result of agricultural policy instruments.

CONCLUSIONS

Simulation modelling is often used in the agricultural sector by policy makers. The most popular models used for simulations are: system dynamic, agent-based, hybrid and discrete event models.

Diverse models are used in the EU for simulation of the agricultural sector. There are eight key models of different complexity used to predict the development of the agricultural sector in the EU and OECD countries. These models are used to develop an outlook for the agricultural sector and adjust policy measures of the EU and its member states to promote the most beneficial economical development of the agricultural sector.

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USE OF ICT SERVICES AT FOOD PROCESSING ENTERPRISES AND THE INFORMATION SOCIETY DEVELOPMENT

Robert Nowacki, PhD¹

Faculty of Management and Finance, University of Economics and Human Sciences

ABSTRACT

The aim of the article is to analyse the scale of use and to assess the services related to modern information and communication technologies at food processing enterprises and to identify the dependencies between the obtained indices and the features characterising the entities surveyed. The grounds for considerations are findings of the surveys with 201 managers of enterprises of this sector, differentiated in terms of size. The analysis comprised the three areas of ICT services: telecommunications services, services related to software and consultancy in the IT area, and information-related services. The results indicate a wide scope of the use of ICT services – telecommunication services are used by all the entities surveyed, those related to software and consultancy – by three quarters, while information-related services – by almost 60%. In case of all entities there are noted growing outlays on their application, justified, on the one side, by the demand, and, on the other side, by high appraisals of their quality and up-to-datedness (more than 70% of indications) as well as their impact on competitiveness of the entities using them (percentages at the level of more than 60%). It must be said that there occur quite big differences in the indices obtained, due to the features of the enterprises in question. Most often statistically significant dependencies appear in case of information-related services – they are determined by the size of enterprises and the origin of their capital. In case of the services related to software and IT consultancy, the said dependencies also concern the enterprises' size and, additionally, the range of their activities. Definitely most seldom the statistically significant dependencies occur in case of telecommunication services.

Keywords: food processing, ICT, ICT services, information society

JEL codes: D22, D83, L66, L86

INTRODUCTION

The contemporary economies to an ever growing degree depend on the development of information and communication technologies. They significantly affect the socioeconomic development, shape the social and economic trends, and the results achieved by this sector are significant for an overall economic performance (OECD, 2004). The notion of informa-

tion and communication technologies, also called information and telecommunication technologies, ICT, telematics, relates in general to the family of technologies processing, collecting, and transmitting information in the electronic form (GUS, 2010). Such an approach goes far beyond the common understanding of this notion when it is related to computer science technologies, connected with the area of computerisation and implementation of IT solutions, while it

¹ Corresponding author: Pawia 55, 01-030 Warsaw, Poland, nowacki@vizja.pl, +48 601 701 213

omits the issues of communication technologies, or connected with networks.

In the context of this study, there is adopted the definition and classification of the ICT sector based on the Statistical Classification of Economic Activities in the European Community (fr. *Nomenclature statistique des Activités économiques dans la Communauté Européenne*), NACE Rev. 2, according to which it covers the enterprises dealing with production, where the goods manufactured thereby allow for electronic processing of information and communication (including transmission and display), as well as the enterprises dealing with services, where the services provided allow for electronic processing of information and communication (GUS, 2010).

The aim of the article is to analyse the scale of use and to assess the services related to modern information and communication technologies at food processing enterprises and to identify the dependencies between the obtained indices and the features characterising the entities surveyed.

THEORETICAL BACKGROUND

The economic development is connected with continuous changes taking place in various areas of the contemporary world. One of the key processes is evolution towards the development of the information society. This term appeared in 1963, in the context of polemics of T. Umesao on the post-industrial society, initiated in 1959 by Bell (1973) and continued, i.a. by Machlup (1962), Drucker (1968, 1993), Castells (1996, 1997, 1998) as well as Toffler (1980) and his concept of the 'third wave', based on information and information and communication technology (ICT). At present, the information society is treated as a further stage after the industrial society (Nowacki, 2017).

The concept of information society had been primarily developing in Japan, then in the United States (Kluszczyński, 2001). The origin of formation of the information society in Europe goes to the year 1994, when the European Commission published the document entitled *Europe and the Global Information Society: Recommendations to the European Council*, whose author was Bangemann

(Dąbrowska, Janoś-Kresło and Wódkowski, 2009). Compliant to the document, the information society is defined as 'the society to which specific is preparedness and ability to use IT systems and to make use of telecommunication services for the purposes of information transmission and distant processing' (GUS, 2010). In Poland, for the purposes of *Strategia rozwoju społeczeństwa informacyjnego do roku 2013* [The Strategy of Development of Information Society up to the year 2013] (MSWiA, 2008), it is defined as such where 'information processing with the use of information and communication technologies is a considerable social, economic and cultural value'. In turn, according to Goban-Klas and Sienkiewicz (1999), this is 'the society which not only has developed means of information processing and communicating, but information processing is the basis for creation of national income and provides the sources of income of the majority of the society'. A similar definition is proposed by Kisielnicki (2008): 'this is such a society which has an access and can make use of IT infrastructure, information resources and knowledge for accomplishment of collective and individual aims in an efficient and economical way'. The two latter definitions emphasise the economic function fulfilled by the information society. In turn, Olszewski (2013) pays attention to the technological aspect, describing the information society as a 'new type (...), who has formed up in the countries where the development of modern information technologies has reached a very fast rate'.

The level of development of the information society is decided by the three groups of indicators: those related to the sectors of ICT production and services, those connected with the use of ICT at enterprises, and those related to the use of ICT in households. From the point of view of this study, of the key importance are the two first groups of indicators. According to the CSO's data, in 2016, in Poland, there operated 2278 entities dealing with ICT production and services, which employed in aggregate 227,356 individuals and gained revenues at the level of 5.1% of total revenues of the sector of manufacturing and service businesses. Looking through the prism of the use of ICT at enterprises, the data for the year 2017

show that 95.6% of them are equipped with computers, 94.8% have an access to the Internet, of which 95.1% – the broad-band access. 45.6% of employees use computers and 39.7% – computers with the access to the Internet (GUS, 2017).

MATERIALS AND METHODS

The grounds for considerations in this article are findings of the research carried out on a national sample of 201 enterprises operating in the sphere of food processing. The sampling was performed by the method of stratified quota sampling taking into consideration the three basic stratification criteria: the sector of activity, the size measured with the number of employees, and the headquarters location (Kuczevska and Nowacki, 2016). To describe the population surveyed there were used the three variables connected with the size, scope of activity, and capital origin (Table 1).

The research was carried out by the method of face-to-face interviews with managers of enterprises, based on an author's questionnaire with the questions related to various aspects of functioning in the market, including the use of services connected with ICT. The analysis covered the three categories of such services: telecommunication services,

the services connected with software (increasing, creating, delivering, and documenting the software produced to the order, writing commissioned programmes, designing websites) and consultancy in the IT area (planning and designing the computer systems that combine hardware, software and communication technologies, including training for users) as well as services in the information area (covering data processing, website management, operation of Internet portals, and operation of information agencies).

The analysis of findings was carried out with the use of the statistical package IBM SPSS Statistics 24.0, with the use of descriptive statistics and correlation coefficients between variables (nonparametric Mann–Whitney U test in case of independent variables, comprising two independent groups, and the Kruskal–Wallis test in case of independent variables comprising more than two independent groups) and their power (Cramer's V test in case of ascertainment of the statistically significant correlation). The analysis covered the use of ICT services and their multi-aspect evaluation together with correlations between these issues and the three features describing the enterprises in question: the volume measured by the number of employees, the scope of activity, and capital origin.

Table 1. Structure of the sample of enterprises related to food processing

Features of the surveyed enterprises		<i>N</i>	%
×	Total	201	100.0
Enterprise size	from 10 to 49 employees	32	15.9
	from 50 to 249 employees	75	37.3
	250 and more employees	94	46.8
Range of operations	local	14	7.0
	regional	29	14.4
	national	85	42.3
	international	73	36.3
Capital structure	Polish	149	74.1
	foreign / mixed	52	25.9

Source: author's own research, 2014/2015.

RESULTS AND DISCUSSION

The carried out research shows that the use of ICT services is common. Telecommunication services are used by every market entity. Lower indices of the use are specific to the services related to software and IT consultancy (74.6%) and the services related to information (59.2%) – Table 2. The characteristic phenomenon is the growing scale of the use of ICT services, measured with outlay dynamics. To the highest degree it concerns services related to information and services related to software and IT consultancy. Over the two years preceding the research there was noted the growth of spending on these services at 47.0 and 45.3%, respectively, of the enterprises surveyed (with less than 5% of those indicating reduction in spending). The lower dynamics is specific to telecommunication services – the growth of outlays was declared by merely 31.9% of entities, while the drop – by 12.0%.

ICT services are positively evaluated from the point of view of quality. More than 80% of the surveyed indicate high and very high quality of services related to software and consultancy as well as to information. And relatively often there is indicated the statement that their value is higher than the costs incurred for this account (almost 20% of indications). Again, the worst is the case of telecommunication services for which the ratio showing their high quality drops to a little bit above 70%, with the only 12.0% ratio indicating the favourable price and quality ratio. One can also see high assessment of innovativeness and up-to-datedness of ICT services. More than three quarters of the enterprises surveyed assign them such a score, while more than 30% assess the services related to software and IT consultancy and information as very innovative and 20.9% of them such a score assign to telecommunication services. The importance of ICT services for enterprises from the food processing sector is decided, *inter alia*, by their usefulness in the process of formation of their market position. An affect thereof is impact on competitiveness. Also from this viewpoint ICT services are assessed positively. 71.1 and 70.1% of enterprises declare their high, positive impact on raising competitiveness in case of information-related services as well as those

related to software and IT consultancy, while 65.2% assess so telecommunication services.

When analysing the correlations between the responses to particular research questions and the variables characterising the enterprises surveyed, one may see – in accordance with expectations – generally positive correlations between them. The bigger are enterprises, the wider scope of their scope of activity and the higher share of foreign capital, the more positive are scores assigned to ICT services. There is only appearing the question whether the perceived tendencies are statistically significant. The application of the nonparametric Kruskal–Wallis and Mann–Whitney U tests (Table 3) shows that from among all 54 correlations analysed (6 research questions times 3 independent variables times 3 types of ICT services) the statistically significant correlation occurs in 24 cases. The level of significance p of the test of variables independence did not exceed in these cases the critical value $p = 0.05$, what means that there are no grounds for rejection of the hypothesis of correlation between variables.

Most often (14 cases) statistically significant correlations occurred in case of information-related services. They concerned all the questions in correlation with the enterprise size and their capital structure and, additionally, also correlations between assessments of innovativeness and the price and quality ratio and the businesses' range of operations. In relation to the services related to software and IT consultancy, such correlations appeared 8 times, of which five times for the variable describing the enterprise size (lack of correlations took place only in case of assessment of the price and quality ratio) and three times for the 'range of operations' variable (assessment of the degree of use of services, the price and quality ratio, and innovativeness). In case of telecommunication services, the statistically significant correlations occurred twice – this concerns the relationship between assessment of services innovativeness and the range of operations as well as assessment of the impact on competitiveness with capital structure.

However, the power of identified correlations is relatively weak. In eight cases, the calculated Cramer's V coefficient reaches value below 0.2, in fifteen, it oscillates within 0.2–0.3, and only in one case (cor-

Table 2. Use and assessment of ICT services at the enterprises surveyed

Specification	Telecommunication services (%)	Services related to software and IT consultancy (%)	Information-related services (%)
Use of ICT services	100.0	74.6	59.2
Outlays dynamics			
Outlays clearly decreased	3.0%	0.7	0.8
Outlays slightly decreased	9.0	2.0	3.4
Outlays remained at the same level	56.2	52.0	48.7
Outlays slightly increased	25.9	35.3	36.1
Outlays clearly increased	6.0	10.0	10.9
Assessment of quality			
Low quality	1.5	1.3	0.8
Average quality	25.9	13.3	11.8
High quality	50.7	54.0	57.1
Very high quality	21.9	31.3	30.3
Price and quality ratio			
Are worth much less	1.0	0.0	0.8
Are worth slightly less	14.9	10.0	10.9
Price is adequate	72.1	69.3	68.1
Are worth lightly more	8.0	15.3	16.0
Are worth much more	4.0	5.3	4.2
Innovativeness			
Not innovative at all/non-modern	1.0	0.7	1.7
Rather not very innovative/not very modern	9.0	4.0	5.0
I do not know/difficult to say	11.9	8.7	10.1
Rather innovative/modern	57.2	56.0	52.1
Very innovative/modern	20.9	30.7	31.1
Assessment of the impact on enterprise's competitiveness			
Difficult to say	5.0	8.5	11.9
To a very low degree	5.0	7.0	4.0
Rather to a low degree	24.9	14.4	12.9
Rather to a high degree	41.3	36.8	36.3
To a very high degree	23.9	33.3	34.8

Source: author's own research, 2014/2015.

Table 3. Analysis of correlations between the use and assessment of ICT services and the features of the businesses surveyed with the use of Kruskal–Wallis (for the enterprise size and range of operations) and Mann–Whitney U tests (for capital structure)

Dependent variable	Grouping variable								
	enterprise size			range of operations			capital structure		
	χ^2	sign.	Cramer's V	χ^2	sign.	Cramer's V	Z	sign.	Cramer's V
Telecommunication services									
Use	0.000	1.000	–	0.000	1.000	–	0.000	1.000	–
Outlays dynamics	1.395	0.498	0.190	6.318	0.097	0.187	–0.491	0.623	0.168
Quality	1.298	0.523	0.125	6.384	0.094	0.171	–0.294	0.769	0.057
Price and quality ratio	1.188	0.552	0.081	3.867	0.276	0.198	–0.968	0.333	0.090
Innovativeness	1.797	0.407	0.149	8.998	0.029	0.163	–0.009	0.993	0.093
Impact on competitiveness	3.188	0.203	0.191	5.115	0.164	0.149	–2.014	0.044	0.170
Services related to software and IT consultancy									
Use	7.593	0.022	0.195	8.664	0.034	0.208	–0.810	0.418	0.057
Outlays dynamics	10.412	0.005	0.215	6.099	0.107	0.188	–0.633	0.527	0.219
Quality	16.752	0.000	0.237	6.579	0.087	0.178	–1.063	0.288	0.107
Price and quality ratio	4.833	0.089	0.161	8.072	0.045	0.180	–0.392	0.695	0.077
Innovativeness	17.448	0.000	0.270	11.796	0.008	0.179	–1.161	0.246	0.154
Impact on competitiveness	10.028	0.007	0.220	7.002	0.072	0.152	–0.761	0.447	0.119
Information-related services									
Use	9.373	0.009	0.216	6.451	0.092	0.180	–2.685	0.007	0.190
Outlays dynamics	11.097	0.004	0.221	6.190	0.103	0.205	–2.858	0.004	0.332
Quality	11.278	0.004	0.205	5.351	0.148	0.170	–2.334	0.020	0.208
Price and quality ratio	8.042	0.018	0.198	8.302	0.040	0.233	–2.710	0.007	0.236
Innovativeness	15.739	0.000	0.239	10.518	0.015	0.171	–2.748	0.006	0.235
Impact on competitiveness	13.650	0.001	0.240	4.325	0.228	0.153	–2.755	0.006	0.203

Source: author's own research, 2014/2015.

relation between the dynamics of outlays on information-related services and enterprise's capital origin exceeds 0.3 reaching the value of 0.332.

CONCLUSIONS

The evolution of the contemporary world related to the development of information societies sets forth the demand to apply more and more advanced technologies. The presented research findings show that this trend is also noticed in the food processing sector. This is confirmed by the indices showing the significant importance of modern ICT services for functioning of enterprises operating in this sector. The very ICT services also deserve positive assessments – they are perceived as modern, of high quality and adequate value related to their price as well as useful from the point of view of their impact on competitiveness.

A significant phenomenon is also the relatively high differentiation of assessments depending on the features characterising the entities in question. Higher scores are primarily specific for bigger entities, with a wider scope of activity as well as those using the support of foreign capital. Based on this, we may conclude that the potential area for improving ICT services in Poland is improvement of the relationships between service providers and customers from the SME sector, connected, i.a. with creation of the offer of services better adjust to their needs and taking into account specific conditions of activity.

This category of enterprises – undoubtedly dominating in the entire economy – is characterised by a limited use of ICT services (in comparison to large business entities) on the one hand, and the greatest flexibility regarding their implementation on the other.

The role of enterprises with foreign capital also deserves our attention. With greater capital at their disposal and benefits associated with using the experience transfer red from other countries, they tend to set trends with regard to the practical application of modern technologies.

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THE FARM TYPOLOGIES AND ITS PERFORMANCE IN ALBANIA (CASE OF ELBASAN)

Maksim Meço, PhD, Associated Professor¹; **Ilir Kapaj**, PhD, Associated Professor²;
Ilir Tomorri, PhD³

Faculty of Economy and Agribusiness, Agricultural University of Tirana

ABSTRACT

The aim of this paper is to determine the farm typology in Elbasan region and orient policy maker's agriculture support scheme. Albania is divided into 12 regions and 61 municipality. Region of Elbasan is one of the intermediate ones⁴ and consists of 4 districts (district of Elbasan, Gramsh, Librazhd and Peqin). Elbasan ranked third by the availability of agricultural land in the country after Fier and Korca (72,872 ha or 10.4% of the agricultural land area at country level). Despite the size of the agricultural land area, it should be considered that a good part of it lies in hilly and mountainous part especially in Librazhd and Gramsh districts.

Besides construction and development services, there is observed a growing trend of agricultural activity especially in terms of olive and vegetables cultivation in open field and greenhouses. In this region operate about 32,439 farms. The average farm family size is 4.9 persons, while the national average farm size is 4.5 persons (MAFCP, 2012).

The farm typology was determined using nine indicators. Based on these indicators are identified the following type of cluster/typology for Elbasani district: poly-culture for market; livestock; leisure farms; fruit trees; arable crop farm; self-sufficiency. The farm performance was determined using factors productivity which reveals that farms that belong to the poly-culture for market, livestock and self-sufficient clusters are performing better than other clusters.

Keywords: Elbasani region, farm typology, farm performance

JEL code: Q10

INTRODUCTION

During the transition period, production structures as well as other indicators that characterize the agricultural sector of a country have changed significantly in Albania. Among the factors that have influenced

the orientation and decision making of farmers can be mentioned:

- Meeting the needs (it is clear that completion of consumption needs, under the conditions of subsistence farms, is one of the main motives in their decision making).

¹ Corresponding author: Rr. Pajsi Vodica, Kodër/Kamëz, Tirana, Albania, mmeco@ubt.edu.al, +355 675 463 180

² Corresponding author: Rr. Pajsi Vodica, Kodër/Kamëz, Tirana, Albania, ikapaj@ubt.edu.al, +355 684 013 722

³ Corresponding author: Rr. Pajsi Vodica, Kodër/Kamëz, Tirana, Albania, itomorri@ubt.edu.al, +355 672 017 908

⁴ OECD Classification.

- Availability of resources (farmers were engaged in production systems where needs for human resources are mainly provided by family farmers, and in crops whose products resist for a long time and have relatively low demands for purchased inputs).
- Incomes intensity (culture cultivation with high income per unit of surface as well as higher market opportunities).
- Experience and tradition (the farmers were oriented towards activities well-known by them).

The impact of these factors combined with the mentality, level of information and geographic location led to a total new orientation of Albanian farm production structures. In the first decade after the 1990s it is noticed the adoption of complex and multi-cultural production systems, characterised by a large number of agricultural crops and animals.

A part of the development barriers identified above continue to be major obstacles to farm development. Surface of agricultural land has relatively little decreased (according to the latest official statistics). It results to be 696,000 ha, because of changing its destination into non-agricultural (mainly for urban use), but an important issue remains the fallow land mainly because of emigration and urban migration. Thus, the number of farms, which have left partially or completely fallow land are estimated at 91,251 farms (MAFCP, 2014).

During the last two decades of market economy, due to the major demographic movements and displacement of population to urban areas, the number of farms with productive activity has fallen significantly. Today, the number of farms in operation is estimated to be nearly 350,654 (MAFCP, 2014). The average household size in Albania is high. This is mainly due to the living traditions where the household is composed by several families. This indicator is on national average of 4.7 household/farm, and can be considered as a development barrier. Likewise, number of farm families has remained almost unchanged in the last 10 years with an average of 1.1 families/farm.

THEORETICAL BACKGROUND

During the economic transition the agricultural sector of Albania has changed significantly. This process continues parallel with global trends of periods of relative consolidation. The diversity of farm types is increasing in terms of both their production structure and production organization. Even though the farms are still small in terms of the average size, there is an increasing tendency of fallow land, due to emigration and migration of the rural population (Boeckhout and McClements, 2010). This is mainly due to traditions, because households composed of several families use greater parts of farm land for subsistence. Region of Elbasani is part of the central statistical region, according to second level of Eurostat. Annual income per capita in 2009 according to Eurostat statistics for Elbasani Region is about 287 thousand ALL (EUR 2,053⁵), about 20% lower than the national average (LSMS, 2012). Meanwhile, the level of poverty in two mountainous districts of the region (Librazhd and Gramsh) is 2% higher than the national average (MAFCP, 2012). Besides construction and development services, there is observed a growing trend of agricultural activity especially in terms of olive and vegetables cultivation in open field and greenhouses. In this region operate about 32,439 farms. The average farm family size is 4.9 persons, while the national average is 4.5 persons (MAFCP, 2012). As to the age structure of family farms, it is evidenced a relatively young age of the family farm with about 66% of the population aged from 15 to 54 years. Determining the farm typology in Elbasani region can help the policy-makers to orient their support program towards specific type of farms contributing though to enlarge their production and resource employment (labour included) and reduce poverty in rural area.

MATERIALS AND METHODS

This study was focused on the assessment and analysis of detailed data that are collected through structured questionnaires in selected farms. The main source of information for our study was:

⁵ Exchange rate EUR 1 = ALL 139.38. (http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm, Accessed 15.06.2014).

- survey conducted with farmers of Elbasan district, to estimate and value rigorously according to the methodology of sample selection,
- data provided through official sources (District Statistics, INSTAT, MoAFCP),
- consultation with fields expert,
- similar studies conducted in this field.

During the period foreseen for the action plan (data collection) and based on study criteria and methodological framework, 497 face to face interviews with farmers were conducted throughout the region. This phase was proceeded by presenting of questionnaires and their adjustment according to the problems identified. Farm typology is determined based on the following indicators:

- % of sold production / total production,
- % of watered surface / total surface,
- % of livestock production / total livestock production,
- % of agricultural production / total agricultural production,
- % of orchards production / total agricultural production,
- costs / production,
- % of cropped surface / total area,
- income outside the farm / total income,
- ALL AWU / thousand produced.

This analysis will enable the withdrawal of conclusions which can serve as a useful tool for evaluating the policies pursued, as well as the design of future policies for agriculture and rural development.

RESULTS AND DISCUSSION

Types of farms identified in Elbasan region is shown in Table 1. In this region the number of persons employed in the farm is two to three people. In connection to this indicator values from one cluster to another reflect insignificant changes. Simultaneously it is recorded that almost all typologies for one to two farm family members engage in activities outside the farm.

Table 1. Types of farms and their respective number identified in the region of Elbasan

Types of farms	Number
Poly-culture for market	47
Livestock	187
Leisure farms	35
Fruit trees	19
Arable crop farm	58

Source: calculations based on the survey.

This phenomenon is more pronounced in areas that are close to urban markets and employment opportunities are greater, but on the other hand it is a clear expression of insufficient capacity of farms in terms of ability to engage fully and with a calendar as perennial-farm labour force.

More detailed information about the structure of the family as well as persons engaged in farm activities is presented in Figure 1.

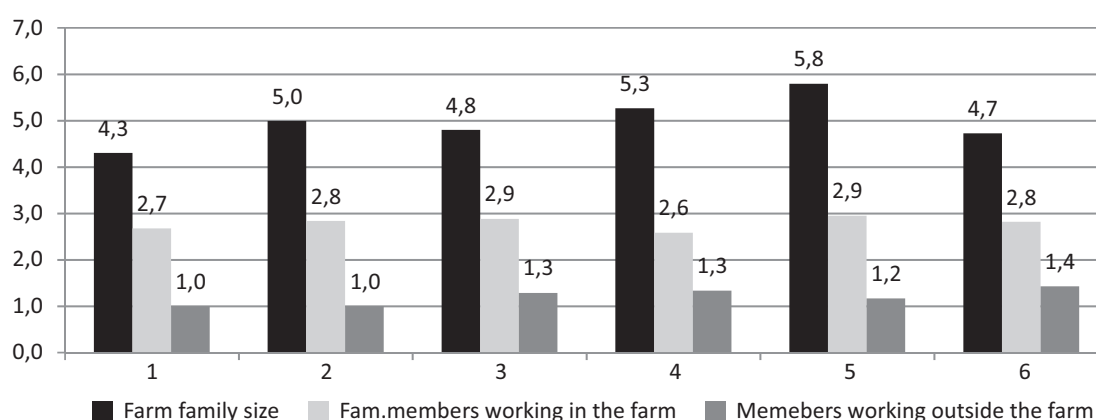


Figure 1. Farm family structure

Source: calculations based on the survey.

Despite the presented average values from the data processing should be noted that the number of farms identified for each cluster is different and therefore their weight is just different.

Land structure and farms size

If we analyse the indicator at national level, it has a noticeable fluctuation from one district to another. What can be said with certainty (for all this is already a known fact), is that our country has a very low index of farm size. According to official statistics, the average farm size is 1.2 ha in national level. This indicator despite dramatic structural changes that have occurred in the Albanian economy has seen a very small improvement (in 2000 it was 1.04 h/farm) (MoAFCP, 2012). According to the same statistics, Elbasan district stands near the national average values in terms of this indicator.

Referring indicators of farm size (Fig. 2) is noted that farms typology of arable crop farm are found to be the smallest with an average area of 0.6 ha/farm and farms cluster 3 and 6 leisure farms and self-sufficiency farms result in an area of about 1.5 ha/farm. Farms with livestock orientation as well as the fruit tree farms result with a size of about 0.8 ha/farm, which can question the efficiency of their operations. As becomes evident from the values, this indicator has a great variation between the different typologies with about 0.9 ha.

It should be brought into attention the fact that leasing the land results in negligible values, what creates a problem that regards the intensification also increasing of farm size and specialization. Similarly high the number of plots for each farm continues to pose a barrier for this sector development.

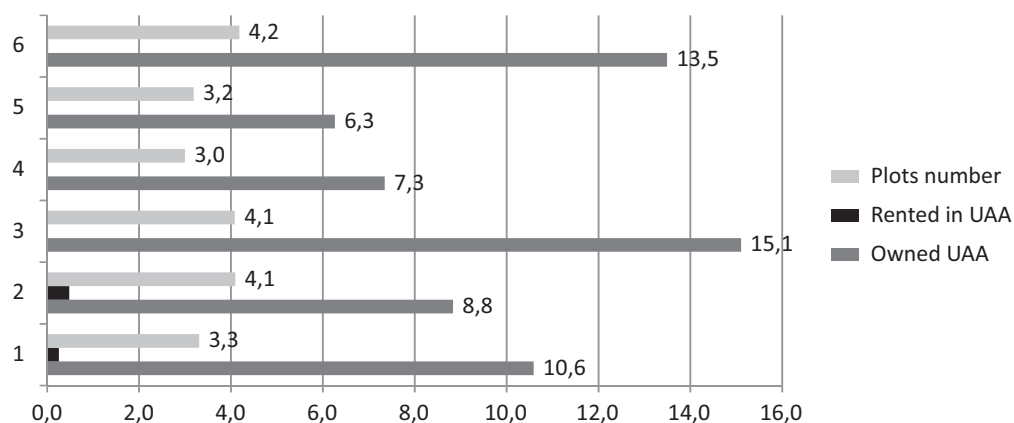


Figure 2. Farm size and plots number
 Source: calculations based on the survey.

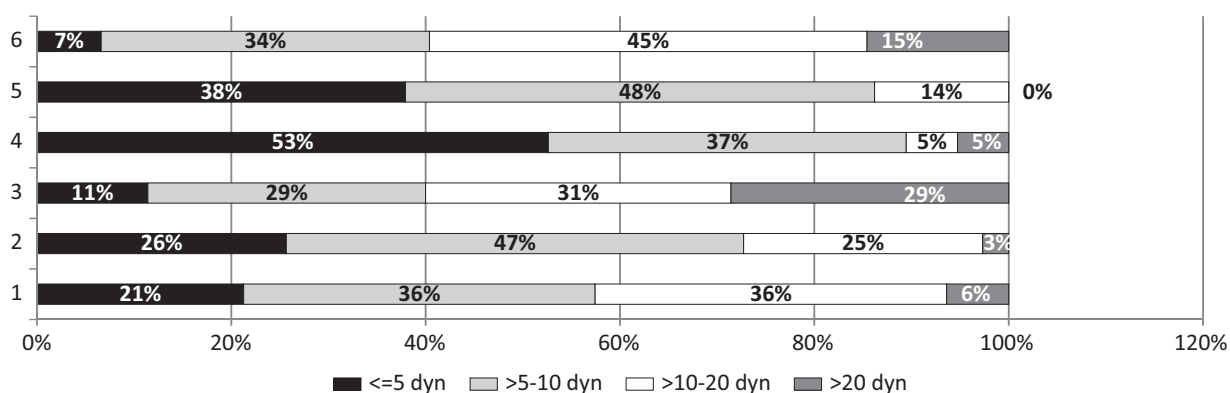


Figure 3. Farm size according typologies
 Source: calculations based on the survey.

Analysis of farm's economic performance – Case of Elbasan

Existing literature frequently divides business performance measures into financial performance, which includes factors such as revenues, profit, or stock prices, and non-financial performance measures such as reputation, loyalty, or customer satisfaction. As Louhichi et al. (2013) approach, this study will assess performance in terms of viability and productivity.

Productivity will be assessed in terms of farm net income per work units (FNI/WU), farm net income per utilized agricultural area (FNI/UAA) and farm net income per capital (FNI/C).

Viability will be assessed in terms of minimal wage (MW)⁶ and extreme/complete poverty⁷ lines. Thus, the minimal wage approach is the comparison of FNI/WU with the minimal wage for 2014. The second indicator is the comparison of FNI/HM with the poverty line. The importance of non-farm incomes in Albanian rural areas makes necessary to perform the analysis not only for the FNI but as

well as for the total household income (THI). The following table shows the utilization of these two indicators.

Table 2 shows when a farm perform better or worse in terms of viability. Thus, when the calculation of viability in terms of minimal wage results more than 1, means that the farms within that cluster are paying the work more than minimal wage. The same line of interpretation will be followed for other indicator as shown in Table 2.

Farms productivity

Productivity is a broad concept, but within this study by productivity, we mean the farm net income per work unit, per utilized agricultural area and per capital. Through these three indicators, we aim to verify how much productive are the Elbasan's agricultural units.

As shown in the Figure 4, the Elbasan's farms generally are performing positively in terms FNI/AWU. Furthermore, farms that belong to clusters such as

Table 2. Viability analysis

	Indicator	Value	Note
Minimal wage	$\frac{FNI}{WU \cdot 12 \cdot MW}$	> 1	The work in agriculture is paid more than the minimal wage (MW)
		= 1	The work in agriculture is paid as much as the minimal wage (MW)
		< 1	The work in agriculture is paid less than the minimal wage (MW)
Poverty line Extreme poverty	$\frac{FNI}{HM \cdot 12 \cdot 4,037 ALL}$	> 1	The members of the family live above the extreme poverty line
		= 1	The members of the family live on the extreme poverty line
		< 1	The members of the family live below the extreme poverty line
Poverty line Complete poverty	$\frac{FNI}{HM \cdot 12 \cdot 4,891 ALL}$	> 1	The members of the family live above the complete poverty line
		= 1	The members of the family live on the complete poverty line
		< 1	The members of the family live below the complete poverty line

⁶ For administrative reasons, the Albanian government fix the level of minimal wage. In 2014 the minimal monthly wage amounts ALL 22,000 (EUR 156.6).

⁷ According to the Institute of Statistics of Albania (INSTAT), an inhabitant is in extreme poverty condition if its monthly income doesn't exceed the value of ALL 4,037 (EUR 28.7) and is a complete poverty condition if its monthly income doesn't exceed the amount of ALL 4,891 (EUR 34.8).

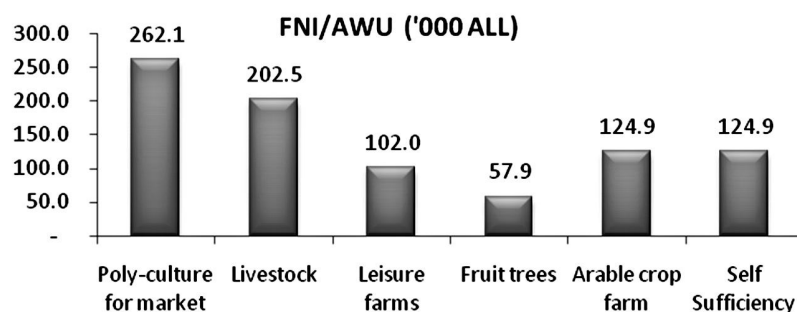


Figure 4. Farm net income per annual work unit

Source: calculations based on the survey.

Poly-Culture for market and Livestock are more productive than other clusters. These results are justified when we argue regarding the level of diversification activities. Thus, theoretically it is known the fact that the more diversified is a farm the more will take engagement the work units in activities. This means that the work units in poly-culture and livestock farms are more intensive, justifying the high level of FNI/AWU.

In contrary to poly-culture and livestock clusters, the leisure, fruit trees, arable crop and self-sufficient farms are not so intensive regarding the work utilization during a year, justifying the low productivity.

Farm viability

The first indicator related to the viability is comparison of FNI/WU with minimal wage. The first thing we emphasize within this indicator is the closed related trend with FNI/AWU and FNI/UAA,

meaning that the more intensive a farm is in terms of FNI/AWU and FNI/UAA the more high tend to pay the work.

We clearly see that all clusters are paying the work unit less than minimal wage. Except this fact, we must argue poly-culture, livestock and self-sufficient clusters, because their work payment is close to the MW. Shortly, this situation is justified by the fact that these three clusters are more intensive in terms of productivity as well. Nevertheless, the efficacy at agricultural farms still remains too low and this came as a consequence of high cost for ensuring inputs, lack of cooperation etc.

Total household income per work units compared with minimal wage. As Figure 6 shows we see the raise of clusters that had low WU payment by agricultural income. Thus, Leisure, fruit trees and arable crop farms have the highest off farm income respectively 68.5, 73.3 and 63.8%.

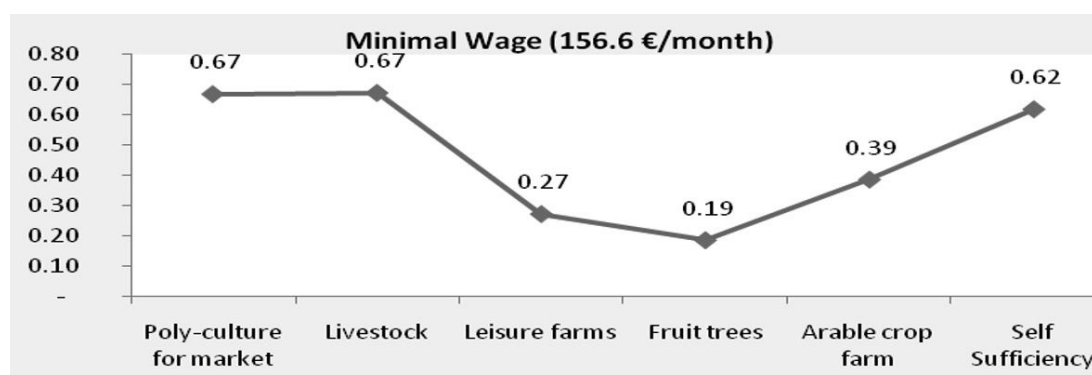


Figure 5. Minimal wage

Source: calculations based on the survey.

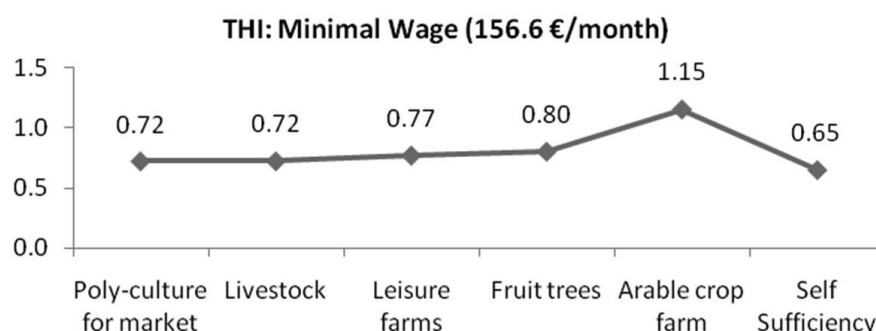


Figure 6. Total household income per work units with minimal wage

Source: calculations based on the survey.

Farm net income per work units per household member compared with extreme and complete poverty. According to the Institute of Statistics of Albania (INSTAT), an inhabitant is in extreme poverty condition if its monthly income doesn't exceed the value of ALL 4,037 (EUR 28.7) and is a complete poverty condition if its monthly income doesn't exceed the amount of ALL 4,891 (EUR 34.8). Thus, taking in account the below figure, we again conclude that families within poly-culture, livestock and self-sufficient clusters are living above extreme and complete poverty. Actually, this justifies the importance of agricultural businesses on welfare and standard living in rural areas. Additionally, even in terms of productivity and minimal wage these clusters were better performing as well.

Families of arable crop farms are living above extreme poverty but under complete poverty. Actually, the coefficient of complete poverty is close to the line of living above complete poverty, meaning this cluster is at least better performing than leisure, fruit trees clusters. When we focus on leisure, fruit trees clusters we again find them performing worse. This situation is a consequence of not having positive productivity (Fig. 7).

Total household income per household member compared with extreme and complete poverty. Figure 8 shows a clear raise on standard living of leisure, fruit trees and arable crop farms and furthermore they are better performing than other clusters. This result is fully supported by the fact that these three clusters have the highest off-farm income.

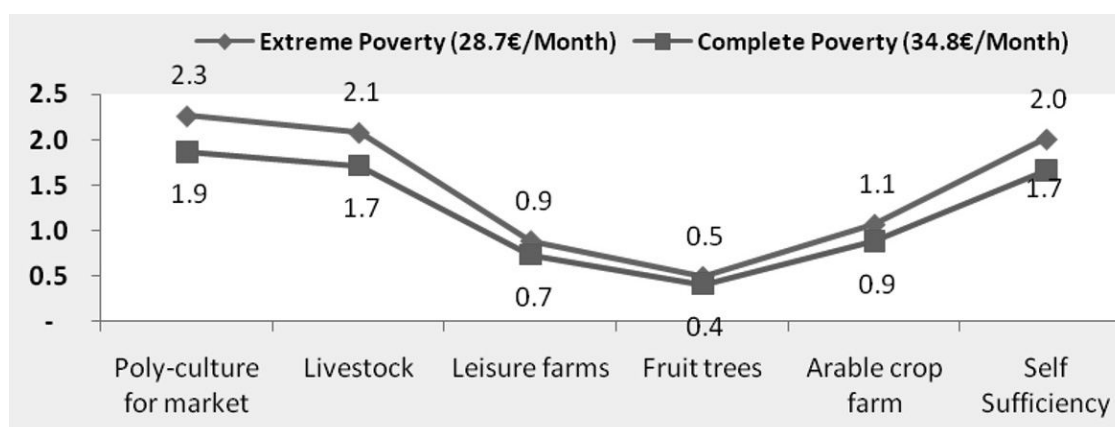


Figure 7. Farm net income per work units per household member with extreme and complete poverty

Source: calculations based on the survey.

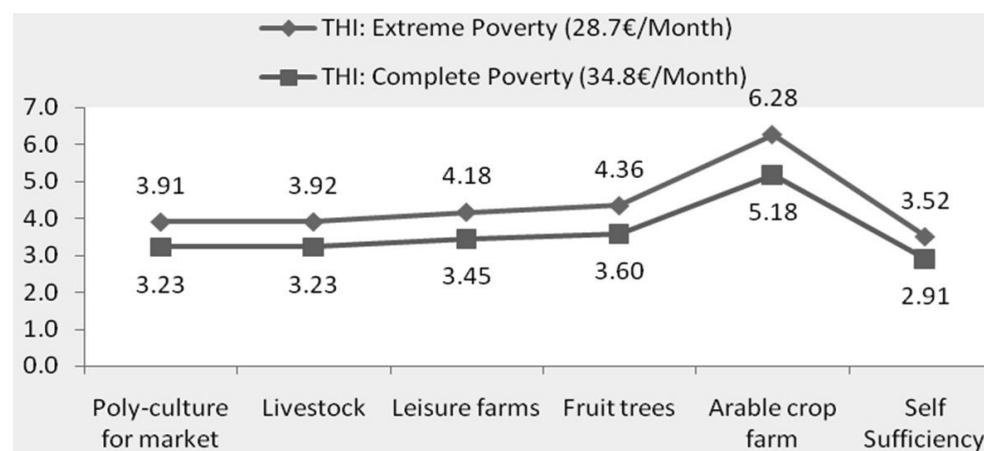


Figure 8. Total household income per household member compared with extreme and complete poverty

Source: calculations based on the survey.

CONCLUSIONS

Even that we had some clusters that were not positively performing in terms of productivity and viability, we can conclude that agricultural is a very important activity for rural areas in Elbasani region. Additionally, farms that belong to the poly-culture for market, livestock and self-sufficient clusters are better performing than other clusters.

A very important issue to handle is even that most of clusters are having positive performance in terms of productivity they are still facing concerns or obstacles such as high cost, lack of horizontal integration, lack of cooperation etc. This, argument is justified by the fact that all clusters are still not capable to provide payment for the work compared to the minimal wage.

This study concludes that poly-culture farms, livestock and self-sufficient farm are more productive and viable and must be a priority to be supported by the governmental support agricultural scheme.

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DIFFERENCE IN CONSUMPTION BETWEEN URBAN AND RURAL HOUSEHOLDS

Magdalena Cyrek, PhD¹, Piotr Cyrek, PhD¹

Faculty of Economics, University of Rzeszów

ABSTRACT

Levels of income, consumer expenditure and their structure display significant disproportions between areas of different degrees of urbanisation. These disproportions are reflected both in the objective comparison and subjectively perceived material situation of households. This study contains an assessment of the differences in income and consumption in rural areas and cities of Poland at a national level and in relation to the Subcarpathian Province, as a less developed region. The results of public statistic surveys were supplemented with the results of own research regarding the perception of the situation by the inhabitants of Subcarpathia. The scale of existing socio-economic disproportion in spatial layout and directions of changes in accordance to objective and subjective indicators were identified. The changes in the value of purchases of various types of products, levels of savings and living conditions were addressed. In order to verify the hypothesis of consumption convergence in the city-countryside system, a statistical analysis of national structures was carried out and the differences in change patterns typical for urban and rural households in Subcarpathia were identified. This research allows to conclude that there exist adverse disproportions in rural development and some signs of overcoming them on a national and regional level.

Keywords: consumption, well-being, households, city-countryside

JEL codes: D10, D31, D60, I30, I31, O15, O18, R12, R20

INTRODUCTION

In modern times, well-being in rural areas is considered to be a complex phenomenon, which encompasses a desire to balance economic parameters with personal, social and environmental matters (Rivera et al., 2018). One of the primary indicators of the standard and quality of living is the manner of wealth distribution, including the level and structure of consumption. Patterns in this scope are often different in urban and rural areas, which is visible not only in

the difference in lifestyles, but also in the level of an inhabitant's well-being.

The goal of this study is the identification of differences existing among the residents of cities and villages in Poland and in the character of consumption. The hypothesis of decreasing spatial inequality and the simultaneous existence of adversity for villagers in the level of well-being will be verified. It is assumed that it is both objective and subjective in nature as well as linked with the perception of the material situation of one's own household. Since it

¹ Corresponding author: Ćwiklińskiej 2, 35-601 Rzeszów, Poland, mcyrek@ur.edu.pl

² Corresponding author: Ćwiklińskiej 2, 35-601 Rzeszów, Poland, piotrcyr@univ.rzeszow.pl

is assumed that convergence occurs in relation to the improvement of the level of general well-being, variation in consumption should be highest in the poorest regions. Therefore, special attention is devoted to the material situation of households from the Subcarpathian region which is characterised by one of the lowest GDP per capita in the country.

THEORETICAL BACKGROUND

Variation in the standard of living, described by the level of income or consumption between urban and rural areas is the subject of intensive research. The analyses are focused on identifying factors determining the incidence of disproportions and changes in the depth of the observed gap. By comparing different countries, Simler and Dudwick (n.d.) refer to a paradigm, according to which the growth level of income initially increases inequality of well-being between the city and the countryside, which is then followed by convergence. However, they point out that there are almost as many examples of countries with observable processes of a living standard convergence as those where divergence is common, even among economies of a similar level of urbanisation or GDP per capita.

In European countries inequality in the city-countryside system are mostly a subject of analyses in less developed countries, where intense processes of structural changes are occurring. Gîdiu and Toader (2011) point out that, in Romania, the differences between the city and the countryside in terms of income, consumption and structure are not only significant but also growing. Similarly as in Poland, the existence of a well-being gap between the city and the countryside are a point of interest for many researchers. For instance, Chmieliński and Chmielewska (2015) reached a conclusion that despite great differences in i.a. the level and structure of income and expenditure, the convergence of the economic situation is still observable. Utzig (2017) concludes that rural and urban households move their consumption patterns towards less sustainable consumption. Similarly, Leśniak-Moczuk (2008) claims that the consumption model of the rural population transforms into a universal model of mass consumption, which is typical for city dwellers.

In the most developed countries, extended research of consumption patterns is also conducted but are focused on individual categories of expenditure and the nature of the consumption structure. Barigozzi et al. (2012) analysed the structure of household expenditure in Italy between 1989–2004 in four categories: nondurable goods, food, durable goods, and insurance premia. The conclusion was drawn that there was no significant difference over time. However, studies of consumption behaviour in Ireland conducted by (Carey et al., 2014) indicate that they are susceptible to modification influenced by general economic development changes. By comparing urban and rural households, the authors point out that the purchase patterns analysed in spatial layout are visibly varied, which is caused by socio-economic characteristics of the client, as well as spatial properties of trade network development and categories of purchased products.

MATERIALS AND METHODS

The study refers to a variation in consumption when comparing the city and the countryside on a national and regional level. The source of data for national scope are the results of each edition of household budget surveys carried out by GUS between 2006–2016, which were supplemented by public statistic data presented by GUS in the local data bank and Eurostat. The scale of differences in the structure of expenditure on consumer goods and services was analysed in relation to six spending groups categorised as: food (food and non-alcoholic beverages; alcoholic beverages, tobacco and narcotics), clothing and footwear, accommodation (housing, water, electricity, gas and other fuels; furnishing household equipment and routine maintenance of the house), investment in human capital (health; recreation and culture; education), communication (transport; communication), and others (restaurants and hotels; miscellaneous goods and services; pocket-money). The variation in the structure over time and in the spatial layout was measured on the basis of statistical analysis of structures (SAS) based on Kukuła's variation measurement method (Kukuła, 1996).

What was also included was the specificity of the material situation of inhabitants of cities and vil-

lages in relatively poorly developed regions, such as the Subcarpathian Province. In this arrangement, the results of our own research carried out on a group of 611 inhabitants, in the last quarter of 2015 and in the first quarter of 2016, using the method of direct interview, were used.

RESULTS AND DISCUSSION

The summary of characteristics, determining the level of well-being in urban and rural areas (Fig. 1), indicates an accumulation of numerous socio-economic problems and adverse disproportions in rural develop-

ment. Villagers earn less than 3/4 of a city dweller's income, and therefore spend less. Additionally, the level of income is definitely more internally varied in rural areas, which indicates existing social disproportions. Adverse income inequality is accompanied by lower economic activity, a higher unemployment rate and lower employment rates in the countryside. Rural areas are also more vulnerable to poverty and social exclusion.

The changes, which were examined between 2006–2016, do not lead to a definite diagnosis regarding the lowering of the development gap in rural areas in relation to the city. On the one hand, the improve-

Table 1. Disproportions in the level of selected socio-economic indicators between rural and urban areas in Poland between 2006–2016

Specification	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Average monthly available income per capita in households											
Rural/urban (%)	69.8	71.3	71.1	70.9	71.0	70.5	71.4	73.0	70.4	70.6	73.9
Average monthly per capita expenditures on consumer goods and services in households											
Rural/urban (%)	72.1	71.9	72.8	72.5	72.8	72.8	73.2	73.8	73.1	73.0	74.8
Activity rate by LFS (%)											
Urban	68.3	68.6	69.7	70.7	71.7	72.4	73.3	74.1	75.2	75.5	76.3
Rural	70.7	69.9	70.4	71.2	71.5	71.7	72.4	72.6	73.0	72.9	73.5
Unemployment rate by LFS (%)											
Urban	14.4	9.9	7.2	8.3	9.9	9.7	10.0	10.3	8.7	7.2	5.9
Rural	13.0	9.2	7.0	8.0	9.2	9.5	10.2	10.4	9.5	8.0	6.5
Employment rate by LFS (%)											
Urban	58.4	61.8	64.6	64.8	64.5	65.2	65.8	66.3	68.5	70.0	71.7
Rural	61.3	63.3	65.3	65.4	64.8	64.7	64.8	64.8	66.0	67.0	68.6
People at risk of poverty or social exclusion (%)											
Urban	32.3	28.0	23.5	21.1	21.1	21.2	20.4	19.8	17.8	16.7	16.2
Rural	45.1	39.0	36.1	33.6	33.9	32.7	33.2	32.5	31.2	30.0	27.9
Difference in income measured by Gini coefficient											
Urban	0.329	0.325	0.315	0.312	0.323	0.317	0.317	0.312	0.306	0.303	0.288
Rural	0.331	0.341	0.343	0.338	0.339	0.337	0.343	0.352	0.329	0.323	0.305

Source: own research based on GUS (2006–2017), Local Data Bank of Statistics Poland (GUS), Eurostat database: People at risk of poverty or social exclusion by degree of urbanisation [ilc_peps13].

ment of the situation in the countryside may indicate a growth in the relation of the level of income and expenses, a decrease in the risk of the poverty rate and an increase in economic activity, the employment rate and reduction of unemployment. On the other hand, inequalities regarding income and consumption in relation to cities are significant and the relative level of labour market indicators in the countryside in comparison to cities since the period 2010–2012 has become less favourable for rural residents.

The structure of consumption expenditure of Polish households (Table 2) mostly involves expenses on basic necessities, namely food and accommodation. However, while in 2016, the cost of food was the highest value in rural household budgets, in cities, they were on the same level as accommodation costs. The countryside involved noticeably higher costs of transportation, which stem from the need to commute

to the workplace or to infrastructures by countryside inhabitants. In cities, expenses regarded as investment in human capital were more crucial. Also, the share of other expenses was higher and included goods satisfying higher needs, such as mass consumption and needs appearing in the case of financial surplus. In conclusion, the differences in the structure of expenditure reflect the different levels of well-being in the city and countryside. In rural households, the expense proportions are typical of poorer societies, which devote a larger share of income to sustaining ongoing basic needs.

Between 2006–2016 two notable tendencies in the changes of consumption expenditure could be observed. Firstly, the share of food costs decreased both in the city and the countryside. This tendency was relatively stable in rural areas, whereas, in cities, it was prone to cyclical fluctuations. Secondly,

Table 2. The structure of expenditure on consumer goods and services of urban and rural households in Poland between 2006–2016

Specification	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Urban (%)											
Food	28.9	28.4	27.4	27.1	27.0	27.1	27.4	27.1	26.6	26.2	26.3
Clothing and footwear	5.7	6.0	5.8	5.6	5.7	5.5	5.2	5.3	5.6	5.7	5.8
Accommodation	26.5	25.5	25.7	26.5	26.8	26.9	26.8	27.0	26.6	26.8	26.3
Communication	14.3	14.8	15.4	14.8	14.3	14.2	14.0	15.1	14.4	14.0	14.0
Investment in human capital	15.4	15.8	16.0	16.0	16.1	16.1	16.2	14.2	14.1	14.5	14.6
Other	9.2	9.4	9.6	10.0	10.2	10.2	10.5	11.2	12.7	12.8	13.0
Rural (%)											
Food	36.2	35.6	33.9	33.5	33.0	33.1	32.6	32.0	31.5	31.1	31.2
Clothing and footwear	5.4	5.8	5.5	5.2	5.2	5.0	5.0	5.2	5.5	5.7	6.0
Accommodation	24.8	23.8	24.9	25.5	26.0	26.2	25.2	25.6	25.0	25.1	24.7
Communication	15.0	15.3	15.6	15.2	15.3	14.7	15.3	16.1	15.9	15.4	14.8
Investment in human capital	11.2	11.6	11.8	12.3	12.0	12.3	12.5	11.5	11.3	11.7	12.0
Other	7.4	7.8	8.3	8.3	8.5	8.8	9.3	9.6	10.8	11.0	11.3

Source: GUS (2007–2017).

expenditure in the cost group referred to as other, described as purchases of goods and services of luxurious nature. increased both in the city and the countryside, thus reflecting the growth of well-being and free decision funds. Both changes indicate a gradual conversion into consumption patterns typical of richer societies.

Assessment of changes in the structure of consumption in the context of convergence processes between the city and the countryside enables the positive verification of the hypothesis concerning the gradual reduction of disparity. Between 2006–2016, inequalities measured by the Kukuła's method decreased (Table 3). Such evidence can be linked to two positive aspects of change in the countryside in the context of a consumption gap decrease. These changes occurred more rapidly than in the city and were more focused (monotonic). As a result, the structure of consumption in the countryside in 2016 changed significantly in comparison to spending ratios in 2006. It can be therefore inferred that rural societies were subject to deeper evolution during the period of European integration, gradually reducing the distance in relation to their urban counterparts.

Deeper disparities in spatial layout are to be expected in less economically developed regions. The results of own research carried out in the Subcarpathian Province confirm that assumption, indicating the differences in economic characteristics describing the inhabitants of cities and villages (Fig. 1).

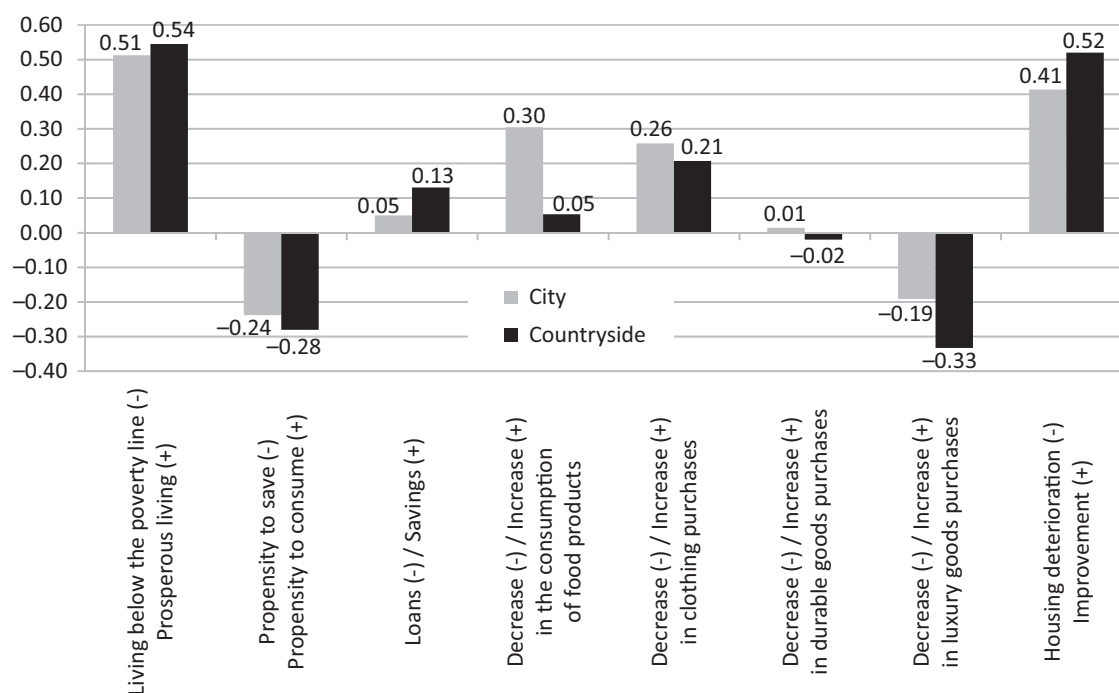
Some optimism can be observed in the subjective assessment of well-being and directions of its change, both among urban and rural residents. Out of the respondents who described typical situations for their households during the previous year, the majority reported prosperous living and housing improvement. Rural respondents were more prone to assess the situation of their own households as prosperous. Additionally, it was mostly rural dwellers, who experienced a positive change regarding housing improvement. Such tendencies lead to the conclusion that the spatial disproportion in the level of well-being may be decreasing in the region of Subcarpathia.

Also, the differences in the directions of change in income distribution were observed. Regardless of place of residence, the surveyed claimed that their propensity to save is increasing – that declaration is supported by statements regarding an increase in the

Table 3. Measures of changes and spatial diversity of the structure of expenditure on consumer goods and services of urban and rural households in Poland in 2006–2016

Item	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Diversity of the consumption expenditure structure in comparison to the previous year measured by Kukuła's method											
Urban	–	0.0146	0.0114	0.0123	0.0062	0.0028	0.0067	0.0225	0.0172	0.0077	0.0052
Rural	–	0.0150	0.0200	0.0118	0.0083	0.0086	0.0144	0.0170	0.0154	0.0088	0.0100
Diversity of the consumption expenditure structure in comparison to the base year (2006) measured by Kukuła's method											
Urban	–	0.0146	0.0225	0.0192	0.0199	0.0215	0.0238	0.0336	0.0367	0.0390	0.0387
Rural	–	0.0150	0.0226	0.0292	0.0339	0.0393	0.0402	0.0450	0.0471	0.0511	0.0535
Diversity of the consumption expenditure structure between the city and the countryside measured by Kukuła's method											
Urban-rural	0.0798	0.0771	0.0664	0.0675	0.0699	0.0638	0.0663	0.0592	0.0635	0.0631	0.0597
Average rate of changes in the structure of consumption expenditure between 2006–2016				urban	0.0107	Monotonicity of changes in the structure of consumption expenditure between 2006–2016				urban	0.3628
				rural	0.0129					rural	0.4136

Source: GUS (2007–2017).



The values were assumed as an average of the indications of respondents based on a scale from -3 to 3, where 0 – I have no opinion 3 – I agree entirely.

Figure 1. Characteristics of the material situation of Subcarpathian households

Source: calculations based on own research.

level of savings. Such patterns, however, were mostly typical of the countryside, which suggests the existence of different behaviour patterns associated with the forethought of countryside residents.

A more consumption-oriented lifestyle of city dwellers was also indicated by an increase in purchases in most product groups: food; clothing; durable goods and less restraint in purchases of luxury goods than among countryside residents. Similar trends also characterised rural households. However, the increase in purchases involved clothing and food exclusively and its scale was much lower than in the city. Regarding durable goods and luxury goods, rural inhabitants declared a reduction in expenditure.

The results of the conducted research in the Subcarpathian Province led to a favourable assessment of the household situation and an increase of respondent prudence, who try to make savings by limiting purchases not involving basic needs. Such behaviour is mostly typical of persons inhabiting rural areas. Thus, our research findings are in line with

other studies generally suggesting a convergence between rural and urban areas, however, the model of income and consumption behaviour of the rural population seems to differ from commonly expected consumptionism. Nevertheless, such inconsistencies may be influenced by a diversified inner structure of rural residents' features and behaviour as pointed out by Piekut (2017).

CONCLUSIONS

The conducted research allows to confirm the initial assumption of numerous overlapping socio-economic problems in the countryside and the existence of adverse disproportions in the development of the Polish countryside in comparison with urban areas. What is more, the transformation observed between 2006–2016 does not allow us to draw the definite conclusion of disproportion minimisation. On the one hand, there are some reasons to believe in a convergence of level of income and expenditure in spatial

layout. Additionally, a gradual decrease in the disparity in the consumption structure can be observed. On the other hand, labour market indicators for the countryside are not favourable. Also, what is different are the behaviour patterns declared by the inhabitants of the city and the countryside especially in a poorly developed region such as the Subcarpathian Province. A more optimistic assessment of the well-being of rural residents coexists with an increase in the level of thrift, while the attitudes of urban respondents indicate an increase in consumptionism. The presented study results regarding the assessment of well-being on a regional level and their disparity along the city-countryside system suggest the validity of intensifying the analysis of factors differentiating the attitudes and patterns of consumption including this relatively inadequately researched plane of comparison.

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CONSUMPTION PATTERNS AMONG ONE-PERSON HOUSEHOLDS OF NEVER MARRIED IN POLAND

Marlena Piekut, Eng PhD¹

College of Economics and Social Sciences, Warsaw University of Technology

ABSTRACT

The scientific objective of the study was to identify consumption patterns in one-person households of never-married women and men, living independently. Ward's grouping method make possible to establish the number of households' clusters. The final stage of household grouping procedure, regarding consumption expenditures was accomplished with k-means clustering method. It can be concluded that distinguishing the consumption patterns for one-person households of never married is possible on the basis of diversification both level and structure of incomes in these households as well as socio-demographic differences between them. Depending on economic and socio-demographic variables, disparate consumption patterns for these types of households can be observed. In addition, it's worth stressing that household having different level of income (although coming from similar source) but similar demographic structure show greater similarity than households having similar financial situation.

Keywords: single-person households, consumption, goods, services

JEL codes: D12, E21

INTRODUCTION

Consumption patterns of households are influenced by several factors, among them household size and marital status of household head. The diversity in consumer behaviour of different household types is determined by satisfying consumer needs and characteristics of household members, whereas the hierarchy of consumer needs stays the same.

The literature review indicates that one-person households are under several researchers' *attention*, as singleness as a life-style is increasingly recognized as the new way of life for numerous women and men. These households not only differ from traditional families, but also are distinct from one another. The

problem of consumption patterns is considered mainly with respect to these households as a whole, or to elderly one-person households. However, there is apparent lack of studies on consumption patterns of one-person households of never-married women and men. The subject is considered to be important, as this kind of households is continuing to expand.

The curiosity to learn more about one-person households of never-married became the incentive for conceptualization of research purpose. The scientific objective of the study is to identify consumption patterns in one-person households of never-married women and men, living independently.

The growing number and social significance of one-person households make this research subject

¹ Corresponding author: Lukaszewicza 17, 09-400 Płock, Poland, Marlena.Piekut@pw.edu.pl

applicable. This study contributes to understanding differences between consumption in various types of one-person households, with particular emphasis on households of never-married.

THEORETICAL BACKGROUND

The one-person household is the fastest growing type of household in many countries of the world, because of changes in the past few decades in demographic behaviours, institutional arrangements, and labour migration (Yeung and Cheung, 2015). In the past, when living alone could have been a short-term condition, for many it is now a long-term situation. The result of a number of demographic and economic studies over the past half century showed: greater affluence, later ages of marriage, longer lives, smaller family sizes, greater labour force participation, higher divorce and financial independence of women, as well as stronger government safety nets across a broad spectrum of social programs (Masnick, 2015).

According to Euromonitor International forecasts over 2016–2030, one-person households will see faster growth than any other household type globally, with around 120 million new one-person households to be added over the period. The group of elderly widowed and divorced is also growing, especially, this group is large in developed countries. There is also a growing group of young people, never married forming single-person households. In Poland, according to the National Census, the one-person households of young people never married in general of one-person households in 2002 constituted 30.4% and 35.3% in 2011. Younger singles exchanging family life for education and careers.

The increase in the numbers of one-person households may have several implications for the economy and many businesses. The growing number of one-person households will have an impact on numerous industries, ranging from health care to housing. One-person households spend more on housing than other households. These households may prefer to rent, not to buy houses. And even if they buy a house, they prefer multi-family houses rather than single-family ones. This may affect the structure of the housing market. A rise in one-person households may aid labour

market mobility. With less attachment to property and on marital burdens, these people can be more open to moving cities for jobs. This may make the labour market more mobile than it is today. However, one-person households will have to deal with lower availability of informal personal care from the partners. Such non-market production (as economists would define it) may require replacement of purchased personal care services, in particular health and nursing care, which could significantly affect the health care industry (Bachman and Barua, 2015).

Services take play an important place in the singles expenses. According to studies among Polish singles, in the case of increased income, they spend additional resources on educational, healthcare, tourist and banking services. If they strive to improve housing conditions, purchase of home appliances/audio/video devices, or purchase of a car, there is a place activities for accompanying services (Dąbrowska and Janoś-Kresło, 2011).

More one-person households force changes on food processors. Consumers creating one-person households express a greater demand for products of lower grammage, also for products for quick preparation. Studies on food purchasing habits confirm that single-living households are more likely to opt for convenient and other 'easy-to-serve and portion controlled' meal alternatives compared to couples and families with children (Candel, 2001; Harris and Shiptsova, 2007).

As the number of one-person household increases the proportion of expenditures on services is expected to increase while that on necessities such as beverage, food, and energy to decrease. Accordingly policy responses are required to prepare for the expansion of service industries such as housekeeping, health, hospital services. In particular, companies must adopt a strategy targeted at one-person households with high income and purchasing power, such as unmarried professional people.

Jo (2016) showed on the basis of research conducted in single person households in Korea that the income elasticities of all products are greater than 1 except: food and beverages, housing, gas and electricity, water, communication. Income elasticities are significantly different among consuming products.

In addition, the income elasticities are also different depending on the various age and income groups of one-person households. Therefore governments and companies must take this into account when devising their policies or strategies regarding one-person households.

Statistics showed a high level of heterogeneity among groups who live alone, some of them by choice, others out of need (Yeung and Cheung, 2015). It also indicates the heterogeneity of consumption behaviours in single-person households (Palmer, 2006). The variety of consumption patterns results, from the marital status of the person running the household (Piekut, 2017). Earlier mentioned the aforementioned increase in the share of one-person households of never married is an incentive to identify consumption patterns in these households.

CONCEPTION OF ANALYSIS, RESULTS AND DISCUSSION

The study was focused on one-person households of never married in Poland. The research material was represented by the statistical data from individual, unpublished CSO (GUS) data for household budget investigations in 2015. The CSO data base for 2015 covered over 37,000 households. There were one-person households of never married in 2015.

The subject of study is to analyse consumption expenditures so as to create consumption patterns. In the first stage of the study, operational taxonomic units (OTU) were defined. The OTUs were formed on the basis of three socio-demographic variables, i.e. socio-economic, education and age. Then, the grouping procedure was applied for OTUs. Although all the variables (12 categories in expenditures on consumption goods and services) were expressed in PLN, standardization was carried out, since this operation helped avoiding dominating classification by the highest average expenditures. Ward's grouping method make possible to establish the number of households' clusters. The dendrogram was cut-off on the level of 140, which made six groups. The applied criterion was the first significant leap in agglomeration distance. The selected number of groups means the group preceding the first significant leap in

agglomeration distance. The final stage of household grouping procedure, regarding consumption expenditures was accomplished with *k*-means clustering method.

The grouping of one-person never-married households made possible to distinguish five groups of these households for data 2015. One of these groups was distinctively greater than the others, which indicates one dominant consumption pattern. Consumption patterns represented by individual groups of households were the result of socio-demographic features of their members.

The specific features of household types and consumption patterns for 2015 are presented below. The largest cluster (the 1st one) covered the youngest people, i.e. below 40 years old, with higher or middle education level. Most commonly, the main source of income for them was white-collar job or self-employment. These households were localized in the largest cities. Slightly more frequently they were female households (58%). As for expenditures level, in the 1st group, in comparison to others, the largest sum was allocated for dwelling maintenance, education, catering services and accommodation. Relatively high expenditure level for necessary clothing and footwear, transportation, culture and leisure and connected with telecommunication was discerned. In the structure of disposable income, the largest of all other clusters, were expenses of clothing and footwear (5.2%), catering services and accommodation (9.8%), whereas the shares of expenses of food and non-alcoholic beverages (12.8%), alcoholic beverages and tobacco products (2.5%) were the lowest of all groups. The share of expenditures on consumption goods and services in disposable income was over 84%, what makes it one of the smaller, after the 4th cluster, which is the evidence of better saving possibilities for households of young, never married people.

Another (the 2nd) cluster has been formed by the people age 50 and over (92%), with over 79% female households, and with post-employment benefits as the main income source for over 3/4 households. The majority of people in this group of households had middle or higher education. The households were localized at various settlement units. The specific features in this group were the largest expenditures

on health service and relatively high expenditures on food, non-alcoholic beverages, furnishing and other consumption goods and services. Relatively low expenses were designated for education, catering services and accommodation. In relation to other groups, high share of expenditures on dwelling maintenance (25.0%), health service (8.4%), telecommunication (4.9%) and other goods and services (7.1%); meanwhile smaller percentage of expenditures on catering services and accommodation (3.2%) was observed. The share of expenditures on consumption goods and services in disposable income was about 92%, what makes it the highest of all the clusters, which is evidence of the smallest saving tendency, although disposable income for these households were higher than in two further clusters.

The 3rd cluster contained, above all, people of the age between 50 and 70 (75%). There were usually male households (about 2/3), with head having rather low education level. The main income sources for 92% of households were post-employment benefits, pensions and other social benefits. The 3rd cluster households were localized at rural areas (46%) or in smaller towns – up to 99,000 dwellers (31%). The specific features in this group were the lowest levels both of disposable income and expenditures on main categories of consumption goods and services; with the exception of education services and expenses connected with catering services and accommodation. The value of social benefits, i.e. the main income source for this cluster, is generally lower than value of salaries or self-employment income, so the expenditures on some consumption goods and services are relatively low, and, consequently – in consumption pattern only basic needs are covered. In the structure of disposable income, the largest percentage of expenditures on food and non-alcoholic beverages (28.0%) was noticed. Relatively high percentage of expenditures was designated on catering services and accommodation (7.6% of disposable income). The lowest percentage of disposable income, in comparison to other clusters, was for clothing and footwear (2.3%), dwelling maintenance (2.3%), transportation (2.9%) as well as culture and leisure (3.5%). Moreover, alcoholic beverages and tobacco products (2.5%). The share of expenditures on consumption

goods and services in disposable income was 87%, so it was equal to the households in 5th cluster, although the 5th cluster is characterized by significantly higher level of disposable income.

The further, 4th cluster was represented by households of people of the age 40–70, especially male (76%), poorer educated (over a half had vocational training, less than ¼ completed lower secondary school or even not). The main source of income for 43% of households were blue-collar jobs and for 14% – agricultural labour. 54% of 4th cluster households were located at rural area. The distinctive feature for this group was relatively high level of expenditures on alcoholic beverages and tobacco products and the lowest level of health service spending. Comparably, in the structure of disposable income, the share of expenditures on alcoholic beverages and tobacco products (5.3%) was the highest of all the clusters, while the share of expenses on health service (2.7%) and for other goods and services (3.4%) were the lowest of all. The behaviours of these household members seem to be rather risky. The share of expenditures on consumption goods and services in disposable income was 80%, what makes it the lowest of all clusters.

The last (the 5th) cluster was formed by of people of the age between 40 and 60 (73%), working for a living in white-collar jobs (60%) or self-employed (24%). 59% of these households were female. 84% of the people representing the 5th cluster had higher education. In this group, the highest level of disposable income was noted. The level of expenditures on consumption goods and services – especially on food and non-alcoholic beverages, furnishing, transportation, culture and leisure and others was also the highest. As for disposable income, relatively low, as compared to other clusters, was the share of expenditures on food and non-alcoholic beverages (13.6%) and dwelling maintenance (15.5%). Meanwhile, high share of disposable income was observed in expenditures on furnishing (6.1%), transportation (14.4%), culture and leisure (9.5%) and other consumption goods and services (7.4%). High disposable income of these households make possible to meet high-order needs. The share of expenditures on consumption goods and services in disposable income was over 87%, and it was one of the highest among all clusters.

Groups of households with a dominant percentage of men had different consumption patterns from groups of households with women's domination. In men's households more were spent on alcoholic beverages and tobacco products as well as on gastronomy and accommodation compared to households run by women. These results are also confirmed by studies from other countries (Changpetch et al., 2016). It is argued that women are more aware of the health effects of consumption of stimulants.

The age and sex of people creating households were also associated with expenses for catering services. In households with older people are more time to cook home-made meals and are less familiar with the use of (the rather more recent) ready-made meals and products (Daniels and Glorieux, 2015), own research confirms the observed regularity. In the group of households created mainly by women over 50 years old, the smallest expenditures on catering services were recorded. Older-generation households have different cultural values and food perceptions than younger households as ready meals are less likely to appear on their table (Daniels and Glorieux, 2015). The lifestyle of older people is changing, among others by the dynamic development of medical services. The stereotypical image of lonely and poor elderly people is slowly replaced with the image of active people, with a hedonistic approach to life.

CONCLUSIONS

The proportion of one-person households in total number of households remains in similar level in Poland; however the proportion of one-person households of never married continues to grow, which makes this type of households the interesting research area. In the study it was shown that one-person households of never-married have various consumption patterns, influenced by economic and socio-demographic features as well as connected with household localization. In general, it can be concluded that distinguishing the consumption patterns for one-person households of never married is possible on the basis of diversification both level and structure of incomes in these households as well as socio-demographic differences between them. Depending on economic

and socio-demographic variables, disparate consumption patterns for these types of households can be observed.

As for the further research, it seems to be worth establishing the diagnosis for consumption patterns in other types of one-person households, considering household head's marital status. These results could be compared with consumption patterns presented above.

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EXCHANGE OF INFORMATION AND EDUCATION IN COOPERATION BETWEEN AGRICULTURAL HOLDINGS MAINTAINING CONSERVATIVE BREED ANIMALS

Marta Domagalska-Grędyś, PhD¹

Faculty of Agriculture and Economics, University of Agriculture in Krakow

ABSTRACT

The development by means of cooperation, an exchange of knowledge and education is of crucial importance in the contemporary knowledge-based economy. The goal of the study was to determine important goals in cooperation with regard to the scope of knowledge and education of agricultural holdings maintaining conservative breed animals in the region of fragmented agriculture (South-Eastern Poland). The studied entities contribute to an increased biodiversity and maintenance of small agricultural holdings. The conditions of cooperation basing on an exchange of knowledge and education are laid down based on the results of a questionnaire study conducted among 145 agricultural holdings and principal component analyses (PCA). The evaluation of the exchange of knowledge and education varied within the industry. The highest degree of approval for the exchange of knowledge and education was among breeders of pigs and cows, the lowest among sheep breeders. It was demonstrated that participation in fairs and trainings improved the evaluation of analysed cooperation.

Keywords: cooperation goals, knowledge exchange and education, livestock conservative breeds, principal component analysis (PCA)

JEL codes: Q57, Q12, D71

INTRODUCTION

Development through cooperation in the exchange of knowledge and education is of crucial importance in the contemporary knowledge-based economy (Alee, 2003; Gloor, 2006; Castels, 2007; Dias and Franco, 2018). Cooperation between producers is valued by practitioners and theoretics even though, apart from the benefits (beneficial effects of scale and synergy), it may pose certain difficulties (conflicts, 'fare-dodging', increasing costs). The exchange determines

the quality of functioning of contemporary society basing mainly on a network structure² (Stepka and Subda, 2011).

Farmers who deal in animal production with conservative breeds obtain subsidies. However, their operations require knowledge and, often, also additional education (trainings). Complying with a number of procedures, combined with the specificity of production resulting from breeding of conservative breed animals, brings deficits in knowledge and skills to light and, therefore, translates into educational and

¹ Corresponding author: al. Mickiewicza 21, 31-120 Kraków, Poland, rrdomaga@cyf-kr.edu.pl, +4812 662 44 43

² Network social structure is a system of mutually-dependent objects forming an extensive and dynamic system.

training needs of producers. Due to the fact that these farmers enter into relationships with research institutions, advisory centres and industry associations, they regularly cooperate and exchange knowledge with one another.

This paper discusses the problem of cooperation due to the exchange of information and knowledge and concentrates not on the effects of such an exchange, but on their evaluation among groups of breeders of respective species (cow, pig, sheep), farmer age, farm size and the period of introduction of conservative breeds. It has been observed that a high evaluation of cooperation goals regarding the exchange of knowledge and education of breeders are a symptom of desirable attitudes of producers and a premise for the development of agricultural holdings (a paradigm of a knowledge-based economy).

The purpose of the study was to indicate the conditions of cooperation in the scope of an exchange of information and education. Relationships were sought in which the evaluation of such cooperation was worst and would require intervention as well as those evaluated highly, certifying the presence of valuable social (intellectual) assets. Attention was drawn to the differences in the evaluation of knowledge and education due to qualities of various entities (farmer's education, work experience in the agricultural sector, period of introduction of conservative breeds and farm size).

THEORETICAL BACKGROUND

The functioning of economic entities depends on knowledge. The concept of a knowledge-based economy³ underlines the importance of the participation of various entities (organizations, natural persons and communities) in the processes of creation, assimilation, propagation and use of knowledge for the quick development of the economy and society. In macro-economic terms, entities basing their operations on knowledge are considered to have a competitive advantage (Kozłowski, 2001; Wyrwicka, ed., 2011).

In developed countries, the increasing importance of cooperation of universities and public research in-

stitutions with private economic entities and the scale of interdisciplinary projects leads to the invalidation of the traditional perception of the education system as the main creator of new knowledge (OECD, 2000). The European Union firmly emphasizes the development and continuous creation of new knowledge. Hence, the necessity of a priority approach to the research and development sector (R&D) is increasingly more pronounced. In turn, the OECD pays particular attention to partnership-based cooperation between three segments of the agricultural knowledge and information system, i.e. research, education and advice and it recommends support in the articulation and solving of problems rather than, as it used to be, give ready solutions (Kania, 2014).

As follows from the results of Polish authors 'agricultural knowledge is often created without any link to the needs and expectations of its recipients (...), hence the effects of functioning of various research institutions and organizations are worse than could be expected, given the quality and quantity of existing intellectual assets' (Kania et al., 2011).

Cooperation among farmers and between farmers and institutions enables an exchange of knowledge, but there are certain prerequisites for cooperation: trust, easy communication, negotiations, cohesion (EIP-AGRI, 2016). The studies of agricultural producer groups conducted by Kiełbasa and Knapik (2018) reveal difficulties in knowledge management at the stage of transformation of concealed knowledge into common knowledge, as well as high costs of obtaining knowledge (expensive trainings and courses).

According to researchers, at present there is no well-functioning Agricultural Knowledge and Information System in Poland. Despite the existence of a majority of institutions and organizations specified therein, a lack of mutual and existing relationships prevents cooperation and functioning as a system (Kania et al., 2011). Therefore, it seems purposeful to commence efforts to create a farmer's knowledge network based on organizational networks (Alee, 2003; Franco, Mainardes and Martins, 2011; Pindado and Sánchez, 2017).

³ KBE – Knowledge-Based Economy.

COOPERATION OF BREEDERS IN THE CONTEXT OF KNOWLEDGE AND EDUCATION (THEORY)

Thus far, the existing experience of breeders of conservative breed animals, in the scope of exchange of knowledge and education, has come down to several activities: participation in fairs, study tours and trainings. As a result, producers have gained knowledge and training and have entered into active cooperation, creating a specific knowledge network. These activities show a mechanism of repeatability (e.g. regular participation in fairs, exhibitions⁴) and participation (involvement) of institutions (agricultural advisory centres, industry associations) in the organization of study tours. It follows, from the opinion of farmers, that foreign tours were the main point of interest and were most effective in promoting cooperation and innovativeness. Solving market difficulties, creating new initiatives in industry associations abroad: in France, Germany, Italy (Tudisca et al., 2014) constituted a template of action for Polish breeders. In Poland, most industry associations are involved in the organization of study tours, hence this activity constitutes a traditional source of education and knowledge exchange.

In light of the aforementioned situation, it is reasonable to commence knowledge networking that should be preceded by an in-depth analysis of relationships between breeders of conservative breed animals and the surroundings: research institutions, industry associations, etc. (Aldrich and Cliff, 2003). In the case of the knowledge process, the primary entity is man who creates, collects, interprets and uses knowledge. In turn, the network perspective emphasizes social relationships, imposing researchers to analyse key processes supporting the creation of a learning 'formation' (internal communication, creation, accumulation and transfer of knowledge and innovation; Hajdukiewicz 2014). The results of studies concerning knowledge management (in the

scope of Science and Technology – S&T) at various stages of sustainable development show that an effective knowledge management system should include an institutional mechanism enabling communication and negotiations in network nodes. The authors underline that building an effective knowledge management system 'requires time and patience' (Cash et al., 2003; Hall, 2003; Meccheri and Pelloni, 2006; Rutten and Boekema, 2007).

MATERIALS AND METHODS

The test group comprised a population of 145 agricultural holdings representing agricultural holdings with animals of three conservative breeds (cattle, sheep and pigs) from South-Eastern Poland. The study concerned cooperation in the scope of inter-organizational relationships (farm-surroundings). The study concerned agricultural holdings that regularly cooperated with the most important entities in their surroundings⁵. For the purposes of this paper, a fragment of broader study of cooperation goals was used⁶. The study tool was a questionnaire from interviews conducted in 2017 among agricultural holdings. Analysis was conducted using the PCA method which enabled the reduction of numerous variables, relating to cooperation goals and helped in the determination of the importance of goals with regard to descriptive variables (age, farmer's work experience, farm size, year of introduction of conservative breeds). The separate cooperation area referred to as 3, namely, 'Exchange of knowledge and education' covered four cooperation goals with the highest correlation: exchange of strategic information, training, participation in fairs and study tours. Therefore, applying reference to a single dimension in the description of results: the exchange of information and education covered four cooperation goals simultaneously.

The adopted research method was intended to help in the understanding of various needs of recipients in

⁴ National breeding exhibitions in Poznań, regional breeding exhibitions in Szepietowo.

⁵ Research institutions, industry associations, agricultural advice centres, production means, suppliers and clients.

⁶ By applying the PCA method, three areas of cooperation between breeders were identified: knowledge and education, marketing and market and development. This study focuses on knowledge and education referring to others in a contextual and justified situation for the better understanding of issues presented herein.

the scope of knowledge and education, taking into account demographic changes (society gentrification) and experience of farmers (breeders of conservative breed animals).

RESULTS AND DISCUSSION

Conservative breed animal breeders and producers are currently at a stage of absorbing funds assigned to them for their contribution in maintaining biodiversity. Farmers are in a unique situation due to specificity of production, liaison with the niche market of products derived from such production and the obligation to comply with applicable rules (including but not limited to keeping breed books, reports). Market and legislative requirements drive the intensification of their actions related to seeking cooperation relationships, exchanging experience, knowledge and education. The authors' observations and interviews with breeders as well as representatives of industry institutions revealed difficulties in maintaining economic viability of agricultural holdings and 'if not for subsidies', would have abandoned their operations. The questionnaire interviews also revealed additional contexts of reference opinions. Breeders evaluated goals of cooperation differently, depending on the species they bred (cattle, pigs, sheep). What was also examined was whether other characteristics of agricultural holdings (size) and farmers (education, age) affected evaluation concerning cooperation in the scope of knowledge and education exchange.

The results of the reliability analysis for the cooperation dimension (scale) - exchange of information and education – is shown in Table 1. The dimension should be considered reliable since Cronbach Alpha exceeds 0.7 (0.7587). Almost all items (cooperation goals) showed a strong correlation with the dimension: exchange of information and education (correlations above 0.5), hence they confirmed the correct selection of variables describing cooperation. The strongest correlations in the analysed dimension of cooperation (exchange of information) accompanied participation in fairs (0.6413) and trainings (0.5883; Table 1). The highest diversity of evaluations concerned the exchange of strategic information (farmers evaluated this cooperation goal both high and low; standard deviation 3.9601; Table 1).

Analysis in the groups of agricultural holdings by animal species allows to conclude that the dimension of cooperation 3, exchange of information was of highest importance in the creation of a cooperation network for cow and pig breeders and of least importance for sheep breeders (negative mean -0.3559; Table 2). Sheep breeders reported higher benefits of cooperation in the scope of the remaining goals: 1 – Development and 2 – Market.

The cooperation goals in the scope of exchange of knowledge and education were evaluated best by farmers with a secondary education (average score 0.1624; Table 3). The better the education, the lower the importance of cooperation dimension 3 concerning exchange of information and education. In turn,

Table 1. Results of reliability analysis for scale (main dimension) 'Information exchange and education'

Scale summary: mean 10.8000; standard deviation 4.81837; number of significant (<i>N</i>) 145; Cronbach Alpha 0.758736; standardized Alpha 0.758583; mean correlation between items 0.446052					
Cooperation goals of the dimension: Exchange of information and education	Mean	Variance	Standard deviation	Item and scale correlation	Cronbach Alpha
Exchange of strategic information	8.00000	15.68276	3.96014	0.425192	0.76811
Trainings	7.60000	14.48828	3.80634	0.588397	0.68777
Participation in fairs	8.186207	12.8274	3.58153	0.641268	0.65291
Study tours	8.613793	13.05085	3.61259	0.583195	0.68770

Source: own research.

Table 2. Results of statistics of the cooperation dimension 'Exchange of information and education' between conservative breed species

Specification	Means	Number of important cases	Standard deviation
Cattle	0.27961	52	0.96421
Breed	-0.35596	74	0.94251
Pig	0.62112	19	0.78045
Total	0.00000	145	1.00000

Source: own research.

Table 3. Research results for the main dimension 'Exchange of information and education' of breeders according to the education of farmers

Specification	Means	Number of important cases	Standard deviation
Basic	-0.33158	14	0.87230
Vacation education	0.08312	55	0.90751
Secondary education	0.16242	51	1.12471
Higher education	-0.13584	13	0.96506
Other higher education	-0.64068	11	0.82640
Total	-0.00416	144	1.00222

Source: own research.

the persons with primary education evaluated dimension 3 lower than average.

The trend of low evaluation of cooperation regarding the exchange of information and education in the oldest and youngest farms (more than 20 years) was clearly visible. Middle-aged farmers (aged 30–40) were more appreciative of information cooperation than younger and older producers (Table 4).

In conditions of fragmented agriculture in South-Eastern Poland, the study result indicating an interest in the exchange of knowledge and education of farms with a small farm size is important (Table 5). It should be noted that persons most interested in cooperation in the scope of exchange of knowledge and education were farmers owning mid-size farms with an area range of 15–30 ha. A point of concern is a lack of

Table 4. Research results for the main dimension 'Exchange information and education' of breeders according to farm age with animals of conservative breeds

Specification	Means	Number of important cases	Standard deviation
Up to 30 years old	-0.237486	16	0.982595
30–40 years old	0.172187	31	1.090160
41–50 years old	0.065770	39	0.963740
Above 50 years old	-0.081087	58	0.989759
Total	-0.004166	144	1.002227

Source: own research.

Table 5. Results of statistics in the area of cooperation 'Exchange information and education' of breeders according to farm size with animals of conservative breeds

Specification	Means	Number of important cases	Standard deviation
Up to 5 ha	-0.401271	35	1.053216
5–15 ha	0.097262	65	0.865632
15–30 ha	0.161874	44	1.084404
Over 30 ha	-0.004166	144	1.002227
Total	-0.401271	35	1.053216

Source: own research.

Table 6. Research results for the main dimension 'Exchange information and education' of breeders according to the time of introducing conservative breeds onto the animal farm

Specification	Means	Number of important cases	Standard deviation
Before 2004	-0.041873	26	0.796098
Between 2005–2010	0.031021	63	1.120272
After 2010	-0.000420	54	0.949647
Total	0.005895	143	0.998425

Source: own research.

recognition for cooperation in the scope of exchange of information and education among small, fragmented farms (up to 5 ha; average score: -0.4012).

The time of introduction of conservative breeds had a specifically differentiating impact on the evaluation of cooperation in the scope of exchange of knowledge and education. Farms with medium experience in maintaining conservative breeds of animals (introduced between 2005 and 2010) evaluated this dimension of cooperation higher than producers (breeders) with longer experience (more than 14 years) and shorter experience (approx. 7 years) (means, respectively: -0.0042 and -0.0418; Table 6).

CONCLUSIONS

The undertaken study and PCA allowed to determine the premises for creating knowledge by breeders and producers of conservative breed animals, making up for insufficient research in this regard. The

studied phenomena determine needs in the scope of knowledge and education with regard to characteristics of farmers and their farms and provide certain legitimacy to estimate the knowledge which the study subjects may contribute to society. Referring to the important role of breeders in biodiversity processes, it may be concluded that the studied farmers, despite being in need of knowledge and education, regularly propagate knowledge by maintaining the tradition of breeding and meeting consumers on the market. Insight into the current situation of cattle, pig and sheep breeders helps in understanding the difference in their approach to knowledge and education. Those who highly value the exchange of knowledge (pig and cattle breeders) are able to gain more benefits from it thanks to their experience in tackling market cycles (pig market upward and downward trends) and good sector organization. In turn, Polish sheep breeders, by rebuilding their inventories (which saw a great reduction in the nineties), regained a competi-

tive advantage not due to cooperation in the scope of exchange of knowledge and education, but thanks to opening to new (foreign) markets and the introduction of new products (lamb meat for export, traditional products, e.g. oscypek, bundz cheese varieties) as well as cooperation with national parks (access to EU funds). Individual knowledge was of lesser importance to them than collective knowledge (held by industry organizations and producer associations, e.g. 'Bacowie'). For sheep breeders, knowledge was obtained by industry organizations which made business contacts and used EU programme funding. In the view of sheep breeders, cooperation via associations was supposed to bring tangible market benefits (material benefits). Knowledge, as such, is not an interesting goal of cooperation. Enlarging farms may increase their interest in knowledge and education. In the current situation, the persons most interested in cooperation in the scope of exchange of knowledge and education were farmers owning mid-size farms with an area range of 15–30 ha. A point of concern is a lack of recognition for cooperation in the scope of exchange of information and education among small, fragmented farms (up to 5 ha). A poor education of farmers reduces their motivation to gain knowledge and to educate themselves. The need to exchange knowledge and education is notoriously low in groups with the highest and lowest education. In the first group, the awareness of benefits from knowledge is low (precedence of experience over knowledge), while the second group has a low sense of losses due to insufficient knowledge (no need to learn anymore).

Short experience in maintaining conservative breeds of animals increases the need to exchange knowledge and educate among farmers. From the point of view of fragmented farms, cooperation is not an essential source of knowledge to stay on the market. It is also of significance that increased attendance during fairs and trainings improved overall evaluation in the scope of exchange of knowledge and education.

The strategy of producers not appreciating the need of cooperation based on an exchange of knowledge and education is a matter of concern. The role of research and advisory institutions is to fill this gap

by partnership-based and 'tailor-made' education and training programmes. Industry organizations constitute a bridge in the transfer of knowledge, invaluable in the context of breeders' needs.

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FOOD SECURITY PROBLEMS IN SUB-SAHARAN AFRICAN COUNTRIES

Aleksander Grzelak, PhD¹; Agnieszka Sapa, PhD²

Faculty of Economics, Poznań University of Economics and Business

ABSTRACT

The main purpose of the study is to identify food security problems in Sub-Saharan African countries. Despite progress in increasing food security in the world, it is still one of the most important challenges facing Sub-Saharan Africa. The research shows that the food security is different across countries. The more favourable situation takes place in South Africa, Botswana, while at the other extreme are countries such as Madagascar, Burundi and Sierra Leone. The economic affordability of food seems to be the most important problem for these countries. So an inclusive growth could be a chance to improve the level of food security.

Keywords: food security, Global Food Security Index, Sub-Saharan Africa

JEL codes: Q18, H55, E64

INTRODUCTION

In spite of conditions of continuous economic growth, development of food markets, advanced technical and technological progress, the global economy, although allows providing the appropriate amount of food in the global dimension, does not guarantee everyone's accessibility to it. The problem of lack of food security mainly affects the inhabitants of developing countries, especially the countries of Sub-Saharan Africa. This issue is particularly important in the light of forecasts indicating that food production by 2050 must increase by 64% compared to the 2006 year (Hanson, 2013) to provide adequate amount (in caloric terms) for the estimated 9.3 billion people (UN, 2011). It is worth to state, that at the same time, nearly half (47%) of the projected population growth will take place in Sub-Saharan Africa (Hilderink et

al., 2012), which is characterized by very low land productivity and high dependence on food import (Rakotoarisoa, Lafrate and Paschali, 2011). So in the face of the problem of hunger and malnutrition, it is essential to present the level of food security in individual regions or countries. The appropriate measures of assessing and comparing the level and changes of food security across regions serve this purpose (Thomas et al., 2017; FAO et al., 2017). The main objective of the study is to assess food security in its three dimensions in Sub-Saharan Africa using Global Food Security Index in 2012–2017.

THEORETICAL BACKGROUND

The concept of food security has been modified for years, which reflects both the number of formulated definitions and the change in the definitions' empha-

¹ Corresponding author: al. Niepodległości 10, 61-875 Poznań, Poland, aleksander.grzelak@ue.poznan.pl, +4461 854 30 12

² Corresponding author: al. Niepodległości 10, 61-875 Poznań, Poland, agnieszka.sapa@ue.poznan.pl, +4461 854 30 12

sis on various elements of food security (Maxwell and Smith, 1992; FAO, 2012). The first definitions of food security focused on the supply side (UN, 1975), then on the demand aspect (FAO, 1983; World Bank, 1986) and qualitative dimension in the subsequent years (FAO, 2003). In 1996, at the World Food Summit, it was assumed that: food security, at the level of a single person, household, national, regional and global, is achieved when all people have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996). This definition indicates four pillars of food security: food availability, food affordability, utilization and stability (FAO, 2006). Some researchers also emphasise the need to take into account the fifth pillar of food security, e.g. environmental sustainability (Hanson, 2013). Given the multifaceted nature of the food security problem, there is a need for a holistic view of this issue, which is a challenge in the field of creating comparable ways of measuring food security and identifying ways to improve it (Kraciuk, 2017; Poczta-Wajda, 2018). Some literature is particularly focused on factors determining the level of food security. These factors can be divided into natural, political, social, economic and institutional (Gulbicka, 2009). FAO highlights five general drivers: economic growth, the role of family farming and smallholder agriculture, international trade, social protection systems and avoiding protracted crises (Hedden et al., 2016). At the same time, FAO as the primary cause of food insecurity indicates a too low income of households that do not allow people to achieve economic availability of food. Economic growth, which implies an increase in income of the poorest households, is crucial for building long-term food security (FAO and OECD, 2014).

Considering economic growth, as a factor determining the level of food security, the question arises whether economic growth implies reducing hunger and malnutrition or vice versa, food security implies economic growth. According to some researchers, economic growth is necessary to reduce hunger and

malnutrition. Economic growth implies higher wages, increase in household incomes, reduction of unemployment, nutrition, and thus the quality of human capital and productivity (FAO and OECD, 2014). This dependence was also the subject of empirical analyses (FAO, 2015). Other research indicates that food security determines economic growth. It is happening through the positive influence of food on physical and mental health, it means on human capital is an essential factor in economic growth. The food security is analysed in the context of the role of human capital in development (Burchi and De Mur, 2012; UNDP, 2012) and relation with sustainable development (Kleemann, 2012). The lack of food security in one country is a barrier and additional costs for global, regional or national economic growth (Torero, 2016), which was also confirmed by empirical studies (Agboola, 2014).

MATERIALS AND METHODS

The conducted research are based on the Global Food Security Index (GFSI) developed at the request of DuPont by the Economist Intelligence Unit (EIU) from 2012. This composite indicator is aiming at monitoring progress towards food security at a country level. This synthetic index is a result of 28 indicators grouped in 3 domain (adequate to three dimensions of food security): affordability (6 indicators), availability (11 indicators) and quality and safety (11 indicators). GFSI focuses on contributing factors to food security rather than on outcomes such as food consumption or the nutritional status of the population³. Due to the method of data aggregation, the index, on the one hand, allows a macroeconomic approach to food security, which avoids diversifying the level of food security within a selected country between households. On the other hand, the standardised data allow for international comparisons in static and dynamic approach, eliminating the subjectivism of assessments. The analysis is based on GFSI data for 28 countries of Sub-Saharan Africa in 2012–2017. Such a scope of work is determined by the availabil-

³ More details on GFSI: (Thomas et al., 2017; <https://foodsecurityindex.eiu.com/>).

ity of data. The research involved the analysis of the dynamics of phenomena, comparative analysis of indicators and correlation analysis.

RESULTS AND DISCUSSION

According to the Global Food Security Index (GFSI), the countries of Sub-Saharan Africa have the lowest level of food security (Table 1). Although in 2017 and 2012 there was an improvement in food security in Sub-Saharan Africa, the relatively high rate of change was mainly the effect of the base as well as the relatively good economic situation in most African countries in 2012–2017⁴. However, the drop in the index in 2017, as compared to the previous year, may be disturbing. This unfavourable reversal of the trend is also confirmed by research conducted by other measures (FAO, 2015; FAO, 2017).

Given the scale of the problem, progress in this area on the African continent is still insufficient. For example, according to FAO data in 1990/1992–2014/2016, the share of hungry and malnourished people decreased by 12 p.p., but the number of them increased by 25% (FAO, 2015), which was also associated with a high rate of demographic growth (e.g. 2.8%, compared to 1.35% in the world and 0.2% in Europe). In 2016, the problem of food insecurity af-

fects over 21% of Sub-Saharan Africans, while over 27% of the population has experienced severe food insecurity (FAO et al., 2017).

In the majority of the analysed African countries, the GFSI increased between 2012 and 2017. The most favourable situation was recorded in South Africa and Botswana (Table 2). These countries are generally characterized by a relatively higher level of economic development compared to the other analysed countries. In 2017 the least favourable situation was in Madagascar, Burundi and Sierra Leone. And, what is worth to highlight, in the examined period the food security situation worsened in countries with the lowest food security level. So it affects countries with a low level of economic and social development, very unfavourable climate, low farmland resources, low level of human capital and low productivity of production factors. Some countries are exposed to socio-political instability⁵ and numerous armed conflicts⁶ (FAO et al., 2017) or weather disasters⁷ associated with adverse climate change. As a consequence, the scale of hunger is especially significant there. The relatively high economic growth in Sub-Saharan African countries is at the same time marked by strong environmental degradation (Omisere, 2018), which consequently has a negative impact on the qualitative dimension of food security.

Table 1. Global Food Security Index in selected world's regions in 2012–2017

Group	2012	2013	2014	2015	2016	2017	Change (%) 2017/2012
All countries	56.0	55.9	56.6	57.5	57.9	57.3	2.32
Europe	75.0	74.5	74.6	74.6	75.6	75.2	0.27
Sub-Saharan Africa	36.0	36.3	37.2	38.3	38.4	37.3	3.61
Middle East and North Africa	60.3	59.9	61.3	62.0	62.0	60.8	0.83

Source: own elaboration based on Global Food Security Index (<http://foodsecurityindex.eu.com>).

⁴ The average annual GDP rate growth in sub-Saharan African countries in 2012–2017 was 4.1% (from 3% in 2016 to 5.1% in 2013), IMF Regional Economic Outlook: Sub-Saharan Africa, May 2016.

⁵ For that countries the political stability and absence of violence/terrorism index was very low. In 2015 the index was: –2.09 in Central Africa Republic, –0.4 in Madagascar while for Africa average value was 2.0, but for Europe 9.7 (info.worldbank.org/governance/wgi/#reports).

⁶ For example in Rwanda, Burundi and Chad.

⁷ For example an effects of El Nino in 2014–2015 in Senegal, Malawi, Zimbabwe.

Table 2. Value and structure of Global Food Security Index (GFSI) in selected Sub-Saharan countries in 2012 and 2017

Country	2017	2012	Change (%) 2017/2012	2017	2012	Change (%) 2017/2012	2017	2012	Change (%) 2017/2012	2017	2012	Change (%) 2017/2012
	GFSI			affordability			availability			quality and safety		
Angola	33.2	33.60	-1.2	21.9	31.10	-29.58	42.50	37	14.25	35.80	30	18.54
Benin	39.6	33.80	17.2	30.0	27.00	11.11	47.80	41	17.73	41.40	32	29.78
Botswana	59.4	56.90	4.4	54.5	50.20	8.57	67.30	65	2.91	50.10	50	-0.40
Burkina Faso	33.1	31.10	6.4	19.8	18.30	8.20	44.40	41	9.36	35.70	37	-3.77
Burundi	25.1	27.40	-8.4	13.5	16.30	-17.18	32.70	37	-11.38	33.40	29	14.78
Cameroon	41.6	38.10	9.2	33.6	29.90	12.37	44.20	42	6.51	54.20	49	9.72
Chad	28.3	28.70	-1.4	19.9	21.60	-7.87	33.00	33	-0.90	36.10	33	8.08
Congo (Dem. Rep.)	25.5	26.40	-3.4	15.7	20.40	-23.04	33.20	30	11.41	29.10	32	-9.63
Cote d'Ivoire	42.5	40.00	6.3	37.4	36.20	3.31	49.70	46	8.52	35.30	34	5.06
Ethiopia	33.3	36.50	-8.8	16.9	27.80	-39.21	47.60	46	3.48	34.90	32	9.75
Ghana	47.9	44.50	7.6	34.5	36.10	-4.43	58.00	51	14.40	53.60	49	10.52
Guinea	34.0	30.00	13.3	26.4	25.60	3.12	42.20	36	18.54	30.30	26	18.36
Kenya	42.2	42.10	0.2	37.6	39.60	-5.05	46.50	45	4.03	41.80	41	0.97
Madagascar	27.2	31.60	-13.9	15.0	21.40	-29.91	40.90	45	-8.71	20.20	21	-2.88
Malawi	31.3	32.10	-2.5	15.4	21.70	-29.03	43.40	43	2.12	37.60	29	28.77
Mali	39.4	37.80	4.2	24.0	26.70	-10.11	51.60	47	9.32	44.20	40	11.62
Mozambique	33.7	32.20	4.7	24.3	22.30	8.97	48.70	48	1.25	16.00	13	24.03
Niger	29.5	30.00	-1.7	18.9	19.90	-5.03	38.20	38	1.60	31.70	34	-6.49
Nigeria	38.4	35.40	8.5	25.0	21.40	16.82	46.40	44	6.67	49.90	48	4.61
Rwanda	39.8	38.90	2.3	29.4	30.50	-3.61	46.20	46	0.43	48.30	40	20.15
Senegal	44.2	36.30	21.8	31.6	30.10	4.98	57.00	41	39.71	40.80	39	3.55
Sierra Leone	28.7	32.50	-11.7	22.1	24.30	-9.05	32.50	39	-17.09	34.60	34	0.87
South Africa	64.0	60.10	6.5	62.7	55.50	12.97	66.80	65	2.93	59.70	58	2.40
Sudan	34.8	32.40	7.4	24.1	23.60	2.12	39.40	39	1.29	49.20	36	35.91
Tanzania	35.4	34.50	2.6	26.4	28.70	-8.01	44.30	43	3.02	33.60	26	30.23
Togo	37.2	32.70	13.8	28.5	30.50	-6.56	48.20	37	30.98	28.70	27	7.09
Uganda	43.3	40.00	8.3	36.3	37.80	-3.97	48.50	40	20.65	46.30	45	3.12
Zambia	32.4	32.50	-0.3	19.4	23.00	-15.65	46.40	45	3.57	26.60	22.00	20.91

Source: own elaboration based on Global Food Security Index (<http://foodsecurityindex.eui.com>).

It can also be noted that in Sub-Saharan African countries, the most significant problem when considering food security is the economic affordability (Table 2) of food and purchasing power of income. The remaining dimensions of food security are slightly compensated for the general situation in the area of food security. Although factors limiting food security are mainly on the demand side (affordability), it does not mean that the supply (availability) and qualitative (quality and safety) dimensions do not cause problems. So taking into account that for analysed countries there is a strong positive correlation between economic growth and the value of GFSI⁸ and previous research, there is need to support inclusive economic growth that will include poor, farmers, unskilled labour and support sustainable use of constraining natural resources. It is therefore necessary to create socio-economic development of developing countries, inter alia, by supporting the development of agriculture and rural areas, also due to their economic, social, ecological and political significance (World Bank, 2007).

CONCLUSIONS

Food security is a complex and multi-dimensional phenomenon. So it is difficult or even impossible to indicate a single cause of poor food security situation and, as a consequence, the only way of reducing hunger. It should be remembered that there are a group of general factors determining food security and group of country-specific structural, political and social factors. In this context, the concept of inclusive economic growth is considered. The growth that reaches the most vulnerable people of selected societies it means hungry and poor people.

Despite long-term progress in improvement (still unsatisfied) of food security situation at the global level, the number of people affected by hunger is still significant. Lack of food security is particularly important in the poorest countries, which include countries from Sub-Saharan Africa. But the problem is regionally differentiated, more favourable situation takes place in South Africa, Botswana, while at the

other extreme there are such countries as Madagascar, Burundi and Sierra Leone.

The issue of the economic affordability of food is a particularly sensitive dimension of food security in Sub-Saharan Africa. This is due to the relatively low income of the population, so the adequate economic growth is needed. But it should be inclusive economic growth, which will include the poorest and hungry people. At the same time, that strategy of economic growth cannot negatively affect the natural resources and the quality of the factors of agricultural production. In the opposite case, it will additionally threaten the potential of agricultural production and the qualitative dimension of food security. It is also advisable to develop the food industry, storage and road infrastructure as well as the level of education, in the context of food security problems.

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⁸ Authors' own elaboration.

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THE PHENOMENON OF LAND ABANDONMENT IN THE OPINIONS OF AGRICULTURAL ADVISERS (EXAMPLE OF PODLASKIE VOIVODESHIP)

Zuzanna Szymaniuk, MSc¹

Faculty of Economics, Warsaw University of Life Sciences – SGGW

ABSTRACT

The phenomenon of abandoning agricultural land is the same as discontinuing the agricultural use of certain agricultural land, the causes of which should be sought in environmental, economic and social factors. In the Podlaskie Voivodeship, agriculture plays a key role in economic life due to the significant number of lands classified as agricultural and century-old tradition of agriculture. The research assessed the existence of threats that could cause the problem of abandonment of agricultural land in the region and indicated the complexity of the land abandonment phenomenon. The study is based on opinions of advisers from the regional Agricultural Extension Service Centre. The results indicated that the process of ceasing to use agricultural land is the result of many factors that mutually influence and strengthen each other.

Keywords: land abandonment, land use, agriculture, Podlaskie Voivodeship

JEL codes: Q12, Q15

INTRODUCTION

The changes taking place in the contemporary world leave an imprint on the development and functioning of agriculture. Conducting agricultural activity is impossible without using land as a resource, which plays a key role in the process of providing the right amount and quality of food to the public. The renewal and substitutability of a land's resources is very limited, and therefore we should be treated as a crucial factor in agricultural activities. The processes reducing the amount of land available for agriculture are therefore extremely negative, which justifies the importance of research in this area (Inspekcja Ochrony Środowiska Białystok, 2011).

The decrease in use of certain agricultural land and ceasing agricultural production thereon is called the phenomenon of land abandonment. As a result, not only a reduction in the availability of land for agricultural production occurs but, above all, changes in the natural environment and landscape of rural areas take place, resulting in socio-economic changes. The phenomenon of abandonment of agricultural land has only slightly been examined in the context of its impact on the economic environment. The way to more thoroughly understand the phenomenon under consideration, is to analyse the reasons for its occurrence and factors that determine that some areas are abandoned and others are continuously used.

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, zuzanna_szymaniuk@sggw.pl, +48 780 001 29

The Podlaskie Voivodeship is one of the agricultural regions of Poland, and farmlands make up a significant percentage of its area (Urząd Marszałkowski, 2006). Satellite surveys of Central and Eastern Europe have shown that this region of Poland is characterized by the largest share of lands abandoned in relation to the rest of the country (Alcantara et al., 2013). The main aim of the study was an attempt to outline expert opinions concerning the phenomenon of land abandonment in the Podlaskie Voivodeship, which has not yet been researched before.

THEORETICAL BACKGROUND

The phenomenon of land abandonment is a gradual process of discontinuing the agricultural usage of land and it combines economic, natural and social aspects. Understanding the fact of limiting the usage of certain farming lands, it is necessary to make decisions related to future agriculture and trade. In foreign literature, this phenomenon has several mutually complementary definitions (Renwick et al., 2011).

Keenleyside and Tucker (2010) define that land abandonment leads to a significant reduction in the cultivation of agricultural land, which leads to unwanted changes in the ecosystem. The land that was once used in agriculture and remains covered with natural vegetation during the year is abandoned land according to Bühnemann, Schreiber and Billion (1979), with the indication that these lands are currently not alternatively used as forest or urbanized area. MacDonald et al. (2000) add that this phenomenon can begin the moment the financial and material revenues from the land are utilized and, from an economic view, the continuation of agricultural production on it is not profitable at all. Pinto Correia (1993) draws attention to the relativity of the word abandonment and indicates terms of similar meaning as marginalization or extensification. Land abandonment in this approach may mean a modification of the management method to a less intensive one. Russo's land abandonment process (2003) is not immediate and involves a transition from an extensive or traditional cultivation system towards even less intensive use, until a total reduction of human activity (Russo et al., 2006). Morovec and Zemeckis (2007) referred to inconsistent definitions

of land abandonment in law and science. They pointed out that inaccuracies related to the interpretation and measurement of the phenomenon in Europe may contribute to a lack of actual information about its scale.

The Food and Agriculture Organization of the United Nations and the European Commission have differently defined the time that must pass from the cessation of agricultural use to stating that the land was abandoned. FAO defines abandoned land as all land which is not used in agriculture and connected production for a minimum period of five years. The European Commission, among agricultural-environmental measures, distinguished that land can be assessed as abandoned when it is not used for agriculture or when there is no other economic activity for a period of three years (Council Regulation (EEC) 2078/92).

The Entrepreneurs Organization (EO) indicates that the phenomenon of land abandonment should be rather approached in the way of land management rather than in the vegetation growing on a given area. It is consistent with the position that a change in vegetation is a consequence of changes in the way agriculture is managed (Saukup, Brodsky and Vobora, 2009).

Depending on the extent to which the use of agricultural land has been discontinued, three main types of abandonment of agricultural land can be distinguished (Pointereau et al., 2008). Lack of any form of farming on a given land is also understood as actual abandonment. It is accompanied by a process of overgrowing with natural plant cover, i.e. weeds, shrubs and trees adapted to the climate zone and soil type (Lasanta-Martinez, Vicente-Serrano and Cuadrat-Prats, 2005). Semi-abandonment can be distinguished in the case of a minimal level of farming on agricultural lands. Officially, such lands are not qualified as abandoned, because small-scale agrotechnical activities are carried out on them. Often such a kind of land abandonment is called hidden abandonment as the agrotechnical works there are often insufficient to maintain good conditions of soil environment. The purpose of such management is to meet the requirements of the cross-compliance mechanism, which are mandatory in order to obtain EU subsidies (Verburg and Overmars, 2005). It also happens that a farm with land of marginal importance is later put to normal agricultural use in

the future. Occasional or very extensive use can also be classified as semi-abandonment (European Union, 2004). The effect of complying with old regulations on the obligatory setting-aside of agricultural land was the appearance of the phenomenon of traditional abandonment (Keenleyside and Tucker, 2010).

The phenomenon of abandonment of agricultural land is a consequence of many interrelated causes, which in the majority of cases intensify each other (Moravec and Zemeckis, 2007). Cited by many authors, including Baudry (1991), Gellrich and Zimmermann (2007), Pointereau (2008) and others, the reasons for the abandonment of agricultural use of some lands are present in many areas of science, which indicates the need for a multi-directional analysis. In literature devoted to the study of the described phenomenon, references are made to such reasons as environmental, economic, social, political, legal, historical or agronomic (Pointereau et al., 2008). Due to the specificity of agricultural production, as work with living organisms using a natural environment, in many cases natural causes play a dominant role (Cieśliński et al., 1987). The diversity of regions and the different specificity of conditions of agriculture characteristic for them, multiply the difficulties with the unequivocal determination of the causes of land abandonment (Terres, Nisini and Anguiano, 2013).

One of groups that cause the phenomenon of land abandonment include economic reasons. A decrease in income stemming from cultivation, the inability to cover expenses related to it and the risk of conducting agricultural activities are the main reasons for abandoning land use. This of course is directly related to the economic environment in a given region. Agricultural and macroeconomic indices are also highly significant. An important element is also the functioning of the agricultural land market and legal conditions for land acquisition (FAO, 2006).

MATERIALS AND METHODS

In the theoretical part of the paper, source material from foreign literature devoted to the study of the land abandonment phenomenon was used. In the practical part of the paper, qualitative research was carried out in the form of expert interviews with 13 agricultural advi-

sors from the Podlasie Agricultural Advisory Centre in Szepietowo. Interviews were conducted with advisers related to such departments as: the Department of Economics and Management of Agricultural Farms, the Department of Organic Agriculture and Environmental Protection, the Rural Development Department and the Department of Plant Production Technology and Experimentation. After an evaluation of main characteristics of conducting agricultural activity in the Podlaskie Voivodeship, they were compared to reasons of land abandonment mentioned in the theoretical part of the paper. Basing on this, a questionnaire for extended interviews was created. The answers were evaluated according to the Likert scale. The purpose of the interviews was to obtain information about the scale and assess the reasons for abandoning agricultural land in the Podlaskie Voivodeship.

RESULTS AND DISCUSSION

Advisors agreed that the problem mainly concerns agricultural land located within the eastern border of Poland, the so-called Eastern wall. The main adviser dealing with issues of rural development classified the Poviats of the studied region in accordance with the prospects for the existence of abandoned land there. According to expert opinions, Poviats exposed to a greater extent to the abandonment of agricultural land use are eastern Poviats (Łomżyński, Grajewski, Moniecki, Suwalski, and Sejneński) and the Kolneński Powiat.

Two factors have been identified as those having a rather large impact on the occurrence of land abandonment. The first of these two is the most common reason for the abandonment of agricultural land, not only in the studied region, but also in global research (Kuemmerle et al., 2008). Experts pointed out that natural conditions and their quality in the Podlaskie Voivodeship contribute the most to the occurrence of land abandonment. At the same time, they confirm that despite the constant development of agricultural production techniques and technologies, certain conditions cannot be eliminated without suffering disproportionate costs. For example, with the modern development of science, farmers are able to grow corn on a plot located near a forest, but the economic

legitimacy of this activity is in many cases negligible (Bórawski, 2007; Babuchowska and Marks-Bielska, 2012; Kisiel and Babuchowska, 2013; Inspekcja Ochrony Środowiska Białystok, 2016).

The second factor, which according to experts has a large impact on the occurrence of land abandoning, is socially based, such as generational changes

and how young people perceive working in agriculture. In the opinion of one of the advisers, most often young people do not want to work in agriculture. The adviser assumed that it is associated with hard physical work, especially on small farms, with a lower level of production process modernization (compared to large, modern farms). The adviser admitted

Table 1. Assessment of the impact of factors favouring the presence of disused agricultural land in agriculture in the Podlaskie Voivodeship (scale: 1 – not at all; 7 – absolutely yes)

No	Factors favouring the abandonment of agricultural land	Average rating by experts
1	Poor environmental conditions to conduct agricultural production (e.g. poor soil, unfavourable terrain, wetlands, stoney etc.)	3.67
2	Unfavourable farm locations – a lot of small plots distant from each other	2.83
3	Legal protection, which limits the possibilities of use for agricultural activities (e.g. areas of a National Park, protected landscape areas, Nature 2000, etc.)	2.58
4	Lower profitability of agriculture in the Podlaskie Voivodeship	2.67
5	Insufficient investment in agriculture	2.50
6	Problems with land inheritance and the transfer of land to the younger generation (no successors)	2.25
7	Legal restrictions on the purchase/sale of agricultural land	3.08
8	High prices of agricultural land and permanent grassland limiting the number of transactions with plots of low agricultural potential	2.83
9	Keeping agricultural land by farmers as an investment good	2.83
10	High costs of land use, e.g. agricultural inputs (e.g. fertilizers, fuels, work)	2.92
11	Lower consumption of NPK and calcium fertilizers per 1 ha in the Podlaskie Voivodeship than the average in Poland	2.58
12	Noticeable strong specialization of agriculture in Podlasie towards milk production	2.67
13	Low yields of cereal and potatoes obtained from 1 ha of agricultural land	2.50
14	Lower labour resources available for agriculture compared to the national average	2.83
15	Aging of people managing a farm / problems with succession	3.00
16	A low level of urbanization in the Podlaskie Voivodeship. which results in weaker access to the technical and service infrastructure of the population	2.42
17	Generational changes regarding the perception of work in agriculture (young people do not want to work in agriculture)	3.50
18	Insufficient level of agricultural education of people managing farms	2.42
19	Farmers' reluctance to receive support from EU funds	1.67
20	Insufficient knowledge of farmers regarding programmes supporting agriculture from EU and national funds	2.00
21	Migration of people from villages to cities	3.00

Source: own study based on expert interviews.

though that upon an exchange of views with young people, they often present their devotion to working in agriculture and want to run their own farms. Another reason for agricultural land abandonment in the Podlaskie Voivodeship, in the opinion of the expert group, could be changes in law and resulting restrictions in land purchase/sale transactions. Other issues causing the phenomenon under investigation, which are worth highlighting, are problems with the indication of a successor and problems with inheritance as well as the migration of the rural population.

All answers given in the above described part of the interviews confirm the complexity of abandonment of agricultural land. Experts disagreed with each other in all points. Often, besides reasons of land abandonment coinciding with the opinion of other experts, different and new justifications were given. Research has shown that despite the experts' different views on the problem of abandonment of agricultural land, some reasons are the same in the advisors' answers. After thoroughly analysing the answers of experts, it can be concluded that the abandoning of agricultural land is a complex phenomenon. The research confirmed that it is not possible to indicate only one factor responsible for the occurrence of land abandonment, because it is most often associated with several causes.

The next issue discussed in the interviews concerned the assessment of the phenomenon of ceas-

ing to use agricultural land as positive or negative in the opinion of experts. In most cases, advisors shared the opinion that this is a negative phenomenon considering the functioning and development of agriculture. The arguments for justifying such opinions were different. The opinion of the adviser from the Development Department was that despite obstacles and difficulties, agricultural land should be used, not only for the economic viability of this activity, but also to preserve the landscape potential of agricultural areas. This adviser believed that the land is able to yield the right level of outlays incurred in the process of its use. Another expert added that abandonment of agricultural land leads to a decline in agricultural production, which is a manifestation of negative phenomena in the functioning of agriculture in the Podlaskie Voivodeship. Another expert from the Development Department stated that abandoning of agricultural land is a waste of potential and a threat in the process of agricultural development.

The last issue addressed in the interviews concerned the evaluation of the proposed activities, which could contribute to reducing the abandoning of agricultural production on some land. Experts assessed each proposition of action on a seven-point scale (1 – not at all; 2 – no; 3 – rather not; 4 – neutral; 5 – rather yes; 6 – yes; 7 – absolutely yes). Table 2 contains the average results of the evaluation of individual activities.

Table 2. Average assessment in the area of activities aimed at reducing the practice of abandoning agricultural production (scale: 1 – not at all; 7 – absolutely yes)

No	Measures reducing the occurrence of abandonment of agricultural land	Average rating by experts
1	Development and support of organic farming that also uses areas valuable from the point of view of nature conservation	6.17
2	Increased number of inspections and fines for lack of agricultural use of agricultural land	3.17
3	Training and educational programmes on the consequences of not using certain agricultural lands in agricultural production	5.25
4	Increased support and education of farmers in the field of receiving assistance from the EU and national funds	5.75
5	Programmes for consolidation of small soils	6.33
6	Subsidies for farming on less-favoured land (LFA)	6.08
7	The obligation to grow the land when the holding applies for EU subsidies	6.00

Source: own study based on expert interviews.

The idea of supporting and developing organic farming as an opportunity for using the environmental potential of the Voivodeship was assessed highly by experts. Promotion of regional products and the value derived from the consumption of healthy food is nowadays a popular activity that gathers the sympathy of the society and co-financing institutions. The greatest interest among the ideas to decrease land abandonment was aroused by the proposal of actions aimed at the consolidation of fragmented land and improvement of the agrarian situation. One of the proposals, which according to experts would not decrease abandonment, concerned an increased number of controls and financial penalties for the lack of agricultural land use. According to advisers, this type of action would trigger negative reactions among the farming community, as farmers already have to be wary of the many penalties that could potentially be imposed on them.

CONCLUSIONS

The phenomenon of abandonment of agricultural land is found in regions burdened with harsh enough natural conditions to impede agricultural production, but also in regions with a poorer economic situation, which are struggling with social problems. Podlasie, being such a region in Poland, was examined for the presence of factors increasing the risk of abandoning agricultural land. Within the studied region, there are a number of reasons that have an influence on the occurrence of the land abandonment phenomenon. As a result, the lands located in Podlasie are exposed to abandonment, which is associated with degradation, decline in agricultural production and the weakening role of agriculture in the social and economic structure.

Qualitative research in the form of expert interviews with agricultural advisors associated with the Agricultural Advisory Centre of Podlasie confirmed that the phenomenon of abandoning agricultural land in the Podlaskie Voivodeship could be caused by many factors that connect and intensify their influence. Factors affecting the occurrence of agricultural land abandonment overlap and it is impossible to indicate just one reason for the occurrence of this

phenomenon. Experts from various departments dealing with agriculture paid greatest attention to the significance of environmental causes and limited profitability of agricultural production associated with it. As a reason for abandoning the whole or part of the land, difficulties in using land with poor natural conditions in a way that would bring financial benefits for farmers were pointed out. Due to the limited production potential of certain agricultural lands, activities there are often gradually discontinued. Advisors assessed the importance of financial support for farmers using such lands as compensation for expenses related to agro-technical work, etc., in exchange for maintaining land in good agricultural condition and protecting the countryside's landscape.

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DECOMPOSITION OF UNEMPLOYMENT IN RURAL POPULATION ON THE BASIS OF MAIN SOURCES OF INCOME IN 2002–2009 AND 2016

Włodzimierz Kołodziejczak, PhD¹

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The aim of the paper is to present a decomposition of unemployment in the rural population into the structural and cyclical components in groups distinguished based on their main source of household income. This study was conducted using the method estimating the level of natural unemployment (equilibrium unemployment) proposed by the Centre for Economic Policy Research (1995). The analysis was based on individual, unweighted, quarterly raw data provided by the Polish LFS (BAEL) from the years 2002–2009 and 2016. The professional situation of the rural population in the analysed period improved, which was manifested in an increase in the employment rate and a reduction of the actual unemployment rate. Between the periods of 2002–2005 and 2006–2009 actual unemployment 'followed' the lower values of equilibrium unemployment. In 2016 the actual unemployment rate was lower than in previous periods; however, an adverse change was observed for its relation to the natural unemployment rate. If we assume that it will – as previously – strive to attain the equilibrium level, in the case of a downturn on the market for goods and services the actual unemployment among the rural population may considerably increase, particularly in the group of individuals whose main source of income is provided by unemployment benefits and the family farm.

Keywords: natural unemployment, labour flows, rural population

JEL codes: J20, J63

INTRODUCTION

Literature sources on the subject distinguish two basic directions in the discussion of the phenomenon of unemployment. Representatives of one direction perceive the causes of high unemployment in Poland in structural discrepancies between demand for labour and its supply. Proponents of this theory postulate that in order to reduce the scale of unemploy-

ment it is necessary deregulate the labour law to the advantage of employers and to lower or eliminate minimum salaries (Friedman, 1957; Wilczyński, 2003), which by principle is to result in a shift of equilibrium on the labour market towards high employment rates, and to increase competitiveness of the Polish economy. The other direction stresses the effect of factors connected with the current situation on the market for goods and services. Supporters

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, kolodziejczak@up.poznan.pl, +4861 846 73 05

of this approach indicate the advisability of active instruments of the exchange rate, customs and fiscal policies, which should contribute to increased employment in a given country (Keynes, 1956; Kabaj, 2003). However, unemployment is typically a complex phenomenon of structural and cyclical character, which means that it is necessary to apply simultaneously methods to control it, which are adequate to each of its components. Determination of the relations between actual and structural unemployment not only facilitates selection of proper tools on the labour market, but also makes it possible to predict how the situation on the labour market will be changing in the case of an improvement or deterioration of the situation on the market for goods and services.

The aim of this paper is to present a decomposition of unemployment in the rural population into the structural and cyclical components, in groups distinguished based on the main source of household income. The calculations made it possible to indicate vulnerability of individual groups in the rural population to changes in the economic situation and to the effects of structural factors (including institutional factors), and as a consequence – provided grounds for inference on the threat of unemployment or professional disactivation.

THEORETICAL BACKGROUND

A method to estimate the size of the structural and cyclical components of unemployment consists in the determination of the level of steady-state equilibrium unemployment, i.e. such which the economy is striving to attain over a long period. In this approach the level of unemployment below the equilibrium level is equivalent to the structural component (over a short period generally resistant to changes in the economic situation), while the section of unemployment above the equilibrium level is connected with the cyclical component (i.e. occurring as a result of too low demand for labour).

Socha and Sztanderska (2002) after Haltiwanger (1991) stated that equilibrium unemployment refers

to such a level of unemployment, which a dynamic system strives to attain under the stochastic general equilibrium conditions. It takes into consideration actual, structural characteristics of the labour markets and markets for goods, including market inefficiencies as well as costs associated with searching for a job and mobility costs. In simple terms we may assume that equilibrium unemployment is modified by the effects of the skill-wage mismatch (excessive wage expectations of the labour force in relation to the offer of employers under specific economic conditions), as well as the mismatch concerning qualitative and spatial characteristics of the labour force and vacancies (age, sex, education, location, skills, motivation, certificates and licences, etc.) (Kwiatkowski, 2002; Socha and Sztanderska, 2002). This phenomenon is observed even at the maintenance of equilibrium between the aggregate supply of the labour force and the aggregate demand for labour over the entire market. Causes of the mismatches include wage rigidity and wage expectations, institutional limitations, technological progress, geographical distribution of labour and vacancies as well as structural changes in the economy (Jackman and Roper, 1987; Socha and Sztanderska, 2002; Kołodziejczak and Wysocki, 2013).

Determination of the steady-state unemployment level makes it possible to estimate what part of unemployment observed in the economy is independent of short-term cyclical fluctuations on the markets for goods and services (Socha and Sztanderska, 2002), i.e. what part of unemployment is structural in character and what part is cyclical. This information is the basis for the determination of the type of actions aiming to increase employment and/or reduce unemployment – a high rate of structural unemployment in actual unemployment is an impulse to implement programmes to improve the matching of the supply and demand sides of the labour market and to eliminate non-cyclical barriers (including wage-related) limiting employment, while a considerable share of cyclical (Keynesian) unemployment indicates advisability of stimulation of economic growth.

MATERIALS AND METHODS

This study applies the method to estimate the level of natural (equilibrium) unemployment proposed by the Centre for Economic Policy Research (1995)². The analysis was based on individual, unweighted, quarterly raw data provided by the Polish LFS (BAEL) from the years 2002–2009 and 2016³. Changes in the economic activity of individuals were observed in panels – pairs of quarters, in which among the entire LFS sample only those individuals were considered, who were surveyed in both quarters of a given pair (e.g. the 1st and the 2nd quarters of 2002, next the 2nd and the 3rd quarters of 2002, the 3rd and the 4th quarters of 2002, the 4th quarter of 2002 and the 1st quarter of 2003, etc.).

The analyses were based on 16 unpublished, individual, quarterly sets of LFS raw data from the years 2002–2005, sixteen sets from the years 2006–2009 and four sets from 2016. In each quarter analyses were conducted (depending on the LFS surveyed population size) on min. 44 thousand individuals in the years 2002–2005, 80 thousand individuals in the years 2006–2009 and approx. 100 thousand individuals in 2016. Among the many investigated classification sections (e.g. age, sex, education, place of residence, type of town of their residence, links with agriculture, etc.) the paper presents results obtained for two criteria applied simultaneously, i.e. types of place of residence and the main source of household income. As the calculations were performed on unweighted data (it is the only possible approach in re-

lation to the LFS individual database in the BAEL system, since weights ascribed to respondents by the Main Statistical Office (GUS) are proper only for the entire sample and are not applicable to individual population groups), the results need to be treated as approximate values. Their informative value consists in the indication of differences and potential trends; however, they may not be treated as accurate actual values.

Based on the LFS (BAEL) data the volume and rates of flows were determined between individual types of economic activity status in the population on average in the years 2000–2005, 2006–2009 and in 2016. As a result it was possible to apply the equilibrium unemployment estimation method developed by the Center for Economics Policy Research – CEPR (1995). The CEPR method consists in the determination of the steady-state unemployment rate according to the formula:

$$u^* = \frac{s + z}{s + h + n}$$

where:

- u^* – equilibrium (steady-state) unemployment rate,
- $s = (EU + EN) / E$ – rate of outflow from employment (including to unemployment and economical inactivity),
- $h = UE / U$ – rate of outflow from unemployment to employment,
- $z = (NU - UN - EN) / (E + U)$ – demographic component of unemployment,

² Depending on the applied method estimating equilibrium unemployment they may be determined for the entire economy or for individual groups of the population distinguished based on selected characteristics. Models based on the Philips Curve theory or on the hypothesis of rational expectations and neutrality of money, e.g. NAIRU (Non-Accelerating Inflation Rate of Unemployment) and NAWRU (Non-Accelerating Wage Rate of Unemployment) use market variables and their application is limited generally to aggregate data at the level of whole economies (Socha and Wojciechowski, 2004). Methods based on the analysis of changes in behaviour of individuals on the labour market make it possible to analyse separately groups of the population differing in socio-economic characteristics. The most important of these include the method proposed by the Center for Economics Policy Research (1995), the Gärtner method (1997) and the method proposed by Darby, Haltiwanger and Plant (1986).

³ The period 2002–2005 can be considered as the time of the agreed 'end of transformation' and stabilization of the structure of the economy with simultaneous high unemployment. The years 2006–2009 showed the improvement of the situation, resulting in a negative external shock that revealed as the 2007–2009 financial crisis (Kołodziejczak and Wysocki, 2015). The year of 2016 is a period of noticeable improvement in the labour market, resulting mainly from economic growth and demographic trends (and at the same time the latest LFS data available to the author).

n – percentage changes in labour force resources in the assumed sample duration,

while:

- E – the number of employed at the beginning of the investigated period,
- U – the number of unemployed at the beginning of the investigated period,
- EU – the volume of flows from employment to unemployment in the analysed period (the number of individuals, who changed their status from employed to unemployed),
- EN – the volume of flow from the group of employed to the group of economically inactive,
- NU – the volume of flow from the group of economically inactive to the group of unemployed,
- UN – the volume of flow from the group of unemployed to the group of economically inactive,
- UE – the volume of flow from the group of unemployed to the group of employed.

If $u^* > u$, actual unemployment (u) will probably increase, since it did not yet reach the level resulting from the effect of structural factors on the labour market (mismatch of supply and demand for labour); if $u^* < u$, actual unemployment is greater than that resulting from structural factors and the difference may be approximately treated as equivalent to unemployment caused by a too slow economic growth (thus probably values u may approach level u^* by stimulating the economic prosperity on the market for goods and services). The analysis of changes in values of these indexes for individual groups of the population distinguished from the labour resources or for individual markets makes it possible to determine causes for adverse phenomena, identify problem groups at risk of unemployment and propose directions for corrective actions⁴.

RESULTS AND DISCUSSION

Table 1 presents characteristics of economic activity for the rural population in Poland in terms of the main source of income in the years 2002–2005, 2006–2009 and 2016 (average values in the periods). It may be stated that with time the actual unemployment rate was decreasing in all the investigated groups of the population. This fact and the increasing values of the employment rate indicate improvement in the situation on the labour market. Only among individuals whose main source of income is the running of the family farm the employment rates were decreasing slightly in 2016 in relation to the years 2006–2009; however, the observed difference may be considered to fall within the error of measurement value. Steady-state unemployment rate in the years 2006–2009 in all the groups was lower than in the years 2002–2005. This indicates a decreasing importance of the structural component of unemployment, which may indirectly suggest a reduced role of the qualitative mismatch between labour demand and supply, but – in relation with the decrease in the values of the actual unemployment rate – also the equilibrium unemployment rate following the decreasing actual unemployment. Nevertheless, estimates for 2016 indicate – at least a partial – reversal of this trend.

The overall equilibrium unemployment rate in rural areas was almost two-fold greater in 2016 than in the years 2006–2009, mainly due to the rapid increase in its values among individuals classified to households supported mainly by unemployment benefits (Table 1). While in the earlier periods unemployment in this group could be linked to a considerable extent to the general shortage of jobs, in 2016 almost 50% of the actual unemployment was structural. It may be explained in two ways: firstly, an improvement overall situation on the labour market after 2004, connected among other things with economic migra-

⁴ It needs to be stressed that they are oversimplifications and the interpretation of the results based on these assumptions has to take into consideration economic and social conditions. However, it is worthwhile to accept them in view of their usefulness. Limitations observed in this respect result first of all from the mechanisms of hysteresis on the labour market (cf. Layard, Nickell and Jackman, 1991; Kołodziejczak and Wysocki, 2013).

Table 1. Characteristics of economic activity in the rural population in Poland in terms of the main source of income in 2002–2009 and 2016 (means in periods)*

Area	Years	Economic activity index	Employment rate	Actual unemployment rate	Equilibrium unemployment rate according to CEPR	Actual unemployment to equilibrium unemployment ratio
Total for rural areas	2002–2005	53.9	44.6	17.4	14.1	81.3
	2006–2009	52.0	47.5	8.6	5.1	59.3
	2016	51.2	48.0	6.1	10.1	163.7
Agricultural family farm	2002–2005	69.0	65.2	5.8	5.1	89.2
	2006–2009	67.9	66.0	2.9	2.3	80.3
	2016	67.2	65.4	2.6	5.3	203.3
Employees	2002–2005	60.4	48.8	19.8	8.5	43.0
	2006–2009	56.2	49.9	11.7	3.8	32.2
	2016	59.4	57.0	4.0	1.9	46.3
Self-employed, excluding the running of a private farm in agriculture	2002–2005	64.5	57.6	10.8	21.2	196.2
	2006–2009	63.2	60.3	4.6	3.3	70.6
	2016	73.6	71.6	2.7	0.3	10.1
Unemployment benefits	2002–2005	54.5	15.6	70.8	28.2	39.9
	2006–2009	47.0	12.9	71.7	2.5	3.5
	2016	59.0	41.7	29.5	47.6	161.4

* due to the marginal importance of the risk of unemployment and the limited size of this paper the presented results exclude groups of individuals with income received but not earned: disability pensions, old age pensions and others (excluding unemployed).

Source: the author's calculations based on unpublished, individual quarterly raw data of Polish LFS (BAEL).

tion abroad for the population from areas suffering the most from unemployment, which eliminated a considerable part of the cyclical component of unemployment. Secondly, the remaining unemployed rural population retained their professional situation as a result of institutional regulations (e.g. subsidies to unprofitable farms, stricter regulations concerning temporary employment, social aid programmes) and – probably – a lack of economic justification for undertaking employment at the offered wages. Another group, among which steady-state employment increased included individuals classified to households supported by the running of the family farm. In this case the causes may be similar to those indicated for

the previous group, i.e. migration abroad and subsidies to unprofitable farms. It may be assumed that in both groups individuals better adapted to the needs stated by employers undertook employment in Poland or abroad, while the group of unemployed was composed of those less adapted to the requirements and new individuals classified to that group from among those economically inactive. A certain effect on the increase in the level of equilibrium unemployment may have also been connected with the unemployment revealed by reducing hidden unemployment in agriculture (Kołodziejczak, 2016).

A disturbing finding is connected with the considerable increase in the ratio of the equilibrium un-

employment rate and the actual unemployment rate recorded in 2016 in relation to the years 2006–2009. On average in the rural areas it was almost 164%, among individuals in households supported mainly by unemployment benefits it was over 161%, while in the group of individuals in households supported mainly by running a family farm it was as high as over 203%. Assuming that actual unemployment follows equilibrium unemployment, it indicates potential, marked and adverse changes in the professional situation of the population in those groups at a decline on the market for goods and services. It also points to mostly cyclical/demand causes of a relatively good situation on the labour market (it is possible that to a large extent they are artificially created as a result of both intervention and social programs and the transfer of EU assistance funds). At the same time, it is likely that this situation does not have strong structural foundations. It means that without sustaining market intervention (mostly through money transfers for the population and institutions), the real unemployment rate will be significantly increased.

CONCLUSIONS

The aim of this paper was to deconstruct the phenomenon of unemployment in the rural population into the structural and cyclical components in groups distinguished in terms of the primary source of household income. The investigations showed that the professional situation of the rural population in the analysed period improved, which was manifested in an increase in the values of the employment rate at a reduction of the actual unemployment rate. Between the periods 2002–2005 and 2006–2009 actual unemployment followed lower values of equilibrium unemployment. In 2016 the actual unemployment rate was lower than in earlier periods; however, its relation to the steady-state unemployment rate was deteriorating. If we assume that it will – as previously – attempt to reach the equilibrium level, in the case of a decline on the market for goods and services actual unemployment among the rural population may increase considerably, particularly in the group of individuals in households supported mainly from unemployment benefits and operation of family farms.

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AGRICULTURAL PRODUCTIVITY IN POLAND IN THE CONTEXT OF STRUCTURAL CHANGES IN THE SECTOR IN 2002–2016

Ryszard Kata, PhD, Associate Professor¹

Faculty of Economics, University of Rzeszów

ABSTRACT

This paper attempts to analyse the changes in labour and land productivity in agriculture in Poland resulting from changes to the production structures in this sector, particularly changes in the relationships between production factors, i.e. land, labour and capital. The analysis covered the years 2002–2016. It was found that this period saw important changes in agriculture expressed in the concentration of agrarian structure and the progressive substitution of land and labour by capital, which was reflected in the increase of work technical equipment and the rate of technical progress. There was also a progressive outflow of some of the labour resources from agriculture. A positive correlation between the productivity of land and labour and the said structural changes in agriculture was found.

Key words: agriculture, production factors, productivity of land and labour

JEL codes: Q10, Q18

INTRODUCTION

In terms of utilised agricultural area (UAA) and labour resources in agriculture, Poland has relatively high potential to accomplish its goals in this sector. Regardless of changes in agricultural policy, production and economic results remain the most important objectives of agriculture. This involves achieving the amount and quality of agricultural products demanded by the market and ensuring appropriate income for farmers (Dzun, 2012). Achieving this goal depends not only on the amount of production factors held in agriculture, but also on their effective use in production processes.

In economics, the category of efficiency is of fundamental significance and touches on the problem of managing rare resources and optimising their use for

the creation of goods and services. Agricultural productivity can be regarded in the context of the productivity of production factors or the profitability of agricultural activities, i.e. taking into account the costs (Czyżewski and Staniszewski, 2016). Productivity is the relationship between the amount of products, i.e. production results and the amount of production factors used in the production process, i.e. inputs (Woś, 1984). It can also be expressed as the value of production obtained from a unit of a particular input.

A number of determinants of agricultural productivity can be distinguished, from the quality of the agricultural production area, to macroeconomic determinants (economic trends, price scissors, foreign trade etc.), to external factors. Of the last, a special role is played by agricultural production structures, defined as the arrangement and mutual relationships

¹ Corresponding author: Cwiklińskiej 2, 35-601 Rzeszów, Poland, rdkata@ur.edu.pl, +4817 872 16 04

between production factors and the results of their use. These structures can have many dimensions, such as production structure, i.e. the share of plant and animal production or the share of a given production type in the production value. According to Czyżewski and Staniszewski (2016), the productivity level of individual inputs largely depends on their mutual relationships.

This paper focuses on the relationship between production structures and land and labour productivity in agriculture. Changes in production structures (structural changes) should be understood as changes in the volume of resources of land and labour factors in agriculture, changes in their mutual relationships and the correlation of these resources with the capital factor. These relationships will be considered at the level of the whole sector. The objective of this paper is to analyse and evaluate the direction and scale of structural changes in 2002–2016 and to determine whether these changes were connected with the increase in land and labour productivity.

THEORETICAL BACKGROUND

Studies on the influence of changes in production structures on the level of agricultural productivity and potential determinants of these changes have been conducted in various places in the world for many years. Huffman and Evenson (2001) demonstrated that in the US the specialisation and concentration of production and farmers' access to non-farming sources of income influenced the overall productivity of resources in agriculture. Wang, Schimmelpfennig and Fuglie (2012) studied the determinants of the total productivity of production factors in European agriculture and found the declining significance of the labour factor in their structure. Vandermeulen, Mettepenningen and Calus (2010) demonstrated that the trend of structural changes in Belgian agriculture (the region of Flanders), similarly to those in all Western European agriculture, is towards larger farms and lower employment. These changes are bringing increased productivity, but also specific social and environmental consequences, which are often unfavourable when the structural changes lead to the narrow specialisation of farms and the industrialisation of agriculture.

Capital resources are increasingly important in boosting agricultural productivity (Fuglie and Rada, 2013; Wang et al., 2015). Through investments, this factor contributes to increasing the technical quality of work technical equipment and the rate of technological progress, which favours higher labour efficiency and land productivity (Pawlak, 2016; Kusz and Misiak, 2017). An important role in land and labour productivity is also played by innovation and broadly understood biological and technological progress in agriculture (Wicki, 2016).

In the context of production factors in agriculture, structural changes can serve several objectives at the same time and are usually interconnected. The changes in the production structures of agriculture which favour improved land and labour productivity are:

- the concentration of agrarian structure, expressed in the increase in the average area of an agricultural holding and the higher share of medium-sized and large farms (e.g. more than 15 ha of UAA) in the total number of farms and utilised agricultural area,
- the constantly progressing substitution of labour and land by capital inputs,
- the concentration of labour resources in relation to the land factor.

However, determining the influence of changes in the specific production structures on the productivity level of production factors in agriculture is very difficult, as productivity is determined by a number of factors, including the relationships of prices on the market, which is of particular significance for production expressed in monetary units.

MATERIALS AND METHODS

The values of final output and market output per unit of a given resource, i.e. ha of UAA and AWU were assumed as measures of land and labour productivity. Capital inputs and production volume were analysed in current prices and fixed prices, by means of a deflator – agricultural production price index (as a price deflator for final output and market output) and the price index for investment outlays (as a capital expenditure deflator). The study covered the years 2002–2016. Statistics from Central Statistical Office

(CSO) and Eurostat were the sources of empirical data. The study employed a comparative method, an analysis of the growth rate and an analysis of the average rate of change using the geometric mean. Spearman's rank correlation coefficient was used to determine the correlation of the analysed variables.

RESULTS AND DISCUSSION

The factor that increases the difficulty of achieving the optimal use of production resources in agriculture in Poland is the unfavourable area structure of farms. However, in 2002–2016 there were significant changes towards the concentration of agrarian structure, resulting from several processes. One of those unfavourable factors was the considerable decrease in utilised agricultural area, reaching 1.92 million ha UAA, i.e. 11.4% in relation to utilised agricultural area from 2002 (Table 1). It should be emphasised, however, that in the said period the average rate of

decrease in utilised agricultural area was 0.86%, while in 1990–2001 it had been 1.11%. The rate at which land was removed from agricultural use slowed down in 2004, i.e. with Poland's accession to the EU and the introduction of the CAP, particularly direct payments. The slow but continuous progress in the concentration of agrarian structure resulted from the fact that the decrease in utilised agricultural area in 2002–2016 was accompanied by a much greater decrease in the number of farms (with an area of more than 1 ha of UAA), of as much as 29%. Every year the number of farms dropped by 2.42%, which was nearly 3 times faster than the decrease in utilised agricultural area. As a result, average farm area increased in 2002–2016 by as much as 27.4%. It should be noted that in 1995–2001 average farm area had increased by only 6.6%. The increased rate of concentration of agrarian structure was also evidenced by the fact that the share of farms with more than 15 ha of UAA in total farms increased by 4.8 p.p. in 2002–2016 and their

Table 1. Changes in the agrarian structure and labour resources in agriculture in Poland in 2002–2016

Year	Agricultural land (million ha)	Farms*		Farms over 15 ha of UAA*		Employed in agriculture (in thousands of people)		Labour inputs (thous. AWU)****
		number	average area (ha of UAA)	percentage (%)	share in UAA (%)*	CSO estimates**	Labour Force Surveys***	
2002	16.90	1 956.1	8.4	10.2	44.7	2 109.0	2 664	2 403.5
2004	16.33	1 856.2	8.5	10.3	46.2	2 094.7	2 483	2 283.6
2006	15.95	1 810.4	8.6	11.1	51.6	2 093.3	2 268	2 235.9
2008	16.15	1 810.3	8.8	11.5	52.8	2 091.6	2 136	2 299.3
2010	15.46	1 484.3	9.2	13.2	56.8	2 329.9	2 044	1 914.8
2012	15.57	1 477.8	10.1	14.1	58.4	2 328.0	1 908	1 914.8
2014	15.16	1 381.6	10.3	14.8	59.7	2 331.4	1 843	1 937.1
2016	14.98	1 387.9	10.7	15.0	60.4	2 328.6	1 663	1 675.8
Relative increase								
$d_{t/c}$ (%)	-11.4	-29.0	27,4	-	-	10.4	-37.6	-30.3

* Applies to farms over 1 ha of UAA.

** CSO estimates based on National Agricultural Census and National Census of Population and Housing.

*** The number of employees is the number of people aged ≥ 15 years old who have worked for at least one hour a week, receiving salary or income for it, i.e. they worked in their own or leased farm.

**** Annual Work Unit – equals to 2,120 working hours per year.

Source: GUS and Eurostat data.

share in the total utilised agricultural area increased by as much as 15.7 p.p., reaching 60.4%.

As for the labour factor, attempting to precisely and reliably determine the level of employment in agriculture and the scale of outflow of labour resources from this sector is problematic. Different study and classification methods were used for assessing employment in agriculture in official statistics in Poland and across the EU. To determine employment figures in agriculture, Statistics Poland uses only estimated values prepared on the basis of data from the National Census of Population and Housing (2002 and 2011) and the National Agricultural Census (1996 and 2010). Due to these factors, the data on employment in agriculture presented in Statistical Yearbooks published by Statistics Poland for 1995–2002, 2003–2009 and 2010–2016 cannot be directly compared. In sectoral analysis, this leads to problems with determining the scale and direction of changes in labour productivity. A possible solution is to analyse labour efficiency on the basis of estimated labour inputs in agriculture in annual work units (AWU) and also on the basis of Labour Force Surveys (LFS). Data from the said sources is much more 'stable' when compared to data from the Statistical Yearbooks of Agriculture and seem to more accurately illustrate the actual level and trend of changes in labour resources in agriculture in 2002–2016, which was downward. According to estimates based on LFS (Table 1) employment in agriculture in Poland decreased from 2.66 million in 2002 to 1.66 million as at the end of 2016, i.e. by as much as 37.6%. Statistics Poland data on labour inputs in agriculture in terms of AWU indicate that employment in this sector decreased by 30.3% in this period.

According to Eurostat data between 2008 and 2017 labour inputs in agriculture in Poland decreased by 27.1%, whereas the average decrease in EU-28 was 18.1%. In Poland, the average annual decrease in employment in the same period was 3.45% and in the whole of the EU – 2.17%. According to the Farm Accountancy Data Network (FADN), labour inputs in an average farm in Poland decreased from 1.76 AWU in 2004 to 1.64 AWU in 2015, i.e. 6.8%. As FADN data are representative of about 750 thousand economically-strongest commercial farms, an important conclusion can be made that the outflow of labour re-

sources from agriculture was mainly in economically weak self-supplying farms. In economically stronger farms, aimed at market output, the reduction in employment was relatively low. Average employment in EU farms dropped in 2002–2016 from 1.66 to 1.53 AWU, i.e. by 7.8%. In comparison to an average farm in the EU, Polish farms have higher labour inputs, but the decreasing trend is similar.

Due to the different rate and scale of decrease in utilised agricultural area and labour inputs in agriculture and also the increased capital inputs in the form of capital expenditures, the relationships between production factors in Polish agricultures were subject to significant changes. In 2002–2016 the average number of hectares of utilised agricultural area per AWU increased by nearly 2 ha of UAA, i.e. by 27.1% (Table 2). Accordingly, employment in agriculture per 100 ha of UAA decreased. Taking into account labour inputs in AWU, it was a decrease from 14.2 to 11.2 AWU, i.e. by 21.3%. According to LFS data, employment per 100 ha of UAA decreased by 29.6%.

In 2002–2016 a significant growth of investment outlays in agriculture was observed. The average annual growth in the whole studied period was 3.23%, but directly after Poland's accession to the EU (2004–2008) it was 7.5%, and in 2011–2015 – 6.7%. The increase in capital expenditures contributed to a higher rate of substitution of land and labour by capital in the process of agricultural production. In current book-keeping prices, the gross value of fixed assets in agriculture increased from PLN 110.5 billion in 2002 to PLN 143 billion in 2016, i.e. 29.4%. Work technical equipment (the gross value of fixed assets in agriculture in PLN/AWU) increased by 60% in real terms in relation to the value from 2002. As for the rate of technological progress (the gross value of fixed assets in PLN/ha of UAA), the increase in real terms in the studied period was 29.2% (Table 2).

Structural changes in agriculture in 2002–2016 were accompanied by a noticeable growth in land productivity measured as the volume of final output and market output per 1 ha of UAA (Table 3). As for final output, its nominal value in 2016 was 126.8% (43.1% in fixed prices) higher than in 2002. The average annual growth rate of land productivity expressed by final output was 6.02% in nominal terms and 2.59%

Table 2. Relationships between production factors in agriculture in Poland in 2002–2016

Year	Utilised agricultural area per 1 AWU (ha)	Gross value of fixed assets in constant prices (prices of 2016) per:		AWU number per 100 ha of UAA	Employees number per 100 ha of UAA (according to LFS)
		1 ha UAA (PLN)	1 AWU (PLN)		
2002	7.03	7 612.9	53 534.2	14.2	15.8
2004	7.15	7 641.6	54 645.8	14.0	15.2
2006	7.13	7 948.0	56 698.0	14.0	14.2
2008	7.02	7 786.2	54 688.8	14.2	13.2
2010	8.07	8 728.7	67 739.9	12.4	13.2
2012	8.13	8 917.5	69 717.6	12.3	12.3
2014	7.83	9 633.0	72 405.6	12.8	12.2
2016	8.94	9 832.1	85 319.3	11.2	11.1
d_{vc} (%)	27.1	29.2	59.4	-21.3	-29.6

Source: own calculations based on data as in Table 1.

in real terms. Land productivity expressed as the volume of market output per 1 ha of UAA increased in 2002–2016 by 136.8% in nominal terms (49.3% in real terms). The average annual growth rate in market output was significant, as in this period it amounted to 6.35% (2.9% in fixed prices). Labour productivity expressed as the value of final output per AWU increased in the studied period by 91.1% in nominal

terms and by 20.6% in real terms. The average annual growth rate was lower than in the case of land productivity and amounted to 4.74% (1.34% in fixed prices). The increase in labour productivity expressed in the volume of market output was slightly higher than for final output (Table 3). The average annual growth rate of market output (in PLN/AWU) was 5.05% in nominal terms and 1.65% in real terms.

Table 3. Land and labour productivity in Polish agriculture in 2002–2016

Year	Final output per 1 ha of UAA (PLN)		Market output per 1 ha of UAA (PLN)		Final output per 1 AWU (PLN thous.)		Market output per 1 AWU (PLN thous.)	
	current prices	prices of 2016	current prices	prices of 2016	current prices	prices of 2016	current prices	prices of 2016
2002	2 591	4 108	2 223	3 525	19.2	30.4	16.5	26.2
2004	2 709	3 660	2 297	3 103	25.5	34.4	22.1	29.9
2006	3 021	4 135	2 665	3 648	24.6	33.7	21.9	30.0
2008	3 622	4 242	3 142	3 679	30.4	35.6	26.9	31.5
2010	4 044	4 649	3 676	4 226	28.6	32.9	25.5	29.3
2012	4 855	4 634	4 596	4 387	35.1	33.5	32.2	30.7
2014	6 280	5 988	5 729	5 463	36.8	35.1	32.9	31.4
2016	5 877	5 877	5 263	5 263	36.7	36.7	32.9	32.9
d_{vc} (%)	126.8	43.1	136.8	49.3	91.1	20.6	99.4	25.8

Source: own calculations based on data as in Table 1.

The analysis of Spearman's rank correlation coefficient indicated that the rate of technological progress and the rate of growth in work technical equipment had a statistically significant ($p < 0.05$) covariation with the measures of land and labour productivity (expressed in fixed prices). The correlation coefficient between the rate of technological progress and land productivity per 1 ha of UAA assumed positive values – 0.91 for final output and 0.94 for market output. The correlation coefficient between work technical equipment and labour efficiency per 1 AWU was statistically significant for market output and amounted to 0.52.

CONCLUSIONS

Changes to the agrarian structure and the decrease in employment in Polish agriculture observed in 2002–2016 resulted from the adjustment of the structure of production factors to the changing external and internal determinants. Clearly, an important external factor driving this process was Poland's accession to the EU, which not only necessitated the introduction of institutional adjustments connected with the implementation of the CAP, but also exerted a pressure to increase the economic efficiency of farms to make them more competitive on the market. It is clearly noticeable that the rate of structural changes in agriculture increased since Poland's accession to the EU, which also brought a significant increase in the productivity of production factors in agriculture.

It was found that an increase in land and labour productivity in agriculture was favoured by changes to production structures, which led to a concentration of agrarian structure, improvements in work technical equipment and the rate of technical progress and the outflow of some of the labour resources from agricultural production. A reduction in employment caused a change in the relationship between land and labour towards an increase in utilised agricultural area per full time equivalent in agriculture, a factor that favoured an increase in labour efficiency. This increase would not be possible, however, without considerable investment outlays, which means that the decreasing labour inputs and land resources were replaced by capital inputs.

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STRUCTURAL CHANGES IN THE DAIRY INDUSTRY AND THEIR IMPACT ON THE EFFICIENCY OF DAIRIES – A POLISH EXAMPLE

Maria Zuba-Ciszewska, PhD¹

Faculty of Social Sciences, John Paul II Catholic University of Lublin

ABSTRACT

The purpose of this paper was to determine structural changes in Poland's dairy industry and assess their impact on the efficiency of dairies. It was not until the mid-nineties that the process of concentrating milk processing and the rationalization of its production began in the country. Technical and economical work efficiency have improved. By also taking the dynamic increase in sales profitability into account, one can draw some positive conclusions about the intensive management seen within the dairy sector. Dairies should not only improve their position on the domestic and foreign markets, but also strengthen vertical integration with milk producers.

Keywords: dairy industry, efficiency, changes, milk market

JEL codes: D24, L10, L66, P10, Q13

INTRODUCTION

Since the transformation of the economy from socialist to capitalist, significant restructuring processes have taken place in the Polish milk market. In the period 1990–2015, the number of farms involved in milk production decreased by over 85% (to 265.6 thousand) and the number of dairy cows decreased by half (to 2.4 million head). Conversely, because of the systematic increase in average milk yield by over 71% (to 5.4 thousand litres), milk production in the country dropped by only 16.4% (to 12.9 billion litres). Since Poland's accession to the EU, however, milk production in the country has grown steadily, albeit limited by the milk quota system operating until 2015. The level of milk quota negotiated with the EU by Poland constituted 2/3 of the postulated level.

Therefore, virtually immediately after joining the EU, attention was paid to the necessity to increase the insufficient milk quota granted (Smoleński, 2007). This was essential because it did not allow the full use of production and processing potential. In addition, it diminished the price and cost advantages of the Polish dairy industry (Szajner, 2009). The scale of farm milk production has grown. The average herd of cows grew in this period from 2.7 to 9.2 head, and, currently, almost 28% of the 265.6 thousand farms have more than 10 milk cows – i.e. over 76% of the 2.4 million dairy cows, in contrast to 20 years earlier when this represented just 1.7% of the 1,309 thousand farms and 14.7% of a total of 3.4 million dairy cows (GUS, 2016). What is more, significant changes occurred in the allocation of the volume of produced raw material to increase sales, including deliveries to

¹ Corresponding author: Raławickie 14, 20-950 Lublin, Poland, maria.zuba@kul.pl, +48 814 453 433

dairies. The share of milk produced for sale increased by almost 27 p.p. to 82.1%. Such changes in milk production significantly affected the restructuring process of the dairy industry. In addition, agricultural cooperatives, including those dealing with dairies, entered the period of economic transformation as a developed sector, with significant organizational, membership and economic potential. In the new system, a plan was conceived to restore the cooperatives to operating within their original mandate in accordance with the theory of cooperative movement – i.e. one that stressed self-reliance, self-governance, self-financing – the so-called 3-S. According to the idea of the cooperative movement, of paramount value are the interests of the cooperative members-farmers and co-owners (MacDonald and McBride, 2010) and there was a desire to return to this. The intention was to purge the cooperative movement from the distortions of socialist artifice and give co-operatives a character consistent with the goals and mechanisms of the market economy. However, there was a collapse of cooperatives as a result, *inter alia*, of new regulations that were unfavourable for the industry (Piekara, 2000). The objective of this work is to analyse structural changes in Poland's dairy industry and assess their impact on the efficiency of dairies.

THEORETICAL BACKGROUND

Representatives of the industry's economics are not in agreement as to how the industry should be defined. Based on the theory of the structure of the industry, it is assumed that the companies that produce the same products are grouped in the same industry. According to A. Marshall, the same industry includes companies manufacturing products with the same technical characteristics. Thus, the supply side of the economy formed the crux of the consideration. Nevertheless, goods can be substitutes for one another and the same products can be produced using different technologies. The concepts of E.H. Chamberlin, J. Robinson, A. von Stackelberg, L. Abbott, J.S. Bain, and M.E. Porter were different from those of A. Marshall. They emphasized the demand side of the economy. They took the possibilities of substitution between goods into account and drew attention to customer needs

(Gorynia et al., 2000). The entire industry influences its participants through its characteristics. These are features that can be attributed to enterprises such as efficiency, profitability and structure-organization of the industry from perfect competition to monopoly, degree of concentration, life cycle, existence of strategic groups, industry entry and exit barriers, existence of balance or imbalance on the respective industry market (Gorynia, 1995). The basic research trends in the theory of industry include neoclassical theory, the Austrian school trend, behavioural theories, managerial theories, new institutional economics and the evolutionary theory of the industry. In the neoclassical theory, the basis is the general equilibrium model referring to the situation of the perfect market. The main core of the theories originating from the Austrian school is the conviction of continuous variability of the economic system, which is why studies of various types of competitive processes are very popular within this school. The distinctive feature of the behavioural trend is the vision of a company made up of many individuals with diverse, opposing goals, making decisions in conditions of uncertainty and characterized by limited rationality. The managerial theories perceive the company as a coalition of various interest groups with conflicting goals. The new institutional economy includes, among others the theory of transaction costs, agency theory, theory of property rights. In evolutionary economics, the foundations refer to the theory of Schumpeter, treating innovation as the main driving force behind the processes in the industry (Gorynia et al., 2000).

If the industry is identified with, for example, a group of companies offering substitutes then they are certainly competing companies, and thus interacting with each other through the use of competitive strategies. Two basic types of interactions between industry players are competitive struggle and cooperation. The structure and concentration in the industry shape the intensity of competitive and cooperative processes in the industry. The number and strength of individual entities forming the industry determine the price decisions of individual enterprises (Jankowska, 2002). Within the framework of the Chicago school there is a model based on the efficient structure hypothesis (ESH). This determines the positive impact

of the concentration on the results of enterprises. In contrast to the Harvard school, there is another explanation for this phenomenon. According to the ESH theory, the more effective companies have greater market power and therefore achieve higher profits (Kraciuk, 2008).

The change of the economic and political system in Poland in 1989 led to the emergence of the phenomenon of competition. The main direction of development on the competitive market for the dairy industry in the country is its concentration. The concentration process in milk processing was already postulated by experts over 20 years ago. It was pointed out that it had taken place in other European countries between 1950 and 1970, bringing positive results. The benefits of concentration concern the production, organizational, financial, marketing and distribution spheres of the dairy (Zalewski, 2000). The experience of many countries indicates, however, that the concentration of processing cannot be made quickly if there is a lack of capital, infrastructure and an appropriate scale of milk production (Sznajder, 1999).

MATERIALS AND METHODS

This work uses data from the Institute of Agricultural and Food Economics-National Research Institute (IAFE-NRI) as presented for individual years in the Milk Market magazine. Moreover, it utilizes Central Statistical Office (CSO) data. In addition, data on the largest dairies in Poland from their websites were used.

The net return on sales ratio (ROS) was employed to analyse the efficiency of the dairy. As the most synthetic indicator of sales profitability, this covers the result of the entirety of an industry's operations as expressed in net result (net profit) and sales revenues (Bednarski, 1997). Other indicators used in assessing the efficiency of management in the dairy industry are the figures for technical labour productivity and economic labour productivity. The classic index of labour productivity – i.e. work efficiency – reveals production per hour of work (Hall and Taylor, 2000). The article proposes to assess the statistical efficiency of the employee via the amount of work done (in the case of the dairy industry, it will be expressed as

volume of processed milk produced) and in the development of sales revenues.

$$\begin{aligned} \text{Technical labour productivity (TLP)} &= \\ &= \frac{\text{Amount of processed milk}}{\text{Number of employees}} \end{aligned}$$

$$\begin{aligned} \text{Economical labour productivity (ELP)} &= \\ &= \frac{\text{Sales revenues}}{\text{Number of employees}} \end{aligned}$$

Research into Poland's dairy industry (dairy cooperatives) confirms the positive impact of the dairy operation scale and work efficiency on the financial outcome (Pietrzak, 2006). Intensive management is based on achieving revenue and profit growth through effective technical and organizational progress (Bednarski, 1997). A simplified investment rate (I) was used to assess the degree of investment. It is the relation of the value of capital expenditures, the purpose of which is primarily to create new fixed assets or to improve the existing, to the value of depreciation – i.e. the cost related to gradual wear of fixed and intangible assets (Drózd, 2016). The concentration ratio (CR) indicator was used as the basic indicator of market concentration, showing the percentage share of the largest suppliers in the selected category that characterizes the market (Kraciuk, 2008).

RESULTS AND DISCUSSION

In 1990, cooperatives were the only entities on the milk market, although after a few years they constituted 90% of all entities in the dairy industry and held a 86% share in milk purchases. Furthermore, as the decade unfolded, employment was significantly reduced by 30% to over 56 thousand people (Table 1). The new act of 1990 on cooperatives deprived them, by liquidation of hitherto existing cooperative unions and the prohibition of creating new ones, of support in terms of organizational, economic and legal counselling, professional auditing, their own press and centres of personnel improvement. This led to errors in the cooperative's activity. In turn, helplessness

brought about limitation of activity and loss or sale of assets for current needs (Boczar, Szelażek and Wala, 1993). In addition, dairy co-operatives no longer received state subsidies, so they did not have any current assets. The aforementioned, allied with high inflation and a high interest rate on loans, created an extremely difficult financial situation (Gornowicz, 2003; Brzozowski, 2003; Brodziński, 2005). The cooperative dairy industry's financial health deteriorated until about 1995 as a result of the decrease in the use of processing capacity (down to 50–60% of the total in 1995). The reasons for the low utilization of production capacity were, among others, that the decrease in real incomes of the population caused a drop in demand for dairy products. There were problems with the availability of raw material (Sarnecki, 2004). Dairy cooperatives lacked their own capital for the modernization of obsolete machine parks which had depreciated, were energy and capital-intensive, thus deepening the technical and technological gap (Zalewski, 2000).

There was a significant decentralization of the milk processing industry (Table 1) as measured by the average milk processing level per dairy (down to about 18 million litres). The reason was a drop in the volume of purchased and processed milk (by 38%). The liberalization of the market meant that within

two years there were, albeit in the short-term, 70 new dairies, mostly small private entities and companies, which were often organized on the basis of declining cooperatives. In the difficult macroeconomic conditions, unfortunately, the dairies generated negative sales profitability. Since the late 1990s, restructuring processes in the milk processing segment have accelerated significantly. The concentration of milk processing and rationalization of its production structures is evidenced by the decrease in the number of dairies and in the employment figures. The modernization of processing plants also followed, and is indicated by the high investment rate (Table 1).

Dairy companies eventually modernized the milk purchase organization, financed the farmers' purchase of milk cooling and milking equipment, provided milking hygiene consultancy, covered the costs of farmers' cooperation with veterinary surgeons, and applied price bonuses (up to 40%) for highest quality of milk. Launching the production of new dairy products, improving the quality of products produced so far, raising veterinary and environmental standards required increased investment. A stimulus for investment growth was created by preferential loans for the restructuring of the dairy sector from the state budget (Seremak-Bulge, 2005). With such investments, Poland's dairy industry perceived the possibility of

Table 1. Changes in milk processing in Poland in selected years

Specification	1990	1995	2000	2005	2010	2015
Number of dairies	348	336	324	265	205	177
Share of entities from the cooperative sector (%)	100.00	90.18	82.41	80.75	72.68	67.80
Share of co-operatives in milk purchase (%)	100.00	85.90	76.42	74.88	71.26	68.66
Number of employees	80 700	56 300	50 400	39 300	34 870	32 238
Average milk volume processed by a dairy (million litres)	28.24	18.03	20.02	31.55	42.56	59.64
TLP (million litres)	0.12	0.11	0.13	0.21	0.25	0.33
Average sales of dairy products by a dairy (USD million)	–	7.05	8.83	22.05	37.37	40.33
ELP (USD million)	–	0.04	0.06	0.15	0.22	0.22
ROS (%)	–	–0.29	0.1	1.65	2.21	1.31
I	–	2.23	1.56	1.48	1.34	1.35

Source: own study based on IAFE-NRI data.

producing products that would compete with those imported, and began to recognize fully the need to penetrate external markets. Hence, Poland's dairy industry had to adapt their product range to changing consumer preferences. The demand for products with a higher degree of processing, functionality and convenience in packaging increased. In addition, the modernization of plants brought about improvements in the efficiency of their operation. The increase in milk production is considered one of the most important factors leading to a reduction in production costs and the improved competitiveness of milk production and its processing in the Polish market and in that of the EU (Sznajder, 1999; Parzonko, 2013).

Modern machines and equipment have led to, since 1995, an increase in the average amount of milk processed by a typical dairy plant site by a factor of 3.3, while technical performance also increased 3-fold (Table 1). The reason for such figures was not only a decrease in the number of dairies (by 47%) and a reduction in employment (by 43%), but also an increase in the volume of raw materials processed by the sector (by 75% to 10.56 billion litres). But the technical efficiency of dairies in Poland is still 3–4 times lower than in Germany or Sweden and a dozen or so times smaller than in the Netherlands (Zuba-Ciszewska, 2015b). Owing to increase technical productivity, the value of sales in this period also increased dynamically (by USD 4.8 billion to over USD 7 billion), and thus the economic efficiency of dairies and dairy employees was even enhanced to a greater extent than by technical efficiency (more than 5 times). Export sales also had a significant impact on the increase in revenues in milk processing, especially after 2005. Currently, they generate over 15% of all sales revenues, and their value in 2015 amounted to USD 1.8 billion – i.e. 0.7 billion more than in 2005. By also taking the dynamic increase in sales profitability into account, one can make some positive conclusions about the intensive management seen within the dairy sector. The concentration of milk production in Poland will continue to grow due to the increase in milk production, and is determined by the national increase in demand for dairy products (Adamski and Ziętara, 2014). Research indicates that further processes of concentrating milk processing are necessary due to

the high rate of concentration changes in milk production (Kapusta, 2011), and the related technological progress. These provide an opportunity for further development of the dairy sector in the country (Seremak-Bulge, 2013). Very important in this process is intellectual capital, its decides about the efficiency in how dairies use their resources (Zuba-Ciszewska and Kijek, 2016). Further concentration of the industry is also driven because of the increased export opportunities for Polish dairy products (Szajner, 2009). The share of final consumer products (yoghurts, milk beverages, cheese, butter and ice cream) in the export commodity structure in 2016 amounted to 56%, i.e. 20.2 p.p. more than in 2006. In the context of using production resources and processing the scale effects that determine efficiency, further concentration may improve this relatively small proportion of consumer products in the export structure. It is also worth noting that the concentration results in dairies are diversified due to their scale of production and the type of product (Zuba-Ciszewska, 2015b).

In 2015, 241 dairies were involved in the processing of milk in the country, including 177 employing more than 10 people. Cooperatives play an important role in the milk market because they account for almost 61% of all dairy plants (Sznajder, 2016). There are at least several dairies in each region. However, their clear concentration can be seen in the belt stretching from the south-west to central Poland voivodeships, and further down to the three voivodships in the east of the country (Lublin Voivodship, Podlasie, Warmia and Mazury). Over 88% of the dairies are located in these 10 regions. Almost all regions with a high number of dairies have a good raw material base (apart from the Silesian and Lesser Poland voivodships). And three of the voivodships (Masovia, Podlasie, Greater Poland) are responsible for almost 55% of the volume of milk produced in the country. Dairy cooperatives are concentrated in regions with a large or very large overall number of dairy plants. This confirms the crucial role of cooperatives in the Polish dairy industry, strengthened by experience and a longstanding tradition (over one hundred years). Research shows that domestic dairies, especially dairy cooperatives, are still an important link in the regional dairy chain (Zuba-Ciszewska, 2018). They

form a local food system delivering products mainly to consumers in the country.

An example of the progressive consolidation of the dairy industry are the two largest dairies in the country (Mlekovita Dairy Cooperative and Mlekpól Dairy Cooperative), both based in the Podlasie Voivodship. For more than ten years now, these cooperatives have united in their structure further dairies from various regions of the country, sometimes those experiencing financial problems. They use the existing production potential (such as, for example, specific production lines), invest in a new plant and sometimes limit the product range to increase the size of production. Currently, they have almost 30 plants with over 25 thousand farmers delivering milk. Both dairy cooperatives have a high share in the purchase and processing of milk, which is confirmed by the value of their CR₂ index on the milk processing market. For 2004, this index was 18% and for 2018 it was already 38%. Both entities have a stable source of financing – i.e. a high share of their own equity, while implementing different strategies for its development (Zuba-Ciszewska, 2015a). In central Poland there are several significant dairy groups that have plants in other provinces (LACPOL has 10 plants, POLMLEK 6, and OSM Łowicz 4). Many foreign concerns are withdrawing from the domestic milk market or some of its segments – e.g. in 2016, Danone liquidated its plant in Warsaw, and Zott closed one in Raciborz. Mlekovita bought the Baranów factory from Hochland, Polmlek took over the dairies from the Dutch Friesen in Mława, the Austrian Dr. Oetker in Maków Mazowiecki and from the Danish Arla Foods in Gońcin. The market of dairy products in the country is characterized by the phenomenon of consumer ethnocentrism (Grześ, 2014), which turns out to be a market entry barrier. Due to the concentration of the dairy industry by dairy groups, including mainly cooperative ones, the synergy effect is not only improving their competitive position on the market, but also increasing the range of consumer products and strengthening the already strong image of Polish brands of food products among the consumers. For example, SM Mlekovita offers a thousand different dairy products.

Dairies focusing not only on the growth of production, but on the increase of added value provided by

highly processed products. Thus, there were significant changes in the production structure, leading to better, more profitable use of the processed material. The production structure witnessed an increased share of ripening rennet cheese, cottage cheese, processed cheese, cream and yogurt, ice cream and milk drinks. This process intensified over time. In the period between 1991–2015, the production of highly processed products grew systematically. The most dynamic was in the production of milk beverages (with an almost 11-fold increase to 717,000 tonnes), ice cream (9-fold to 265,000 tonnes), processed cheese (over 5-fold to 78 thousand tonnes) and ripening cheeses (almost 3-fold to 310,000 tonnes). In the case of basic products such as cottage cheese and cream, the increase was also systematic but smaller (2.6 and 2.3 times). Butter production, after a sudden collapse in the early 1990s (by 1/3), among others due to the negative advertising by the margarine industry, finally returned to the level of 25 years previous (191 thousand tonnes) in 2015. Polish dairies, similar to those from other countries, are trying to offer more processed products (MacDonald et al., 2010).

CONCLUSIONS

The article pointed out that the concentration of milk processing and the rationalization of its production structures has positively influenced the efficiency of dairies. Therefore, it is one of the directions for improving the economic results in this sector. There are two dairy cooperatives on the Polish milk processing market, which have a high and growing share in milk processing. Nevertheless, there is room for further consolidation of the sector, although sometimes it may face barriers of a non-economic nature, such as the management of the dairy being reluctant to lose independence. However, the benefits of increased sales, improved technical and economic performance confirm the justification for structural changes in the dairy industry. Dairies should not only improve their position on the domestic and foreign markets, but also strengthen vertical integration with milk producers supplying raw material often being the co-owners of dairies, as members of the cooperative.

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WOMEN'S LABOUR MARKET ACTIVITY IN THE AGRICULTURE SECTOR IN POLAND AND EUROPEAN UNION IN 2016

Aleksandra Matuszewska-Janica, PhD¹

Faculty of Applied Informatics and Mathematics, Warsaw University of Life Sciences – SGGW

ABSTRACT

The European authorities pay particular attention to agriculture and employees in this sector. Women represent more than 33% of this group in the European Union. A significant number of actions are targeted at women from rural areas, having regard to the mentioned issues and specific situation of women in the labour market. Therefore, it requires in-depth analyses. The main aim of the presented study is to assess the diversity of the situation of women working in agriculture across the EU. The quantitative analysis allows to indicate similarities and differences among EU states in the current structure of women's employment in this sector. In the analysis, the *k*-mean method is applied with the Labour Force Survey data from the year 2016. The study refers to 28 EU states and a group of women aged 20–64. The obtained results indicated that we have a large proportion of self-employees in agriculture. However, we observe a larger percentage of those who create jobs for others states that are better economically developed. This analysis confirms the findings that the Polish structure of female employment is closer to those in the Mediterranean countries. Poland is assigned to one cluster with Greece. This group is distinguished by several factors. Firstly, it contains a high proportion of people employed in agriculture with a relatively small share of part-timers. Secondly, it is a very high rate of self-employed with a very low proportion of those who create jobs for others.

Keywords: labour market, female employment, cluster analysis, *k*-mean method

JEL codes: J21, C38

INTRODUCTION

Technological progress, globalisation and economic transition processes are just a few factors that strongly affect changes in employment. This concerns employment in the agriculture sector in particular, which has experienced significant transformations in the recent decades (Klepacki, 2006; Puzio-Waławik, 2006; Szczukocka, 2012). Women are a specific group in the labour market. They are classified as a group called a 'problem group' – disadvantaged group or excluded

group (rynekpracy.org, 2006; Kwiatkowska, 2012). Such issues are widely discussed by Blau et al. (2010) or Sztanderska (2006), among others. These problems concern women living in rural areas, in particular (Sawicka, ed., 2013; Krzyżanowska, 2014). Therefore, this group has a special place in the European labour market policy (Strategy Europe 2020, Strategy for equality between women and men 2010–2015, Strategic Engagement for Gender Equality 2016–2019, European Parliament resolution on the role of women in agriculture and rural areas, among others).

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, aleksandra_matuszewska@sggw.pl, +4822 593 72 54

The employment of women in agriculture is a multidimensional subject, which is very important both from an economic and a social point of view. It requires conducting comprehensive analyses for monitoring and an evaluation of the situation. This in turn translates to the monitoring and an evaluation of the efficiency of the European labour market policy or to the monitoring of the human capital in the rural areas among others. The main aim of the presented study is to assess the diversity of the current situation of women working in agriculture across the European Union (EU). The verified hypothesis refers to the fact that this situation has still characterised by a considerable heterogeneity. The quantitative analysis firstly allows to indicate the similarities and differences among EU states in the structure of women's employment in this sector. Secondly, it allows to compare the current position of female employees in agriculture in Poland to other EU states. In the study, the following indicators are applied: (1) participation rate of women working in the agriculture sector; (2) the proportion of women in the group of employed in agriculture (feminisation rate); (3) the proportion of self-employed women; (4) the proportion of self-employed women with employees; and (5) the participation rate of part-timers in the group of women working agriculture.

SELECTED ISSUES OF THE LABOUR MARKET RELATED TO AGRICULTURE

A reduction in the number of jobs in industry and agriculture has been observed in the recent decades. Changes in the occupational structure have been driving the transition from an industry- and agriculture-dominated economy to a services-dominated economy (Fisher, 1935; Clark, 1940; Puzio-Waławik, 2006). Four percent of those employed in the EU (aged 20–64) are people working in agriculture in 2016 according to the Labour Force Survey. Thirty-three percent of this group are women. The Eurostat's statistics also show that these rates are significantly diversified across Europe. One in five people is employed in agriculture in Bulgaria; every tenth in Poland and Greece. But there are countries where the percentage of agriculture employees does not exceed 1.5% (UK – 0.9%, Belgium – 1.1%, Germany 1.2%

and Malta 1.3%). The most feminised groups of agricultural workers can be found in Austria (44.4%), Poland (40.1%) and Romania (40.8%). In turn, the lowest percentage of women have been observed in Ireland (14%) and Denmark (19.6%). Reports of GEOPA-COPA (Employers' Group of Professional Agricultural Organisations in the European Union) pointed to two essential matters. Firstly, there are significant geographical differences in the general situation of people working in agriculture in the EU. Secondly, they show how much the situation of agricultural workers is different from those in other sectors. These differences are primarily influenced by the structure of the economy and the level of economic development of the state. The agriculture sector is characterised by a significant proportion of seasonal workers (Rudra and Biswas, 1973; Kanwar, 2004). This is mainly due to the fact that we observe a significant impact of natural conditions on the functioning of this economic activity. Another distinctive feature of agriculture employees is the large number of self-employed workers. This fact is confirmed by surveys conducted by GEOPA-COPA (2013). They indicate that agriculture is organised into small businesses all across Europe. On the one hand, this indicates the large potential of entrepreneurship of people employed in agriculture (Mularska-Kucharek and Wiktorowicz, 2015). On the other hand, the literature points to the fact that a high percentage of self-employed (especially in Poland) is rather the result of a large share of individual farming in the economy than a particular propensity to undertake self-employment (Kryńska, 2007).

MATERIALS AND METHODS

The presented analysis uses the publicly available Eurostat's Labour Force Survey (LFS) data from the year 2016. The study refers to 28 EU states and a group of women aged 20–64 (this age range corresponds to the Europe 2020 Strategy). Eurostat classifies economic activities with reference to the Statistical Classification of Economic Activities in the European Community named NACE (NACE Rev. 2 since 2008). The presented analysis concern women employed in section A of the NACE rev. 2 that include agriculture,

forestry and fishing. This sector will hereinafter be called the agricultural sector in order to simplify the description of the analysis results.

- Variable 1 – The participation rate of working in the agriculture sector in the group of employed

$$\text{women aged 20–64: } \%EF(A)_i = \frac{NF(A)_i}{NF_i} \cdot 100\%,$$

where: $NF(A)_i$ – number of women working in the agriculture sector in the i -th state in 2016, NF_i – number of employed women in the i -th state in 2016.

- Variable 2 – The proportion of women in the group of employed in the agriculture sector (feminisation rate):

$$\%Fem(A)_i = \frac{NF(A)_i}{NF(A)_i + NM(A)_i} \cdot 100\%,$$

where: $NM(A)_i$ – number of men working in the agriculture sector in the i -th state in 2016.

- Variable 3 – The proportion of self-employed in the group of women working in the agriculture

$$\text{sector: } \%SELF_F(A)_i = \frac{SELF_NF(A)_i}{NF(A)_i} \cdot 100\%,$$

where: $SELF_NF(A)_i$ – number of female self-employees in the agriculture sector in the i -th state in 2016.

- Variable 4 – The proportion of self-employed women with employees in the analysed sector:

$$\%SELF2_F(A)_i = \frac{SELF2_NF(A)_i}{SELF_NF(A)_i} \cdot 100\%,$$

where: $SELF2_NF(A)_i$ – number of self-employed women with employees in the agriculture sector in the i -th state in 2016.

- Variable 5 – The participation rate of part-timers in the in the group of employed women in the agricul-

$$\text{ture sector: } \%PT_F(A)_i = \frac{PT_NF(A)_i}{NF(A)_i} \cdot 100\%,$$

where: $PT_NF(A)_i$ – number of women working part-time in the agriculture sector in the i -th state in 2016.

There was no possibility of including the temporary employment variable because of significant lack of the data in the Eurostat's datasets.

It is applied the k -means method (McQueen, 1967; Gatnar and Walesiak, eds., 2004) and Statistica soft-

ware for the clustering. The procedure for conducting cluster analysis is taken from the article (Walesiak, 2006). Data was standardized and as a distance measure it was applied Euclidean distance. The k -means method is one of the most widely applied methods for data clustering. It consists of dividing the analysed sample of objects into predefined number of cluster. This method consists in dividing the analysed group of objects into predefined number of classes. In the first phase of analysis, objects (states) were divided into different number of clusters: groups: from 2 to 10 ($k = 2, 3, \dots, 10$). Then, based on silhouette index (SI) (Kaufman and Rousseeuw, 1990), the best divisions were selected. Walesiak (2006) reports that values over 0.5 designated that reasonable structure has been found. then the number of clusters is acceptable.

RESULTS

The obtained results show a great diversity among EU states with respect to the women's labour market activity in the agriculture sector. Division into 10 clusters is the best with the highest value of the silhouette index SI equalling 0.52. Compositions of the clusters and average values of the variables for each cluster are presented in the Table 1. Four one-object clusters have been obtained: Netherlands (cluster 1), Austria (cluster 2), Malta (cluster 3) and Romania (cluster 4). The Netherlands is distinguished by a low proportion of women working in agriculture (1.2% of employed women) and a high proportion of women working part-time (69.3% of the analysed employees in the Netherlands). The Netherlands has generally a high percentage of female part-timers in comparison to other EU countries (74.8% for 20–64 aged group), where part-timers among women are no more than 48%. It is worth to mention that the Netherlands is also characterised by a great share of self-employed women – over 52%. The next cluster (where is Austria classified) is distinguished by the highest feminisation rate of employees in agriculture (44.4%), a high proportion of self-employed (57.3%) and a considerable percentage of those working part-time (40.5%). The lowest percentage of women working in agriculture was obtained for cluster 3

(Malta, 0.3%), whereby the percentage of part-timers is 0%. This cluster is also characterised by the lowest feminisation rate (8.3%). It is worth noting that, in other clusters, the average values of this rate were 24% and greater. Although 50% of women working in agriculture are self-employed in Malta, the share of those self-employed with employees is equal to 0%. A very low participation of self-employed with employees was obtained for cluster 4 (Romania, 0.5%). This group is distinguished by the highest proportion of women employed in agriculture – 19.2%. This situation transfers into a high feminisation rate (40.8%) in the analysed economic sector.

Poland is classified to the cluster number 6, together with Greece. This cluster is characterised by a very high percentage of self-employed women in agriculture (almost 65% on average). Whereby, on average, only 5.8% of this group create jobs for others. The distinguishing feature of this group is also the fact that every tenth woman works in agriculture, but relatively few of them are part-timers (15.9% on average). Attention will also be paid to the fact that the feminisation rate is very high (close to 40%) in comparison to other clusters. Cluster number 6 consists of two countries: Sweden and Luxembourg. The participation of women in the agriculture sector is 0.7% on average. This group is characterised by a

high rate of self-employed women (57% on average) with a high percentage of those who employ others (41.9% on average). Five countries have been classified to cluster 7: Bulgaria, Czech Republic, Estonia, Hungary, Slovenia. A low percentage of part-time employees is characteristic for this group of states (11% on average). Other values of the analysed ratios are at an average level in comparison to the rest of the clusters. Denmark and Germany are classified together with Slovakia (cluster 8). This group of states is distinguished by a low percentage of women working in agriculture (1.1% on average). The rate of self-employed is very low (merely 12.1% on average); however, 44% of them (on average) create additional jobs. Cluster 9 is the biggest with the seven states: Belgium, Ireland, Spain, France, Italy, Cyprus and the United Kingdom. The average rate of female employment in agriculture is rather low (1.4%) for this group. Other indicators are at an average level in comparison to the other clusters. The last cluster (10) is occupied by five countries: Croatia, Latvia, Lithuania, Portugal, Finland. The average agriculture employment rate is equal to 4% for this group. We can also observe a high percentage of self-employed (49.1% on average) with a rather low share of those self-employed with employees (10.4% on average).

Table 1. Compositions of the clusters and average values of the variables

Cluster	States	Var. 1 EF	Var. 2 Fem	Var. 3 Self	Var. 4 Self2	Var. 5 PT
1	Netherlands	1.2%	29.3%	52.5%	20.5%	69.3%
2	Austria	3.6%	44.4%	57.3%	23.2%	40.5%
3	Malta	0.3%	8.3%	50.0%	0.0%	0.0%
4	Romania	19.2%	40.8%	36.1%	0.5%	33.0%
5	Luxembourg, Sweden	0.7%	25.9%	57.0%	41.9%	27.2%
6	Greece, Poland	10.1%	39.8%	64.9%	5.8%	15.9%
7	Bulgaria, Czech Republic, Estonia, Hungary, Slovenia	2.8%	28.6%	24.9%	10.2%	11.0%
8	Denmark, Germany, Slovakia	1.1%	24.6%	12.1%	44.0%	25.0%
9	Belgium, Ireland, Spain, France, Italy, Cyprus, UK	1.4%	24.0%	38.1%	17.6%	26.6%
10	Croatia, Latvia, Lithuania, Portugal, Finland	4.0%	32.4%	49.1%	10.4%	30.6%

Source: own calculation.

DISCUSSION AND CONCLUSIONS

The obtained results indicate that female employment in agriculture across the EU is characterised by a high degree of heterogeneity so the research hypothesis was confirmed. Nevertheless, we can observe some regularities. Some of them refer to the similarity between employment in the agriculture sector and employment at the national level. Firstly, the proportion of part-timers in agriculture is related to those at the national level. Secondly, part-time jobs are more common among women. In turn, the feature which distinguishes the analysed sector – the percentage of self-employed in agriculture – is much higher than those employed at the national level.

Poland was assigned to one group with Greece in the received classification. This confirms the findings that the Polish structure of women employment is closer to Mediterranean countries (Szatanderska, Grotkowska, 2009; Matuszewska-Janica, 2016). Female employment in agriculture in both Greece and Poland is distinguished by several factors in comparison to other EU states. Firstly, it contains a high proportion of those employed in agriculture (about 10% on average) with a relatively small share of part-timers. Secondly, it has a very high rate of self-employed (about 65% on average) with a very low proportion of those who create jobs for others. In turn, this may be a result of a large share of individual farming (Kryńska, 2007).

At the end it is worth noting that a higher percentage of self-employment with employees (also among women) can be observed in the states with a high level of economic development, in contrast to the states with a worse economic situation. The phenomenon of self-employment seems to be a result of necessity rather than opportunity in the less developed countries, as the authors of the report (European Foundation..., 2017) point out. These results enforce further support for changes in the agricultural sector in the EU new member states, in terms of promoting of the entrepreneurship in particular.

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IDENTIFICATION OF THE (DETERMINISTIC OR RANDOM) NATURE OF THE WHEAT PRICE VARIABILITY WITH THE APPLICATION OF RECURRENCE QUANTIFICATION ANALYSIS

Łukasz Pietrych, PhD¹

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

In this article performed was an analysis of the time series which presents the wheat price by means of recurrence quantification analysis. The main research problem was to ascertain whether the time series for this agricultural raw material may be considered as a system in which chaos has the deterministic nature, possibly with slight random disturbances. It was proved that it is justified to believe that the time series under analysis is characterized with the occurrence of deterministic chaos. The literature review led to believe that although this issue had been analysed in a large number of papers, most specialists confirm there is no conclusive evidence of chaos in economic or financial data.

Keywords: deterministic chaos, recurrence quantification analysis, wheat prices

JEL codes: C2, E31

INTRODUCTION

Due to progress in exact sciences available became new mathematical and statistical tools. Therefore, economists eventually notice that many economic phenomena cannot be explained with the so-called traditional approach based upon the linear analysis. The reductionist approach, used in the traditional economic theory, often neglected the relations or reciprocal interactions among the market agents and their effect upon economic systems on the macroeconomic scale. This approach was aimed at simplifying questions, and eventually, at looking for analytical solutions. In the economic literature more and more often underlined is not only the concept that economies are complex adaptive systems consisting of a large number of components, but also their inter-

relations (Faggini and Lux, 2009). Mitchell emphasizes that complex system investigations were aimed at explaining in an interdisciplinary way the process of arising of adaptive behaviours in complex systems consisting of a large number of simple components which are not subject to central control, and among which numerous interactions will occur (Mitchell, 1998).

The necessity of complying with the necessity of developing more realistic models gave rise to new concepts and research tools in economic sciences. A new research perspective, taking into consideration non-linear dynamic systems functioning in the economy, causes considerable changes in the main current of the economic theory. Economists began to discern the functioning of certain patterns in the economy by recognizing its complexity.

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, lukasz_pietrych@sggw.pl, +4822 593 41 48

The purpose of this article was to ascertain whether the system under analysis might be treated as one in which chaos has deterministic nature, possibly with slight random disturbances. The investigations were focused on the agricultural; market, and precisely, upon the price variability of winter wheat. Be stressed that although many papers have been already dedicated to this issue, this research issue is still significant and remains unambiguous. This article constitutes a contribution to the literature, since empirical investigations have been complemented with the agricultural market.

THEORETICAL BACKGROUND

Theoretical foundations of neoclassical economic theory originate from the postulates developed by Adam Smith and the school of utilitarianism, represented mainly by J.S. Mill. Basing upon the developed assumptions of market behaviours, the neoclassical economic theory comprised a concept which brings one closer to conceive the functioning of all markets in the economy, incl. financial markets. Therefore, basing upon this neoclassical perspective there have been developed, among others, financial theories of competitive equilibrium, like the effective market hypothesis and random walk theory (Velasquez, 2010).

While investigating into financial markets, there were detected, however, certain behaviours contrary to the neoclassical theory. The pertinent literature shows some evidence for the occurrence of season anomalies, excessive variability in time series, correlation of returns on assets and company size, market indicators or seasons of the year. Such investigations have been enumerated, among others, by Guimaraes, Kingsman and Taylor (1989) as well as by Loan and MacKinlay (1999). The conclusions arising therefrom can indicate that the prices are not in equilibrium, investors do not act as reasonable individuals and the market changes cannot be described through the random walk theory. This means that the neoclassical concept does not describe correctly the actual behaviour of financial markets (Velasquez, 2010).

In the references underlined is the idea that the discrepancy among the economic and financial the-

ory and reality is attributable to the fact that the neoclassical economic theory reminds of the Newtonian physics (Mirowski, 2001). For example, it is assumed that the agent which is a scaled model of the entire society has extraordinary possibilities in the field of gaining processing of information. This assumption is dubious for the heterogeneity of individuals and their cognitive skills, limited to various extents. Secondly, the neoclassical economic theory was limited to investigating only into systems in equilibrium, neglecting the dynamic nature of certain economic phenomena. As it was proved soon, the equilibrium paths – even in the case of standard economic models – allow one to conceive the issue under analysis more thoroughly, since actually the dynamic economic system may fail to achieve the state referred to as the point of equilibrium, and it may end in limit cycles or even in chaotic paths of highly irregular type. Finally, economists preferred linear models or at least models transformable to a linear form through linearization. Such models, however, do not regard properly the asymmetry of such phenomena, like depressions or periods of recession, price bubbles on stock exchanges with related crunches or the occurrence of regular and irregular business cycles. Such behaviours in the neoclassical economic theory were perceived as anomalies (Faggini and Lux, 2009).

In consequence, the neoclassical economic theory cannot be translated into empirical observations, and the accepted assumptions do not seem reasonable. Thus, the failure of the neoclassical economic theory is believed to be embedded in the selected way of discourse and the set of research tools (Velasquez, 2010). An alternative to economic research becomes more and more often the concept presented by the theory of chaos with pertinent research tools. As Zbilut has it, so far there has been done much research aimed at finding whether economic time series may be modelled with methods which take into consideration the non-linear chaotic dynamics (Zbilut, 2005). Basing upon observations of real life economic systems it may be concluded that on the one hand they seem chaotic, but on the other they are generated by a certain form of determinism. Here, as examples may be given share prices on financial markets, economic growth, price cycles of agricultural raw materials,

business cycles or overlapping generation models for currency crises (Creedy and Martin, 1994).

MATERIALS AND METHODS

For the specific nature of economic data (short time series, non-stationarity and the occurrence of white noise), in the literature - as an alternative to the traditional analysis based upon mathematical chaos models – postulated is the application of a relatively simpler analytical method, viz. recurrence quantification analysis (RQA). The idea of recurrence as the fundamental feature of many dynamic systems was introduced by Poincaré in 1890 (1890). In the successive century recorded was a considerable progress in the theory of dynamic systems. In 1987, Eckmann et al. introduced the method of recurrence plots (RP) in order to visualize the recurrence of states in the phase space for dynamical systems (Eckmann et al., 1987). Those plots are a graphical representation of the following relation (Marwan et al., 2002):

$$R_{ij} = H(\varepsilon - \|X_i - X_j\|), i, j = 1, \dots, M$$

where:

- X_i, X_j – states in space R^m ;
- M – number of states;
- H – Heaviside step function $H(x) = 1$, if $x \geq 0$;
 $H(x) = 0$, if $x < 0$;
- $\|X\|$ – norm of vector X in space R^m (usually, this is the Euclidean or a normal norm);
- ε – the so-called cut-off parameter (non-negative real number).

If the points X_i and X_j belonging to a certain phase space are separated from each other by no more than ε , then $R_{ij} = 1$, which is marked as a black point; otherwise, $R_{ij} = 0$ (a white point). Consequently, the base of the plot described by equation (1) is a $(0, 1)$ zero-one square matrix R_{MM} . According to the nature of the process under analysis, the points on the plot constitute structures having different forms. In 1992, Zbilut and Webber proposed a quantitative procedure for determining standards with statistic measures, and named this approach RQA. Initially, Zbilut and Webber introduced 5 variables to quantify standards in the plots. The references for recurrence plots and their interpretations are shown in Table 1.

The aforementioned quantitative measures supply information on various properties of RP and simultaneously they complement one with another. In order to determine them applied was the software Visual Recurrence Analysis (VRA). The empirical material was the time series of weekly winter wheat prices quoted on the Warsaw Commodities Exchange S.A. (WGT). Those data were downloaded from the website e-WGT. The period under analysis lasted from 20.04.2006 to 26.04.2018. The total number of observations utilized was 629.

RESULTS AND DISCUSSION

Before proceeding to making recurrence plots, described was the structure of the time series under analysis by means of a graph, histogram and descriptive statistics measures. The amplitude oscillations

Table 1. RQA indices and their interpretation

RQA index	Interpretation
%REC	<i>recurrence rate</i> – the percentage ratio of recurrence states (black points in the diagram) to all states
%DET	The percentage of recurrence points which form linear segments parallel to the plot diagonal. %DET is the measure of degree of determinism
MAXLINE	Periodic signal to determine the long segments of a line, whereas short lines mean chaos
TREND	This measure determines the drift and non-stationarity of the phenomenon under analysis (a value close to 0 means the stationarity of a series, whereas a negative value – the occurrence of a trend)
ENT	A high value of entropy occurs in the case of periodic changes, a low value corresponds to chaotic systems, and eventually, a very low value (close to 0) – to an uncorrelated noise

Source: own study on the basis of Marwan et al. (2007).

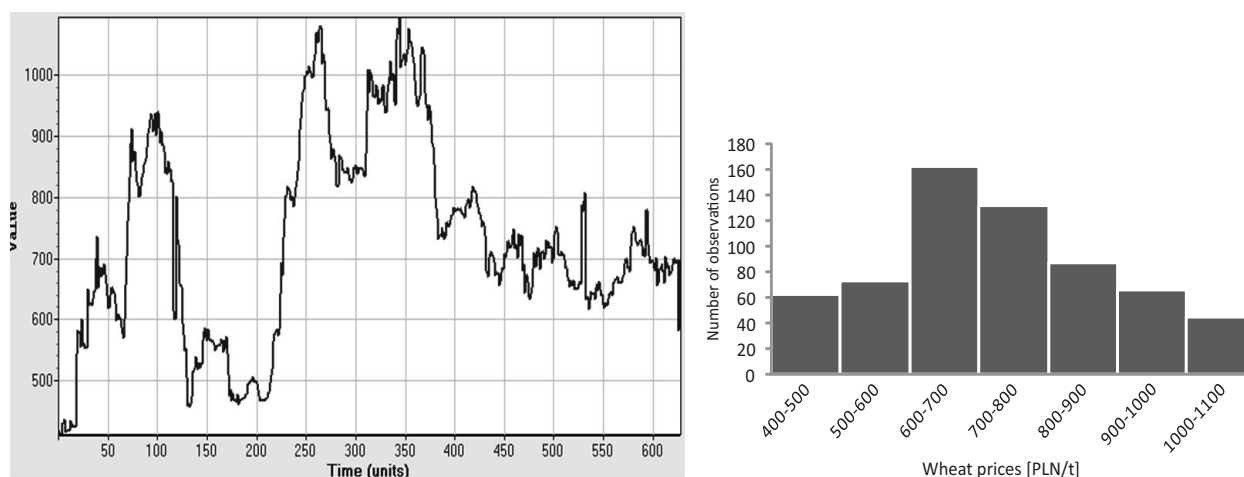


Figure 1. Time series for wheat prices (left-hand side) and size histograms for wheat prices (right-hand side)

Source: own study on the basis of the eWGT data.

for the time series of wheat amounts to PLN 685.44/tonne. Low values of the variability coefficient imply either a small or average variability of the time series under analysis. Recorded was a right-side asymmetry of distribution, which corresponds with the histogram shown on Figure 1 (right-hand side).

The empirical significance level viz. the probability of gaining the given ADF value assuming the genuine nature of zero hypothesis p is high – approx. 0.41 in the case of time series of wheat prices and 0.59. Therefore, there are no reasons for rejecting the hypothesis that the series under analysis is non-stationary. Nevertheless, be stressed that in the case of economic data from a period of several years, the condition of stationarity for the time series is usually impossible to be satisfied.

In the subsequent phase, the investigations were divided into two stages. In the first part, RQA measures were determined for the entire time series; then, the series was divided into sub-periods and calculated were the measures for each of them (those periods are referred to as epochs). For the investigations' stake it was assumed that the length of each epoch is equal to 250 observations and its regular change takes place every 50 observations, which actually means that each epoch overlaps with the subsequent one with 200 observations. Generally speaking, assuming that is the length of each epoch d_e and stands

for the shift, in the time series the shift extremities correspond with the days starting at $t = (i - 1) d_e + 1$ and ending at $t = (i - 1) d_e + N_e + 1$. On the one hand, the application of such an approach enables a global scale investigation into changes, and on the other – an analysis of changes within the entire time series by making calculations for various epochs (Fabretti and Ausloos, 2005).

In the RQA assumed were the following embedding parameters: $\tau = \text{delay} = 9$, $m = \text{embed} = 8$, $\varepsilon = 1.5$, which means that the relation (1) assumes the following form: $R_{i,j} = H(1.5 - \|X_i - X_j\|)$. More information on the issue of phase space reconstruction can be found in (Takens, 1981). Instead, one of the most frequent methods used for determining time delay d , presented in the pertinent literature is Average Mutual Information Function (AMI), proposed by Fraser and Swinney (1986). In the case of the embedding dimension m proposed was the method False Nearest Neighbors (FNN), developer by Kennel et al. (1992). The values of RQA parameters calculated in various epochs and for the entire period are shown in Table 2.

Chaotic processes are characterized with quite low levels of Shannon entropy and a high degree of recurrence. In the case of the series under analysis, the entropy index initially falls from epoch to epoch, and later on it become stabilized; yet, in this phase it

Table 2. Descriptive statistical for the time series of winter wheat price and Dickey–Fuller test

Measure of descriptive statistics	Min (PLN/tonne)	Max (PLN/tonne)	Variability coefficient (%)	Asymmetry coefficient	ADF statistics
Time series for the wheat price	410	1 095.24	22.33	0.79	p = 0.41

Source: own study on the basis of the eWGT data.

is still other than zero, which would imply random processes. This fall is particularly discernible in epoch five. As far as the recurrence index is concerned, in compliance with the previous investigations, for Brown motions it is on an level of 18%, instead for the function sinus – 15% (Fabretti and Ausloos, 2005). Therefore, it is clear that except epoch five, the level of this index falls within this interval; therefore, this corroborates the assumptions that the time series is characterized with chaotic changes. The tabled results of investigations (Table 3) reveals well the determinism of the process under analysis which is most conspicuous in the first four epochs. The values of MaxLine, viz. the longest linear segment measured parallelly to the main diagonal on the recurrence plot confirms that chaotic oscillations intensified in the second phase of the period.

The result of ADF test is also corroborated by negative values of TREND index. Be also noticed that the epoch in which noticed are some changes in the dynamic of the time series presented is epoch five, for the observations from 201 to 451. Those observations correspond with the period starting at the beginning of February 2011, when an increase in

prices was recorded; therefore, it may be stated that the observations in this period considerably depart from other observations in the phase space.

CONCLUSIONS

Free market economies seem to be systems rather more dynamically unstable than deterministic in which case episodes of instability may be attributed to external shocks. In such circumstances it is very hard to consider a concept with linear cause and effect relationships, and in consequence, more realistic seems to be the assumption that relations occurring between the economic factors and the variables are non-linear. Hence, it is necessary to do research aimed at revealing the essence of the mechanisms operating in various sectors of economy. The articles presents the results of preliminary investigations into identifying deterministic chaos in economic time series. There have been made investigations aimed at ascertaining the nature (deterministic or random) of the time series under analysis. Nevertheless, the application of RQA does not authorize one to formulate unequivocal conclusions concerning the occurrence

Table 3. RQA indices for wheat prices

RQA index	Epoch number							All period
	1	2	3	4	5	6	7	
%REC	17.78	18.82	19.40	17.95	12.49	15.32	21.14	15.20
%DET	35.12	36.91	44.31	37.37	20.35	23.60	22.47	30.18
Entropy	2.44	2.35	2.55	2.52	1.81	1.89	1.87	2.35
MaxLine	168	212	193	143	70	70	86	212
Trend	-76.10	-58.98	-196.11	-158.63	-122.35	-180.18	-181.70	-21.33

Source: own study on the basis of the eWGT data.

of deterministic chaos in the time series under analysis. Those investigations need complementing with more accurate methods, at least with a verification of non-linearity by means of non-parametric methods.

The investigations presented hereunder make a certain contribution to the literature, since empirical research has been complemented with the agricultural market, and precisely the market of cereals. Hitherto investigations used to be focused on attempts at identifying deterministic chaos on financial and currency markets. Thus, it seems reasonable to determine the nature of processes in this sector of economy, viz. in agriculture by applying many methods independent one of another, which so far has been done to a little extent.

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CZECH AND POLISH SUGAR INDUSTRY – CONCENTRATION OF SUGAR PRODUCTION

Pavel Kotyza, PhD¹; **Luboš Smutka**, Full Professor²; **Karolina Pawlak**, PhD,
Associate Professor³; **Andrzej Hornowski**, MSc⁴

^{1, 2} Faculty of Economics and Management, Czech University of Life Sciences in Prague

³ Faculty of Economics and Social Sciences, Poznań University of Life Sciences

⁴ Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

The sugar industry, as one of the most regulated food industries in the EU, has been given great challenge due to the sugar quota elimination in 2017. Both in the Czech Republic and Poland, sugar industry underwent significant transformation over last 20 years and mainly after the EU accession. Due to EU's 2006 sugar reform led to significant reduction in number of production facilities. In both countries, we observed improved production of sugar beet driven equally by intensification and extensification in Poland and by extensification forces in the Czech Republic. Reduction in number of refineries also decreased number of competitors which led to market concentration. Conducted Herfindahl-Hirschman analyses proved, that Polish market face lower level of concentration in comparison to Czech market, which is dominated mainly by Tereos TTD and Moravskoslezke cukrovary. Even though Krajowa Spółka Cukrowa also dominate the Polish market, other producers also take advantage of their position. KSC is under the increasing competition of German sugar producers (Südzucker Polska; Pfeifer&Langen; Nordzucker Polska).

Keywords: Czech Republic, Poland, sugar, industry, markets, production, concentration, Herfindahl-Hirschman index

JEL code: Q13

INTRODUCTION AND THEORETICAL BACKGROUND

The sugar industry, as one of the most regulated food industries in the EU, has been given great challenge due to the sugar quota elimination in 2017. Estimation of further market development has been done by multiple authors (Heno et al., 2017; Hryszko and

Szajner, 2017; Kovarova et al., 2017). Both in the Czech Republic and Poland, sugar industry underwent significant transformation over last 20 years and mainly after the EU accession and 2006 sugar reform of the EU which led to elimination of beet sugar production in multiple countries (Bulgaria, Ireland, Latvia, Portugal – mainland and Slovenia; EC, 2009). In the Czech Republic and Poland, sugar production

¹ Corresponding author: Kamycka 129, Prague - Suchdol, Czech Republic, kotyza@pef.czu.cz, +420 22438 2441

² Corresponding author: Kamycka 129, Prague - Suchdol, Czech Republic, smutka@pef.czu.cz, +420 22438 2076

³ Corresponding author: Wojska Polskiego 28, Poznań, Poland, pawlak@up.poznan.pl, +4861 848 75 76

⁴ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, andrzej_hornowski@sggw.pl, +4822 593 42 21

was not fully eliminated, but changes in conditions under common market of the EU led to significant reduction in number of production facilities.

On the other hand, reforms led to increased efficiency and intensity in production (Benešová et al., 2015; Artyszak et al., 2017; Molas et al. 2017). Contrary to improved situation in production efficiency, sugar reforms led to market concentration in the EU and the market is becoming more and more dominated by few players mainly from Germany, France, Netherlands (Rezbova et al., 2015). According to Smutka et al. (2015) present European sugar market have led to market failure when nearly as 10 million tonnes of the production quota (75%) is controlled by five multinational companies – Südzucker, Nordzucker, Pfeifer&Langen (all from Germany), Tereos (FR) and Associated British Foods (UK). Results of empirical investigation presented by Aragrande et al. (2017) shows that vertical price transmission asymmetries still exist after the reform, which in turn contributed to increase sugar sector concentration.

In such a strong concentration exists potential for so called monopolistic margins, where first (agricultural producers) and last (consumers) parts of the chain are characterised by very high number of participants and potentially the weakest bargaining power (Hamulczuk and Szajner, 2015). Under sugar regime of the EU, beet production generated a relative stable income compared to other crops as historically EU guaranteed sugar beet price for farmers as EUR 43.63/tonne and EUR 26.29/tonne from 2009 onwards. As beet quotas were abolished, high price volatility in a free market is expected as a result (Hanse et al., 2018) which will result in additional pressure on least integrated individuals – producers and consumers. Assessment of concentration on site of sugar producers is one of the main aims of this contribution.

MATERIALS AND METHODS

Main aim of presented contribution is to identify main differences in the Czech and Polish sugar industry connected to industry development between 2000 and 2017 and assess concentration on selected markets. Own analyses is based on comparison of secondary data sourced from Czech and Polish sources

(Institute of Agricultural and Food Economics – National Research Institute, Agricultural Market Agency, Ministry of Agriculture and Rural Development, Central Statistical Office of Poland – GUS; Czech Statistical Office – CZSO, Czech Ministry of Agriculture), Eurostat and F.O. Licht database.

For the purpose of own analyses, the following categories of data are observed: (i) sugar beet production characteristics (area, yield, total production); (ii) characteristics of sugar industry (number of refineries, allocation of production quotas, processing capacity); (iii) companies' financial statements.

The development over time is analysed by using simple statistical indicator such as Average Annual Growth Rate (AAGR) based on geometric mean. The calculation was done as follows:

$$AAGR_{GEO} = (X_n/X_0)^{1/n} - 1 \quad (1)$$

The concentration of production capacities is analysed from the point of view of all Czech and Polish sugar producers. This analysis is based on application of Herfindahl-Hirschman index (further referred as HHI). HHI is able to measure the market concentration of the industry. HHI is calculated as follows:

$$HHI = \sum_{i=1}^N s_i^2 = s_1^2 + s_2^2 + s_3^2 + \dots + s_n^2 \quad (2)$$

where:

s_i – market share of corporation,

i – sugar production,

N – total amount of corporations operating on the relevant market in the given country.

According to Hirschman (1964), HHI ranges between 0 and 10,000, while values close to 0 indicates no concentration and high competitiveness of the market; while 10,000 indicates low level of competition and signalise monopoly. Methodology used by U.S. Department of Justice and Federal Trade Commission (2010) indicates: (i) highly competitive environment for values below 100; (ii) non-concentrated environment where operates number of important sugar companies for HHI below 1,500; (iii) market with monopolistic competition and significant concentration with HHI above 2,500. The more HHI ap-

proaches 10,000, the more concentrated and monopolistic the marker is.

RESULTS AND DISCUSSION

In the Czech Republic and Poland, significant changes could be observed in relation to sugar beet production. Table 1 presents changes connected to total harvested area. In Poland, 333 thousand ha were utilised for sugar beet purposes in 2000, which represented about 2.37% of total arable land. Between 2000 and 2009, the total production area decreased by 133 thousand ha (–40%), while total production

of beet (Table 2) changed only by 17% as decreased from 13 million tonnes to 10.8 million tonnes during the same period. After 2006 sugar and quota reform of the EU, which means after 2009 in Poland as the reform was concluded, total harvested area remains relatively constant and oscillate close to 200 thousand h. Total production does not remain as stable as sown area mainly due to different climatic conditions. Therefore total beet production ranges between 9.3 million tonnes (2015) and 13.9 million tonnes (2017). Mainly due to the changes connected to EU accession and 2006 reform, long term trend in harvested area is negative (average annual growth rate: –2.41%), while

Table 1. Sugar beet – harvested area and share on arable land

Producer		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
PL	harvested area (thous. ha)	333	317	303	286	297	286	262	247	187	200
	share on arable land (%)	2.37	2.26	2.32	2.28	2.36	2.37	2.12	2.10	1.56	1.67
CZ	harvested area (thous. ha)	61.3	77.7	77.5	77.3	71.1	65.6	61	54.3	50.4	52.5
	share on arable land (%)	1.98	2.52	2.79	2.81	2.61	2.42	2.31	2.07	1.94	2.03
×		2010	2011	2012	2013	2014	2015	2016	2017	AAGR (%)	
PL	harvested area (thous. ha)	206	203	212	194	198	180	206	220	–2.41	
	harvested area (thous. ha)	1.89	1.84	1.95	1.80	1.82	1.65	1.91	n/a	–1.35	
CZ	harvested area (thous. ha)	56.39	58.33	61.16	62.4	62.96	57.61	60.74	66.1	0.44	
	harvested area (thous. ha)	2.21	2.31	2.43	2.49	2.53	2.31	2.43	n/a	1.30	

Source: Institute of Agricultural and Food Economics – National Research Institute (2001–2017); Czech Ministry of Agriculture (2018).

Table 2. Sugar beet – total production (thous. tonnes)

Producer	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
PL	13 134	11 364	13 432	11 739	12 730	11 912	11 475	12 682	8 715	10 849
CZ	2 809	3 529	3 833	3 495	3 579	3 496	3 138	2 890	2 885	3 038
×	2010	2011	2012	2013	2014	2015	2016	2017	AAGR (%)	
PL	9 973	11 674	12 350	11 234	13 489	9 364	13 500	13 900	0.33	
CZ	3 065	3 899	3 869	3 744	4 425	3 421	4 118	4 399	2.67	

Source: Institute of Agricultural and Food Economics – National Research Institute (2001–2017); Czech Ministry of Agriculture (2018).

positive trend in total production (AAGR: +0.33%) and yield (Table 3) is observed (AAGR: +2.8%). The rapid changes in the beet production could be demonstrated mainly by increased yield. While in 2000 only 39.4 tonnes/ha of beet was harvested, in 2014 producers reached maximum yield of 68.3 tonnes/ha (+73%).

In the Czech Republic, 61.3 thousand ha were utilised for sugar beet purposes in 2000, which represented about 1.98% of total arable land. Between 2000 and 2008, the total production area decreased by 12 thousand ha (–18%), while total production of beet did not change (2.8 in 2000 vs. 2.8 million tonnes in 2008). While in above mentioned referred period in Poland production suffered, loss of land was compensated in the Czech Republic by increase in productivity as yield increased by 25%. After sugar and quota reform of the EU, which means after 2008 in the Czech Republic as the reform was concluded and Eastern Sugar changed production quota for monetary compensations, total harvested area steadily increases and exceeded original 2000 value in 2013 (62.4 thousand ha).

Total production never really felt below 2000 values and it goes up by 2.6% per annum. In 2017, record high production of beet was observed as production reached almost 4.4 million tonnes (+57% to year 2000). Mainly due to the changes connected to EU accession and 2006 reform, long term trend in harvested area is below 0.5%, while positive trend occurs in total production (AAGR: +2.67%) and yield (AAGR: +2.2%). Increased harvested area is seen as the main

influencer of the total production change in the Czech Republic (results based on logarithmic dissolution of factors), which indicates that Czech sugar beet production is driven by extensification. In Poland, both forces (influence of yield and area) are relatively equal and therefore change in production is driven by both extensification as well as intensification.

In both markets, significant reduction of sugar refineries occurred. In Poland, total reduction was from original 71 in 2001 to 18 after year 2009 (–75%). In the Czech Republic, total number of refineries was already reduced between 1989 and 2000 (–38 refineries), so after EU accession and 2006 reform only four refineries were closed. This closure was connected mainly to quota renunciations proposed by 2006 reform. The Eastern Sugar closed 3 refineries, gave up quota of about 102 thousand tonnes (Table 6, 18% of national quota) and received over EUR 74 million (102 thousand × 730). In Poland, total quota renunciation was 366,838 tonnes that resulted in payment of more than EUR 280 million from EU restructuring fund (Ministry of Agriculture and Rural Development, 2011). Total production quota decreased in the Czech Republic and Poland by 18 and 16% respectively. After all, in Poland remained 4 producers running abovementioned 18 refineries – Krajowa Spółka Cukrowa (7×); Südzucker Polska (5×); Pfeifer&Langen (4×); Nordzucker Polska (2×). In the Czech Republic, 5 subjects run 7 refineries: Tereos TTD (2); Moravskoslezské cukrovary (2); Cukrovar Vrbátky (1); Litovelská cukrovarna (1); Hanácká potravinářská společnost (1).

Table 3. Sugar beet – yield (100 kg/ha)

Producer	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
PL	394	358	443	410	428	416	438	513	465	543
CZ	458	454	495	452	503	533	514	532	572	579
×	2010	2011	2012	2013	2014	2015	2016	2017	AAGR (%)	
PL	483	574	582	580	683	520	655	630	2.8	
CZ	544	668	633	600	703	594	678	666	2.2	

Source: Institute of Agricultural and Food Economics – National Research Institute (2001–2017); Czech Ministry of Agriculture (2018).

Table 4. Number of sugar refineries

Producer	2001	2002	2003	2004	2005	2006	2007	2008	2009 and further
PL	76	65	57	43	40	31	29	19	18
CZ	14	13	13	11	11	10	7	7	7

Source: Institute of Agricultural and Food Economics – National Research Institute (2000–2017); Czech Ministry of Agriculture (2017).

Table 5. National production quotas

Producer	2004/05		2005/06		2006/07	2007/08	2008/09 and further
CZ	441.2 (A)	13.7 (B)	423.0 (A)	13.1 (B)	454.9	369.9	372.5
PL	1 580.0 (A)	91.9 (B)	1 495.3 (A)	87.0 (B)	1 671.90	1 772.50	1 405.60

Source: Institute of Agricultural and Food Economics – National Research Institute (2000–2017); Czech Ministry of Agriculture (2017).

Table 6. Total raw sugar production and average production per refinery

Producer	2006/07	2008/09	2010/11	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	AAGR (%)
	Total raw sugar production									
CZ	498	458	517	612	593	632	512	650	695	3.1
PL	1 883	1 427	1 613	2 030	1 959	2 168	1 652	2 278	2 387	2.2
×	Average production per refinery (1,000 tonnes)									
CZ	50	65	74	87	85	90	73	93	99	6.5
PL	61	75	90	113	109	120	92	127	133	7.4

Source: author based on F.O. Licht (2017).

As seen from Table 5, total production of sugar is related to increase in total production of sugar beet. As production of beet goes up, total production of raw sugar increases. We can observe 2 phenomenon – increased in total production which goes up annually in average by 3.1 and 2.2% in the Czech Republic and Poland respectively, while average growth rate of raw sugar production per one refinery increases much faster (6.5 and 7.4%). According to F.O. Licht's Annual reports (2016, 2017) production in Poland ought to exceed 2.3 million tonnes of raw sugar (2.1 million

tonnes of white sugar), while in 2006/2007 it was half million tonnes less. Production in Czech Republic approaches 700 thousand tonnes of raw sugar (640 thousand tonnes of white sugar), while in 2006/2007 it was 200 thousand tonnes less. Second part of Table 6 illustrates average production per one refinery. Increasing trend is connected to investments into new and more efficient technologies, storage facilities as well as prolongation of sugar campaign. Czech refineries are in general smaller than Polish entities. Table 7, see column processing daily capacity, also

illustrates this fact. Average Czech processing capacity per refinery approaches 5,600 tonnes per day, while in Poland this value equals to 7,000 tonnes/day. But, it is worth mentioning, that Tereos TTD has 2 large production facilities, one with capacity of 15 (in Dobrovice) and 7 (in Ceske Mezirici) thousand tonnes of beet per day. The largest Polish refinery is able to process about 12,000 tonnes a day (Glinojec, P&L), while smallest does not goes below 4,000 tonnes per day. In the Czech Republic, the smallest has capacity of about 2,400 tonnes/day.

Described situation describes market concentration calculations presented in Table 8. They presents calculation of Herfindahl-Hirschman Index (HHI) based on different concentration indicators. The concentration is measured based on daily processing capacity, allocated production quotas, revenues and total sugar production. Mean index clearly states, that

in the Czech Republic, total concentration of sugar markets is closer to monopolistic competition as average HHI index reached 3,782. The fact is given by position of Tereos TTD, which is dominating force on the Czech Market, representing 58% of processing capacity and from 49–59% of quotas, revenues and production. Moravskoslezské cukrovar is the second dominant subjec. Both control about 80% of the sugar production and form duopoly. While Krajowa Spółka Cukrowa, Polish State owned enterprise, is also dominating the market, its dominance in relation to competitors is not so significant. It only represents about 48% in processing capacity, and between 36–39 in quotas, revenues and sugar production. Other players (mainly Südzucker Polska and Pfeifer&Langen) has also significant marker role with share above 25% in production. The fact balances distribution of HH points.

Table 7. Sugar producers – basic information

Producer		Σ^*	Processing capacity (tonnes/day)	White sugar quota (tonnes/year)	Revenues (EUR thous.)	White sugar production (tonnes)
PL	Krajowa Spółka Cukrowa	7	60 000	549 600	429 780	685 000
	Südzucker Polska	5	21 000	351 900	183 564	522 000
	Pfeifer & Langen	4	30 000	371 700	352 104	470 000
	Nordzucker Polska	2	15 000	132 500	156 225	218 000
	Total	18	126 000 (est. 17/18)**	1 405 700 (13/14)	1 121 673 (2016)	1 895 000 (2012)
CZ	Tereos TTD	2	22 800	208 716	236 514	306 000
	Moravskoslezské cukrovary	2	8 600	93 973	124 367	194 086
	Cukrovar Vrbátky	1	2 400	21 989	26 909	45 440
	Litovelská cukrovarna	1	2 400	22 597	31 347	40 638
	Hanácká potravinářská spol.	1	3 000	25 184	25 300 (est.)***	38 000
	Total	7	39 200 (17/18)	372 459 (16/17)	444 421 (2016)	624 164 (16/17)

Note: * Σ – number of refineries; **estimation based on data from Stowarzyszenie Techników Cukrowników (Wojtczak, 2018); ***estimation based on last available revenue (2012: EUR 22,683 thousand) and its market share in revenues (5.69%).

Source: latest companies' annual reports, Institute of Agricultural and Food Economics – National Research Institute (2001–2017), Czech Ministry of Agriculture (2017); Wojtczak (2018).

Table 8. Sugar producers – concentration analyses

Producer		Processing capacity		Quota system**		Revenues*		Production***		Mean
		share (%)	HHI	share (%)	HHI	share (%)	HHI	share (%)	HHI	HHI
PL	Krajowa Spółka Cukrowa	48	2 268	39	1 529	38	1 444	36	1 307	1 637
	Südzucker Polska	17	278	25	627	16	256	28	759	480
	Pfeifer & Langen	24	567	26	699	31	961	25	615	711
	Nordzucker Polska	12	142	9	89	14	196	12	132	140
	Total	100	3 254	100	2 943	100	2 857	100	2 857	2 978
CZ	Tereos TTD	58	3 383	56	3 140	53	2 832	49	2 404	2 940
	Moravskoslezské cukrovary	22	481	25	637	28	783	31	967	717
	Cukrovar Vrbátky	6	37	6	35	6****	37	7	53	41
	Litovelská cukrovarna	6	37	6	37	7	50	7	42	42
	Hanácká potravinářská společnost	8	59	7	46	6	32	6	37	43
	Total	100	3 998	100	3 894	100	3 734	100	3 503	3 782

Note: *revenues of P&L Polska and P&L Glinoject; **Polish quota valid for marketing year 13/14 based on Kapusta (2015); ***latest Polish production available for year 2012;****value of own estimation based on 2012 financial results.

Source: author based on data from Table 9.

CONCLUSION

Presented contribution aimed to compare Czech and Polish development in Sugar industry after EU accession. Based on collected data, conducted analyses and related calculations, it could be concluded:

Sugar industry underwent significant reduction in total amount of processing facilities in both countries.

In Poland, this reduction was followed by reduction in total harvested area and production of sugar beet, but at the end of referential period all beet production indicators exceeded original 2000 values. Development of sugar beet production was driven both by intensification in yield and by extensification in harvested area.

In the Czech Republic, closure of refineries resulted in decrease of harvested area, total beet production was newer below 2,000 values and increased annually. Changes in beet production are more dependent

on rise in land utilisation rather than on yield intensification.

Sugar processing industry increased average raw sugar production per one refinery by 6.5 and 7.4% in the Czech Republic and Poland respectively. Total production increased by 200 and 500 thousand tonnes in the Czech Republic and Poland between marketing year 2006/2007 and 2017/18 according to F.O. Licht's data.

Both markets could be classified as markets with monopolistic competition and significant concentration. Market dominance is much more significant in the Czech Republic where certain form of duopoly is observed.

Concentration might have impact on least integrated units in value chain – producers and consumers. Further changes connected to liberalised internal EU market are expected. Quantification of that impact shall be conducted in forthcoming studies.

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COSTS OF VINEYARDS PRODUCTION IN SELECTED EU COUNTRIES IN THE PERIOD 2004–2015

Tadeusz Filipiak, PhD¹; Mariusz Maciejczak, PhD²

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

The aim of the research was to determine the production costs in farms specializing in viticulture in the selected European Union countries in the period 2004–2015. It was found that there was a large variation in terms of the structure of production costs. In the analysed period, the majority of countries recorded an increase in total costs per 1 ha, which was mostly due to the year by year increase of the direct costs. In direct costs the plant protection had the largest share, followed by fertilization costs, while the lowest were the costs of pruning. The share of indirect costs in total costs was relatively high and on EU average reached 82%.

Keywords: cost of production, specialist vineyards, FADN, European Union

JEL codes: Q12, D24

INTRODUCTION

Commercial entities should conduct their businesses in such a way that are profitable. As noted by Latruffe (2010) agricultural producers often have no influence on the prices of their products, as they are shaped by the market, but they have a decisive influence on production costs. Therefore, in order to build a competitive advantage, it is important to properly and rationally bear the costs of running an agricultural business (Sobczyński and Stefko, 2011).

Activities aimed at building a competitive advantage and creating adequate cost related strategies refer to many branches of the agricultural sector, but they are particularly important for the wine sector in the European Union (EU). The wine sector, including viticulture production, plays a major role in many European countries, especially with the favourable

conditions for running such production due to climatic and soil conditions as well as because of centuries-old tradition. However, as emphasized by Filipiak and Maciejczak (2018) achieving income from a farm growing vines for wine at the parity level does not determine the competitive capacity of a farm in the EU farms. This is largely due to significant variations and a relatively low level of costs, in particular wage labour costs.

According to the review of the literature, viticultural farms are influenced by many factors affecting the increase or reduction of the production costs. Sgroi et al. (2014) indicates that for many wine farms in Italy, the reduction of production costs is the only way to gain a competitive advantage. Introducing process innovations, despite the periodic increase in costs, allows to improve the cost position by lowering costs and increasing profit. On the other hand, Delord

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, tadeusz_filipiak@sggw.pl, +4822 593 42 35

² Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, mariusz_maciejczak@sggw.pl, +4822 593 42 35

et al. (2015) showed that in France the size of the farm had a small impact on economic performance. The yield of a farm growing grapes is only slightly dependent on their size. Differences in profitability between farms result from variability in the sale price of wine. These differences relate to the location and designation of origin (Protected Designation of Origin – PDO), i.e. under the influence of supply control and its potential, area and resources used for management in the countries and regions of the Protected Nomenclature of Origin. Maciejczak (2017) argues that the climate change conditions and their changes are important factors that could influence the economic performance of viticultural production in Poland, which as a the EU wine country takes dynamic actions to re-establish and develop viticultural and wine production.

Thus, bearing in mind that the wine sector plays an important role in the economies of many EU Member States, both these with long wine production tradition and those being relatively new on the market as well as considering the problems of profitability of viticulture indicated by many authors (Umbreziova and Hrda, 2014; Toth and Vegvari, 2015), the question arises about the cost of production in wine farms in the EU countries, especially with regard to their structure and size.

Objectives and methods

The aim of the research was to determine the production costs in farms specializing in viticulture in selected European Union countries in the period 2004–2015. The study features the characteristics of wine farms in selected EU countries, then the level and structure of production costs, including direct costs and indirect costs were determined. The undertaken approach to perform such analysis is well established in the literature and focuses on relations

of the costs to the production, being direct or indirect (Goraj and Manko, 2004; Kondraszuk, 2012). In crop production, including in viticulture, direct costs cover: costs of cuttings, costs of organic and mineral fertilizers, costs of plant protection and other specialized cultivation costs. Indirect costs include: general production costs (maintenance of buildings and machinery, energy, external services and other general production costs, such as water, insurance, etc.), depreciation costs, taxes and costs of external factors (wage labour, rent and interest). Individual types of costs were calculated per 1 ha of arable land, so as to make a comparative analysis of viticulture on farms. It is important however to notice that the analysis of specialist vineyards with regard to their costs of production might significantly vary due to many factors, including roodstock and variety, age of plants, the scale of pruning, as well as biotic and factors, etc. Therefore the comparability analysis are difficult due to unification. To overcome such difficulties the European Farm Data Accountancy Network provides the solution for more credible economic analysis.

The research cover farms specializing in viticulture participating in the European FADN system. The time range cover the years 2004–2015. Within the analysed period, the data was available for 14 countries, including: Austria, Bulgaria, Croatia, Cyprus, the Czech Republic, Greece, France, Spain, Germany, Portugal, Romania, Slovenia, Hungary and Italy. Farms specializing in viticulture are classified according to the FADN typology TF8 to type 3 – specialist vineyards.

The article uses methods of descriptive statistics, including the absolute and relative dynamics of changes using linear³ and exponential⁴ regression analysis. In horizontal comparisons, due to high volatility, averages over the entire multi-year and three-year averages were applied.

³ The regression coefficient was calculated based on a linear function in Excel using the REGLINP formula. It is the slope of the regression line and represents the average increase in the value of the dependent variable assuming an increase in the value of the independent variable by 1 unit (time variable – t).

⁴ The average annual change was also calculated based on the exponential function in Excel thanks to the formula of the REGEXPP function. In regression analysis, the function calculates the exponential curve that best fits the data and returns an array of values describing this curve. The function returns an array of values, so it must be entered in the form of an array formula. The curve equation is: $y = (b \cdot (m_1 \wedge x_1) \cdot (m_2 \wedge x_2) \cdot \dots)$.

RESOURCES OF SPECIALIST VINEYARDS FARMS

In the period 2004–2015, the largest viticultural farms were observed in Bulgaria (on average 25.7 ha of UAA), in France (24.4 ha of UAA) and in Spain (21.7 ha of UAA). On the other hand, the smallest farms specializing in viticulture were in Cyprus (on average about 4.0 ha of UAA), on Croatia (4.3 ha of UAA), in Slovenia (approx. 4.5 ha of UAA) and in Greece (4.7 ha of UAA). The resources of viticultural farms in selected EU countries in the years 2004–2015 are presented in Table 1.

In the analysed period, the largest increase in farm area in relative terms was recorded on Spanish farms (annual average of more than 2.9%), Hungarian (2.7%), German (2.4%), Italian (almost 2.3%) and Portuguese farms (2.1%). The decrease in the area of surveyed farms was recorded in Czech farms (on average by 9.4%), Austrian (by –6.5%), Romanian

(almost 5%) and Cypriot (by –2.9%). In absolute terms, the largest increase was recorded in Spanish farms (on average by 0.6 ha of UAA), Bulgarian (by 0.3 ha of UAA) and German (by 0.28 ha of UAA). The largest decrease in absolute terms was recorded in Czech farms (on average annually by –1.39 ha of UAA) and Austrian farms (by –1.16 ha of UAA). Practically at the same level in the analysed period, the UAA occurred on Croatian, French and Greek farms.

In the analysed period, the largest labour resources per 1 ha of UAA occurred in Croatian farms (0.43 AWU per 1 ha UA on average), Slovenian (0.42 AWU per 1 ha UAA), Romanian (0.3 AWU per 1 ha UAA) and Cypriot (0.28 AWU per 1 ha of UAA). The smallest work resources per 1 ha of UAA were on Spanish farms (0.07 AWU per 1 ha UAA), Austrian farms (0.10 AWU per 1 ha UAA) and French farms (0.11 AWU per 1 ha UAA). In the years 2004–2015, the increase in labour outlays per 1 ha of arable land was observed in Austrian farms (on average by 7.5%),

Table 1. Main production factors of specialist vineyards in selected EU countries in the years 2004–2014

Specification	Country	2004–	2007–	2010–	2013–	Average	Average		
		–2006	–2009	–2012	–2015	2004–	annual change		
		absolute values							%
Area of utilised agricultural area (ha)	(BGR) Bulgaria*	–	25.04	24.96	27.12	25.71	0.34	1.24	
	(CYP) Cyprus*	4.75	3.90	3.72	3.67	4.01	–0.13	–2.92	
	(CZE) Czech Republic	20.52	21.71	9.36	8.66	15.06	–1.39	–9.40	
	(DEU) Germany	10.60	11.13	13.04	12.79	11.89	0.28	2.43	
	(ELL) Greece	4.68	4.49	4.36	5.12	4.66	0.05	0.81	
	(ESP) Spain	17.41	22.48	24.21	22.78	21.72	0.60	2.92	
	(FRA) France	24.81	24.42	24.12	24.39	24.44	–0.05	–0.22	
	(HRV) Croatia*	–	–	–	4.33	4.33	0.00	–0.11	
	(HUN) Hungary	8.77	9.82	10.76	11.33	10.17	0.28	2.75	
	(ITA) Italy	7.16	7.81	8.18	8.89	8.01	0.18	2.29	
	(OST) Austria	23.24	17.77	14.03	12.72	16.94	–1.16	–6.54	
	(POR) Portugal	8.96	9.75	10.38	10.75	9.96	0.21	2.10	
	(ROU) Romania*	–	9.86	10.45	6.92	9.08	–0.37	–4.95	
	(SVN) Slovenia*	4.66	5.06	4.32	4.19	4.54	–0.08	–1.75	
(EU) European Union	13.31	14.05	13.85	14.16	13.84	0.08	0.57		

Table 1 – cont.

Specification	Country	2004– –2006	2007– –2009	2010– –2012	2013– –2015	Average 2004– –2015	Average annual change	
		absolute values						%
Total labour input (AWU/ha UAA)	(BGR) Bulgaria*	–	0.27	0.22	0.17	0.22	–0.10	–7.1
	(CYP) Cyprus*	0.21	0.26	0.34	0.35	0.28	0.15	7.2
	(CZE) Czech Republic	0.15	0.18	0.21	0.24	0.19	0.08	4.5
	(DEU) Germany	0.22	0.21	0.19	0.20	0.21	–0.02	–1.6
	(ELL) Greece	0.28	0.29	0.26	0.19	0.25	–0.09	–4.2
	(ESP) Spain	0.08	0.06	0.06	0.06	0.07	–0.01	–2.1
	(FRA) France	0.11	0.11	0.11	0.12	0.11	0.01	1.2
	(HRV) Croatia*	–	–	–	0.43	0.43	0.00	–4.6
	(HUN) Hungary	0.22	0.18	0.19	0.20	0.20	–0.02	–0.9
	(ITA) Italy	0.18	0.16	0.15	0.14	0.16	–0.04	–2.9
	(OST) Austria	0.07	0.09	0.11	0.14	0.10	0.07	7.5
	(POR) Portugal	0.21	0.18	0.17	0.17	0.18	–0.04	–2.4
	(ROU) Romania*		0.22	0.24	0.32	0.30	0.32	–0.6
	(SVN) Slovenia*	0.45	0.54	0.50	0.35	0.42	–0.10	–2.2
(EU) European Union	0.13	0.12	0.12	0.12	0.12	0.00	–0.4	
Total assets (EUR/ha UAA)	(BGR) Bulgaria*	–	10.69	12.34	11.16	11.40	0.16	1.7
	(CYP) Cyprus*	28.54	32.83	61.02	35.89	39.57	0.18	3.9
	(CZE) Czech Republic	13.16	15.43	24.80	55.56	27.24	5.43	14.5
	(DEU) Germany	44.78	46.42	41.15	45.57	44.48	–0.18	–0.3
	(ELL) Greece	19.46	22.13	20.92	20.13	20.66	–0.29	0.1
	(ESP) Spain	10.13	9.68	9.07	9.96	9.71	0.04	–0.3
	(FRA) France	20.20	22.48	24.40	25.39	23.12	0.51	2.6
	(HRV) Croatia*	–	–	–	54.80	54.80	–4.81	–8.8
	(HUN) Hungary	16.25	14.57	17.97	18.97	16.94	0.37	2.1
	(ITA) Italy	37.82	39.52	45.56	47.15	42.51	1.07	2.5
	(OST) Austria	13.09	17.35	21.35	25.79	19.39	1.39	7.5
	(POR) Portugal	11.29	11.58	14.78	17.22	13.72	0.69	4.9
	(ROU) Romania*	–	20.42	9.95	14.29	14.89	–0.80	–4.0
	(SVN) Slovenia*	39.74	36.09	48.73	57.61	46.07	2.61	5.6
(EU) European Union	21.26	22.44	25.53	27.04	24.06	0.67	2.8	

* Data for Slovenia since 2005, for Bulgaria and Romania since 2007 and Croatia since 2013 (entry into the EU).

Source: own study based on FADN data.

Cypriot (7.2%), Czech (4.5%) and French farms (1.2%). In other countries there was a decrease in labour outlays per 1 ha of UAA, the largest in Bulgarian farms (on average 7.1%), Croatian (by –4.6%), Greek (by –4.2%) and Italian (by –2.9%). In absolute terms, the largest increase in labour outlays per 1 ha of UAA was recorded in Romanian farms (on average annually by 0.32 AWU per 1 ha UAA) and Cypriot farms (0.15 ha AWU per 1 ha UAA), while the largest decrease in labour outlays per 1 ha UAA was observed on Bulgarian and Slovenian farms (after –0.10 AWU per 1 ha of UAA) and Greek (by –0.9 AWU per 1 ha of UAA).

In the years 2004–2015, the largest assets per 1 ha of UAA occurred on Croatian farms (on average EUR 54.8 thousand per 1 ha of UAA), Slovenian (EUR 46.1 thousand per 1 ha of UAA) and German (EUR 44.5 thousand per 1 ha of UAA) and Italian (EUR 42.5 thousand per 1 ha of UAA). In the analysed period, the largest relative increase in assets per 1 ha of UAA was in Czech farms (annual average of 14.5%), Austrian (by 7.5%) and Slovenian (by 5.6%). In turn, the decrease in total assets per 1 ha of UAA was on Croatian farms (on average by 8.8%), Romanian (by –4.0%) and German and Spanish (by –0.3%). In absolute terms, the largest increase in total assets per 1 ha of arable land was in Czech farms (by EUR 5.4

thousand per 1 ha of UAA), in Slovenian (by EUR 2.6 thousand per 1 ha of UAA) and in Italian (by EUR 1.1 thousand per 1 ha of UAA). The largest decline in absolute terms was recorded on Croatian farms (on average by EUR 4.8 thousand per 1 ha of UAA) and Romanian (by EUR 0.8 thousand per 1 ha of UAA).

In the surveyed years the Italian farms were characterized by the greatest technical equipment (about EUR 274.6 thousand/AWU on average), then German farms (approx. EUR 215.4 thousand/AWU), French farms (EUR 202.8 thousand/AWU) and Austrian (approx. EUR 190 thousand/AWU) – Figure 1. On the other hand, the smallest technical labour equipment was observed in Bulgarian farms (on average approx. EUR 54 thousand/AWU), Romanian (around approx. 55.1 thousand/AWU), and Portuguese (approx. EUR 75.8 thousand/AWU) and Greek (approx. EUR 84.7 thousand/AWU) and Hungarian (approx. EUR 85.6 thousand/AWU). In the analysed period, in relative terms, the largest increase in technical labour equipment was recorded in Czech (annual average of 10.1%), Bulgarian (approx. 8.8%), Slovenian (approx. 7.8%) and Portuguese (7.3%) farms. In absolute terms, the largest increase in technical labour equipment was recorded in Italian farms (on average annually by approx. EUR 14.9 thousand/AWU), Czech (by EUR 14.4 thousand/AWU) and Slovenian (by

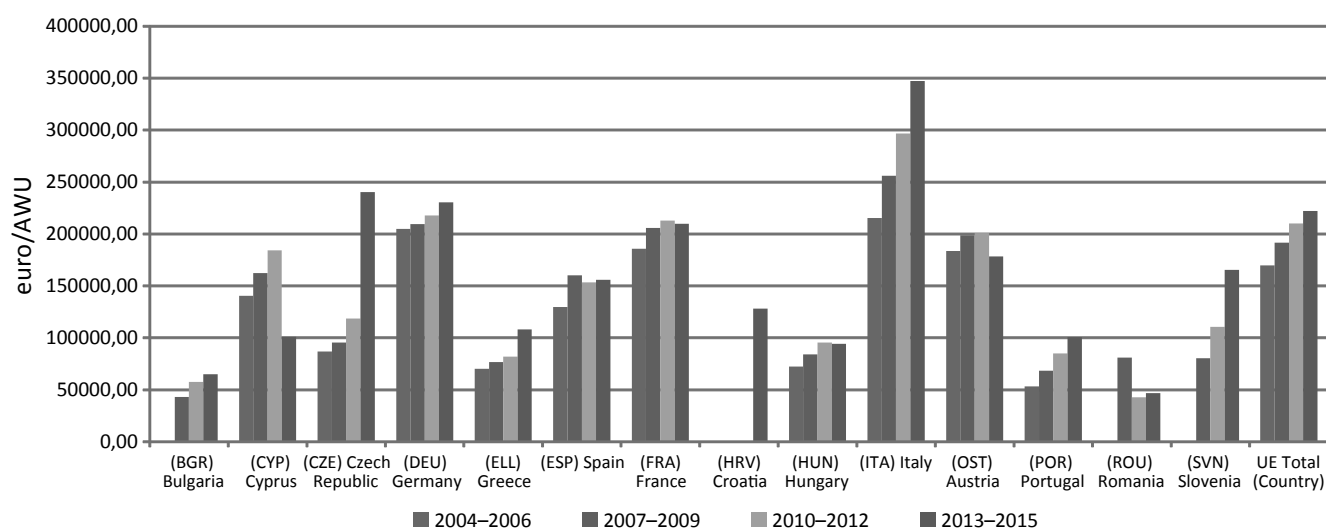


Figure 1. Technical equipment for work in specialist vineyards in the years 2004–2015 (%)

Source: own study based on FADN.

EUR 9.7 thousand/AWU). In the analysed period, the decrease in technical labour equipment was recorded in Croatian farms (on average by 4.2%), Romanian (by –3.4%) and Cypriot (by –3.3%).

TOTAL PRODUCTION COSTS

In 2004–2015 on average in the EU countries the total costs in viticulture increased from approx. EUR 3.4 thousand per 1 ha of UAA to approx. EUR 4.2 thousand per 1 ha of UAA, i.e. by approx. 27.8%. The average annual increase in total costs per 1 ha of UAA was almost 2.3%. On average, in the analysed period, total costs per 1 ha of UAA amounted to approx. EUR 3.7 thousand per 1 ha of UAA (Table 2).

In the analysed period, the largest total costs per 1 ha of arable land in viticulture were on German farms (on average approx. EUR 8.4 thousand per 1 ha of

UAA), then on French farms (on average over EUR 6.5 thousand per 1 ha of UAA), on Czech farms (over EUR 6 thousand per 1 ha of UAA). The lowest total costs per 1 ha of arable land in viticulture were on Spanish farms (on average approx. EUR 822.4 per 1 ha of UAA), then on Portuguese farms (on average over EUR 2 thousand per 1 ha of UAA), also on farms Romanian, Bulgarian (approx. EUR 2.5 thousand per 1 ha of UAA) and Cypriot (over EUR 2.6 thousand per 1 ha of UAA).

In the analysed period, the decrease in total costs per 1 ha of arable land in viticulture was recorded only on Bulgarian farms (on average by almost 1.5%) and on Italian farms (on average by 0.34%). In the other selected EU countries there was an increase in total costs per 1 ha of wine growing UAA. In relative terms, the largest increase in costs was on Czech farms (on average by 15.4% annually), then on Aus-

Table 2. Total input per 1 ha UAA in specialist vineyards in selected EU countries in 2004–2015

Specification	Country	2004–	2007–	2010–	2013–	Average 2004– –2015	Average annual change	
		–2006	–2009	–2012	–2015		absolute values	%
Total input per 1 ha UAA (EUR)	(BGR) Bulgaria*	–	2 544.12	3 163.59	2 026.01	2 577.91	-65.70	–1.48
	(CYP) Cyprus*	1 790.45	1 887.15	2 194.81	3 936.89	2 672.95	241.02	7.90
	(CZE) Czech Republic	2 146.21	3 439.01	5 306.14	9 337.04	6 027.39	775.53	15.41
	(DEU) Germany	7 760.73	8 719.08	8 145.63	8 804.12	8 556.27	81.40	1.00
	(ELL) Greece	2 391.40	2 495.94	2 529.99	2 492.48	2 506.14	16.12	0.68
	(ESP) Spain	779.26	707.59	729.46	1 030.15	822.40	26.01	2.86
	(FRA) France	5 274.10	6 003.31	6 569.85	7 204.38	6 592.51	212.43	3.43
	(HRV) Croatia*	–	–	–	3 726.38	3 726.38	153.77	4.26
	(HUN) Hungary	3 535.92	3 030.46	3 689.79	3 601.30	3 440.52	34.36	1.05
	(ITA) Italy	3 476.87	3 410.35	3 485.41	3 370.98	3 422.25	–12.16	–0.34
	(OST) Austria	2 035.46	2 831.06	3 818.16	5 085.49	3 911.57	331.92	9.99
	(POR) Portugal	1 783.05	1 805.50	2 049.60	2 476.88	2 110.66	73.68	3.57
	(ROU) Romania*	–	2 688.89	2 076.74	2 904.29	2 556.64	7.78	0.76
	(SVN) Slovenia*	3 852.87	3 777.90	5 342.08	5 611.56	4 910.52	260.74	5.73
	(EU) European Union	3 370.27	3 458.63	3 731.14	4 129.77	3 773.18	85.54	2.28

Source: own study based on FADN data.

trian farms (on average by almost 10%) and on Cypriot farms (on average by 7.9% per year). In absolute terms, the highest increase in total costs per 1 ha of UAA was also in Czech farms (on average by more than EUR 775.5 per 1 ha of UAA), Austrian (on average by EUR 331.9 per 1 ha of UAA), and Slovene (on average annually by over EUR 260.7 per 1 ha of UAA), Cypriots (on average annually by over EUR 241.0 per 1 ha of UAA) and French (on average annually by over EUR 212.4 per 1 ha of UAA).

DIRECT PRODUCTION COSTS

The direct costs of wine-growing production per 1 ha of arable land in EU countries amounted to an average of EUR 633.7 per 1 ha of UAA. In the analysed period, in relative terms, the increase in direct costs in the EU countries amounted to about 2.4% on average, while in absolute terms, direct costs increased on an

annual basis by approx. EUR 15.3 per 1 ha of UAA. The largest direct costs per 1 ha of arable land were incurred on German farms (on average approx EUR 2.1 thousand per 1 ha of UAA), then on Slovenian farms (approx. EUR 1.1 thousand) and Czech farms (approx. EUR 917 per 1 ha of UAA), Croatian (over EUR 860 per 1 ha of UAA) and Italian (approx. EUR 842 per 1 ha of UAA). The lowest direct costs per 1 ha of arable land were incurred on Spanish farms (on average approx. EUR 161 per 1 ha of UAA), Cypriot (approx. EUR 354.4 per 1 ha of UAA) and Bulgarian (approx. EUR 428 per 1 ha of UAA).

In the analysed period almost in all countries surveyed there was an increase in direct costs per 1 ha of UAA, except for Italian farms (decrease on average by 2.1%) and Greek (by –1.4%). The largest, in relative terms, increase in direct costs per 1 ha of UAA was in Czech farms (annual average of 11.1%), Portuguese (by 10.3%) and Austrian (by 9.5%). In abso-

Table 3. Specific crops cost per 1 ha UAA in specialist vineyards in selected EU countries in 2004–2015

Specification	Country	2004–	2007–	2010–	2013–	Average 2004– –2015	Average annual change	
		–2006	–2009	–2012	–2015			%
Direct costs per 1 ha (EUR)	(BGR) Bulgaria*	–	278.57	650.85	353.86	427.76	0.27	1.71
	(CYP) Cyprus*	291.12	317.69	396.03	412.65	354.37	15.57	4.38
	(CZE) Czech Republic	541.09	626.51	959.92	1 539.52	916.76	104.65	11.11
	(DEU) Germany	1 933.94	2 259.67	2 065.02	2 224.56	2 120.80	21.91	1.09
	(ELL) Greece	744.00	744.16	703.95	644.43	709.14	–9.89	–1.43
	(ESP) Spain	156.13	136.92	137.03	213.29	160.84	5.84	3.12
	(FRA) France	583.36	715.46	769.87	914.24	745.73	35.09	4.74
	(HRV) Croatia*	–	–	–	860.01	860.01	52.91	6.44
	(HUN) Hungary	399.55	878.34	979.67	649.76	726.83	32.60	5.74
	(ITA) Italy	992.88	796.73	748.43	831.77	842.45	–19.35	–2.13
	(OST) Austria	380.49	497.63	622.69	912.15	603.24	57.21	9.45
	(POR) Portugal	296.76	465.90	620.78	770.30	538.43	51.22	10.28
	(ROU) Romania*	–	416.14	593.17	697.65	568.99	49.38	7.52
	(SVN) Slovenia*	987.96	907.11	1 213.85	1 200.29	1 085.42	38.67	4.01
	(EU) European Union	576.52	580.65	620.10	717.68	623.74	15.26	2.37

Source: own study based on FADN data.

lute terms, the largest increase in total direct costs per 1 ha of UAA was also on Czech farms (on average annually by over EUR 104.6 per 1 ha of UAA) and on Austrian farms (approx. EUR 57.2 per 1 ha of UAA), Croatian (by EUR 52.9 per 1 ha of UAA) and Portuguese (EUR 51.2 per 1 ha of UAA). In absolute terms, the decline in direct costs per 1 ha of UAA on Italian farms was approx. EUR 19.4 per 1 ha of UAA and on Greek farms by approx. EUR 9.9 per 1 ha of UAA.

INDIRECT COSTS OF PRODUCTION

In the years 2004–2015, the average indirect costs per 1 ha of UAA in the EU countries amounted to approx. EUR 3.1 thousand per 1 ha of UAA. In the analysed period, in EU countries a relative increase in indirect costs per 1 ha of UAA was observed on an average annual basis by approx. 2%, while in absolute terms, the average annual growth was about EUR 62.2 per

1 ha of UAA. The highest indirect costs per 1 ha of UAA in the analysed period were in German farms (on average approx. EUR 6.3 thousand per 1 ha of UAA), then French (approx. EUR 5.8 thousand per 1 ha of UAA) and Czech farms (approx. EUR 4.2 thousand per 1 ha of UAA). While the lowest indirect costs per 1 ha of UAA were on Spanish farms (on average approx. EUR 657.3 per 1 ha of UAA), Portuguese (approx. EUR 1,488.7 per 1 ha of UAA) and Romanian (approx. EUR 1,982.3 per 1 ha of UAA). In relative terms, the largest increase in indirect costs per 1 ha of UAA was recorded in Czech holdings (on average by approx. 14.2%), Austrian (by 9.1%), Cypriot (by 8.3%) and Slovenian (by 6.0%). A drop in indirect costs was recorded in Romanian (on average by –1.0%), Italian (by –0.5%), Bulgarian (by –0.5%) and Hungarian (by –0.3%). Total indirect costs per 1 ha in specialist vineyards in selected EU countries are presented in Table 4.

Table 4. Indirect costs per 1 ha in specialist vineyards in selected EU countries in the years 2004–2015

Specification	Country	2004–	2007–	2010–	2013–	Average 2004– –2015	Average annual change	
		–2006	–2009	–2012	–2015		absolute values	%
Indirect costs per 1 ha (EUR)	(BGR) Bulgaria*	–	1 825.25	2 512.66	1 671.51	2 003.14	–21.84	–0.49
	(CYP) Cyprus*	1 499.22	1 569.69	1 798.51	3 501.77	2 289.99	223.20	8.32
	(CZE) Czech Republic	1 501.42	2 796.58	4 345.23	5 617.53	4 253.11	452.63	14.20
	(DEU) Germany	5 819.19	6 451.56	6 075.68	6 472.38	6 333.21	49.09	0.81
	(ELL) Greece	1 643.64	1 745.97	1 819.47	1 830.97	1 798.80	24.97	1.47
	(ESP) Spain	622.97	570.41	592.42	809.12	657.31	19.32	2.70
	(FRA) France	4 682.85	5 282.90	5 796.26	6 259.28	5 779.48	174.94	3.22
	(HRV) Croatia*	–	–	–	2 783.88	2 783.88	78.07	2.87
	(HUN) Hungary	3 134.83	2 151.87	2 709.95	2 812.05	2 557.96	–13.42	–0.29
	(ITA) Italy	2 465.88	2 603.38	2 716.59	2 349.02	2 556.33	–11.64	–0.50
	(OST) Austria	1 646.30	2 321.93	3 188.31	3 816.73	3 108.99	238.39	9.13
	(POR) Portugal	1 481.50	1 334.48	1 426.82	1 704.85	1 488.72	22.86	1.52
	(ROU) Romania*	–	2 271.97	1 481.32	2 193.67	1 982.32	–43.69	–1.04
	(SVN) Slovenia*	2 848.54	2 814.74	4 089.58	4 281.92	3 728.75	208.40	6.02
	(EU) European Union	2 785.67	2 867.55	3 103.84	3 329.33	3 100.24	62.22	2.03

Source: own study based on FADN.

THE SHARE OF DIRECT AND INDIRECT COSTS OF PRODUCTION

In the viticulture in selected EU countries, the share of indirect costs in total costs (per 1 ha of arable land) was high (Fig. 2). In the analysed period, the highest share of indirect costs in total costs was on French farms (on average around 87.7%), then on Cypriot (84.3%), Spanish (80.2%) and Austrian (80.0%) farms. On the other hand, the smallest share of indirect costs was in Portuguese farms (on average around 70.8%), Greek (71.7%), Hungarian (74.4%) and Italian (74.7%). In the analysed period, the decrease in the share of indirect costs in total costs (per 1 ha of UAA) was recorded in Romanian farms (by 24.0 p.p.), Czech (by 21.0 p.p.), Austrian (by 13.7 p.p.), Portuguese (by 9.2 p.p.) and Italian (by 4.9 p.p.). On the other hand, the increase in the share of indirect costs in total costs was recorded only in Cypriot (7.3 p.p.), Greek (4.3 p.p.) and Hungarian (0.3 p.p.) farms.

In the years 2004–2015, the share of direct costs in total costs in farms specializing in viticulture in selected EU countries was relatively low. The share of direct costs in total costs was on average around 17.7%. The highest share of direct costs was in Portuguese farms (on average 29.2%), Greek (28.3%), Hungarian (25.6%) and Italian (25.3%). The smallest

share of direct costs in total costs was on French farms (approx. 12.3% on average), Cypriot (15.7%), Spanish (19.8%) and Austrian farms (20.0%).

CONCLUSIONS

Based on the conducted analysis the following conclusions could be drawn:

- The wine sector plays an important role in many European national economies, especially in areas with favourable conditions for vine growing. In the years 2004–2015, in the surveyed vine farms, there was a large variation in terms of the structure of production costs.
- In the analysed period, the largest total costs per 1 ha of arable land were noticed on German, then French and Czech farms, while the lowest on Romanian, Bulgarian and Cypriot farms. In the analysed period, the majority of countries recorded an increase in total costs per 1 ha of UAA, except for Bulgarian farms.
- The largest direct costs per 1 ha were incurred on German, Slovenian and Czech, farms, while the smallest on Spanish, Cypriot and Bulgarian. In the analysed period almost in all surveyed countries there was an increase in direct costs per 1 ha of UAA, except for Italian and Greek holdings. In

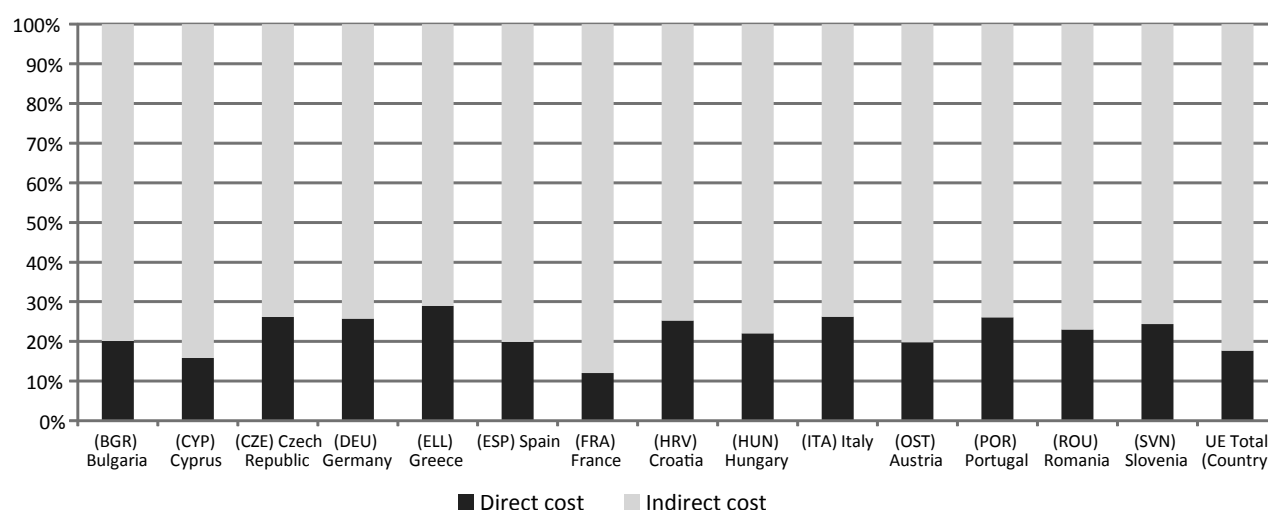


Figure 2. Share of direct and indirect costs per 1 ha of UAA in total inputs in specialist vineyards in the years 2004–2015 (%)

Source: own study based on FADN.

direct costs, plant protection had the largest share, followed by fertilization costs, while the lowest were the costs of pruning.

- The share of indirect costs in total costs in the cultivation of vines in selected countries was relatively high. In the analysed period, the highest share of indirect costs in total costs was on Cypriot, Austrian and Spanish farms, while the lowest was on Czech, Portuguese and Italian.

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TRENDS IN POULTRY CONSUMPTION AFTER POLAND'S ACCESSION TO THE EUROPEAN UNION

Marzena Trajer, MSc¹; Martyn Mieczkowski, MSc²

National Support Centre for Agriculture

ABSTRACT

The poultry industry is one of the most rapidly developing sectors of the national agriculture, and Poland is the largest poultry producer in the European Union. Since Poland's accession to the European Union, the two main factors determining the development of the poultry industry in Poland have been export demand and the growing domestic consumption. The aim of this article was to analyse the changes in the balance sheet of poultry consumption in Poland in the context of conditions of the poultry market and to analyse the impact of changes in red meat consumption on changes in the dynamics of poultry consumption.

Keywords: poultry consumption, poultry, production, foreign sales

INTRODUCTION

Poland is a traditional poultry producer. For many years now, rearing of poultry, i.e. first and foremost birds of the *Gallus domesticus* species (mainly broiler chickens) and turkeys, as well as geese, ducks and helmeted guinea fowls, has been the most intensive area of animal production (Trajer, 2018). Before Poland's accession to the European Union, the national poultry industry carried out a number of modernisation activities in order to adjust to competition on the single EU market. As a result of the investments made before accession to the European Union, a modern production infrastructure was created in Poland – poultry houses, hatcheries, slaughterhouses and processing facilities which comply with high standards. In the pre-accession period, a number of measures were taken in order to improve the qual-

ity of poultry meat. This aim was achieved owing to breeding development in the scope of improvement of meat content in poultry and optimisation of nutrition. At the same time, introduction of high sanitary standards at every production stage resulted in the quality parameters of Polish meat being very good (Mieczkowski, 2015). This process was facilitated and accelerated by production investments with the use of preferential loans for live weight producers as part of adjustment efforts. Implementation of modern solutions led to an improvement in the effectiveness of fattening and lower production costs, accompanied by implementation of high veterinary and sanitary standards (Mieczkowski, 2013). Poland's accession to the European Union resulted in adoption by Poland of all legal regulations of the EU as regards trade arrangements and provisions regarding bird welfare and the natural environment (Mieczkowski, 2015).

¹ Corresponding author: Karolkowa 30, 01-207 Warsaw, Poland, marzena.trajer@kowr.gov.pl, +4822 376 73 11

² Corresponding author: Karolkowa 30, 01-207 Warsaw, Poland, martyn.mieczkowski@kowr.gov.pl, +4822 376 70 17

MATERIAL AND METHODS

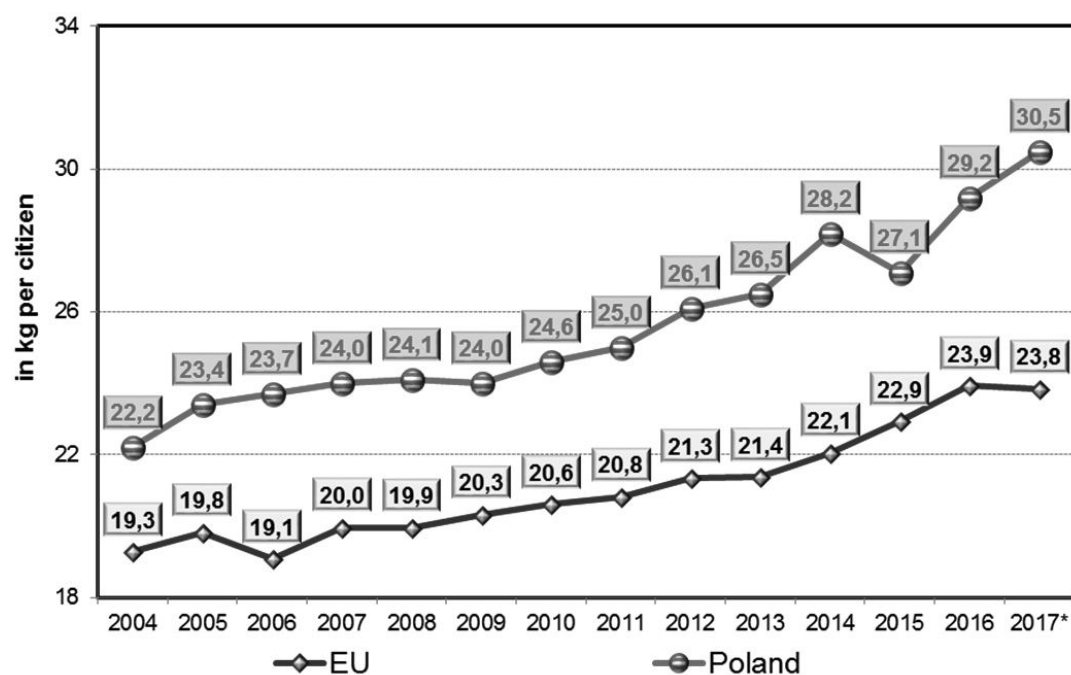
The aim of the study was to present trends in poultry consumption in Poland after the accession to the European Union against the background of changing market conditions with changes in consumer eating habits. The study uses an analysis of time series derived from the database of National Support Centre for Agriculture (KOWR), data of the subject literature as well as data from the Central Statistical Office (GUS), United States Department of Agriculture (USDA) and the Organisation for Economic Co-operation and Development (OECD). The results of the study were presented in a descriptive and graphical form.

CONSUMPTION OF POULTRY IN THE EUROPEAN UNION AND WORLDWIDE

In 2017, in EU-28 the average poultry consumption amounted to 23.8 kg per capita and was 0.4% lower than in 2016. The share of poultry in total meat consumption amounted to nearly 35% just like in 2016

(European Commission, 2018). According to the estimates of the Food and Agriculture Organization of the United Nations (FAO) and the Organisation for Economic Cooperation and Development (OECD), in 2017 the global poultry consumption amounted to 13.86 kg per capita and was 0.5% greater than in the preceding year. In economically advanced countries in 2017 poultry consumption reached the level of 29.65 kg per capita, while in developing countries it amounted to 10.25 kg (IERiGŻ-PIB et al., 2018). The world largest consumers of poultry meat per capita in 2017 were: Israel (56.9 kg), USA (48.3 kg), Australia (46.3 kg), Saudi Arabia (46.3 kg) and Malaysia (43.3 kg) (OECD database). Poland is a country with one of the greatest levels of poultry consumption in the European Union after Portugal, Spain, Ireland and Hungary. A statistical Polish citizen consumes approximately 7 kg of poultry more than the EU average and approximately 16 kg more than the global average (Polska Ziemia – Biuletyn informacyjny, 2018).

In 2017 world production of broiler meat (according to the data of the United States Department



*Estimate of the Institute of Agricultural and Food Economics – National Research Institute and the EC

Figure 1. Balance sheet of poultry consumption in the EU and in Poland per capita

Source: own study based on the data of Statistics Poland (GUS) and the Institute of Agricultural and Food Economics – National Research Institute as well as European Commission (2018).

of Agriculture) increased by 1.7% to 90.7 million tonnes. World leaders in the production of broilers remain USA, Brazil, EU and China, whose total share in global production is over 60%. In 2018, a further increase in global production is expected to reach 92.5 million tonnes. Production will increase, among others in Brazil and the United States (2% each), as well as in the EU (by 1.4%) and China (by 1%). Forecasts of production growth result mainly from the growing consumption demand in the world (USDA, 2018).

MARKET CONDITIONS OF TRENDS IN POULTRY CONSUMPTION

Development of the poultry industry in Poland is characterised by dynamic growth of the most important parameters of supply and demand, i.e. increasing production, export and consumption of poultry. Production of live poultry in Poland has been continually increasing since 1994, and the growth rate is significantly faster than in other Member States (Trajer, 2018). The most dynamic increase in poultry production was noted after Poland's accession to the European Union. In the years 2004–2017, the production of poultry in Poland (in live weight) grew from 1.3 million tonnes to an estimated 3.4 million tonnes (2.4 million tonnes carcass weight). Such a high rate of growth of poultry production was stimulated by the rising export demand and the increasing domestic consumption resulting from the price competitiveness of poultry as compared with red meat. According to the data of Statistics Poland (GUS), in 2017 the retail price index for poultry amounted to 2.1%, whereas in the case of pork and beef it amounted to 8.6 and 2.9%, respectively (KOWR, 2018). The rapidly increasing poultry production resulted in a change in the structure of meat production in Poland. In 2004, the share of poultry in the total meat production in Poland amounted to 26%, while the share of pork and beef together with veal amounted to 57 and 10%, respectively. In 2016, the share of poultry meat in the production structure increased to 45%. At the same time, the share of pork dropped to 38%, while the share of beef and veal remained at 10%.

The rapid increase in poultry production in Poland was a consequence of the following factors: a short

production cycle (especially of broilers), the growing demand on the domestic and foreign market, the feed conversion rate being lower than in the case of red meat (beef and pork) (Stańko and Mikuła, 2017).

The fast-growing domestic production significantly exceeds the increase in consumption, which creates the need to manage the resulting market surpluses on foreign markets. In the last few years, Poland became a leader in poultry production in the EU (2.4 million tonnes carcass weight.) as well as one of the larger exporters of poultry (Dybowski, 2016). The main competitors of Poland in 2016 in terms of poultry production are: the United Kingdom (1.8 million tonnes carcass weight), France (1.6 million tonnes) as well as Spain and Germany (1.5 million tonnes each).

Poland's accession to the European Union granted Polish poultry producers access to nearly 460 million of relatively wealthy consumers, which enabled a rapid increase in export in subsequent years (Mieczkowski, 2015). In the years 2004–2017, the volume of foreign sales of Polish poultry grew nearly tenfold, from 142 thousand tonnes to an estimated 1,375 thousand tonnes.

The dynamic increase of export resulted from the need to manage the growing production surpluses exceeding the domestic demand on foreign markets. The absolute growth of consumption and the rate thereof were lower than those of production, which created the need to manage the increasing production on foreign markets (Stańko and Mikuła, 2017). The success in foreign trade in the presented decade was doubtless connected with the high level of price competitiveness of Polish poultry on the European market, the increasing demand of EU consumers and adjustment of the offered products to the needs of foreign customers. The highest (50%) increase in export of Polish poultry was noted in 2005. Such a great increase in the volume of export of poultry from Poland was possible due to the restrictions imposed by the European Union on purchase of this type of meat from third markets due to the global epidemic of avian influenza. By utilising the resulting supply gap, Polish producers strengthened their position on the Community market. The commercial contacts with EU customers established at the time formed the basis for cooperation in subsequent years (Mieczkowski, 2015).

INCREASE IN POULTRY CONSUMPTION IN POLAND

Apart from the increase in export, after Poland's accession to the European Union the development of the Polish poultry industry was stimulated by growing domestic consumption. The increase in poultry consumption was a result of changes in the dietary habits of Polish people in connection with the rising popularity of healthy eating (Mieczkowski, 2015). Poultry meat is a source of complete animal protein. According to the model recommended by the FAO/WHO, the biological value of chicken meat is equivalent to that of milk protein. Nutrition-wise, poultry is superior to pork and beef as it contains more crude protein and less connective tissue, in particular collagen. Poultry is easily digestible and has a lower energy value because not only does it contain less fat,

but it is also rich in unsaturated fatty acids. It is also a good source of minerals such as potassium, calcium, phosphorus, sodium and iron (Nowak and Trziszka, 2010). The delicate structure of poultry meat makes it easy to digest, which in combination with the wide variety of products and ease of preparation for consumption generates increasing interest of consumers (Mieczkowski, 2013). In the years 2004–2017, the changes in dietary preferences of Polish consumers and the price ratios between poultry and red meat stimulated an increase in poultry consumption, with a greater decrease in beef consumption and changing but relatively stable consumption of pork. The greatest increase in the balance sheet of poultry consumption was noted in the first two years of Poland's membership in the European Union (2004–2005), which was first and foremost a consequence of the growing retail prices of pork and beef. As a consequence, in

Table 1. Balance sheet of meat consumption in Poland

Year	Meat consumption per capita (kg)				Share of individual types of meat in total meat consumption (%)		
	total (meat and offal)	pork	beef	poultry	pork	beef	poultry
2003	72.1	41.2	5.8	19.7	57.1	8.0	27.3
2004	71.8	39.1	5.3	22.2	54.5	7.4	30.9
2005	71.2	39.0	3.9	23.4	54.8	5.5	32.9
2006	74.3	41.4	4.5	23.7	55.7	6.1	31.9
2007	77.6	43.6	4.0	24.0	56.2	5.2	30.9
2008	75.3	42.7	3.8	24.1	56.7	5.0	32.0
2009	75.0	42.4	3.6	24.0	56.5	4.8	32.0
2010	73.7	42.2	2.4	24.6	57.3	3.3	33.4
2011	73.4	42.5	2.1	25.0	57.9	2.9	34.1
2012	71.0	39.2	1.6	26.1	55.2	2.3	36.8
2013	67.5	35.5	1.5	26.5	52.6	2.2	39.3
2014	73.6	39.1	1.6	28.2	53.1	2.2	38.3
2015	75.0	41.4	1.2	27.1	55.2	1.6	36.1
2016	77.6	40.8	2.1	29.2	52.6	2.7	37.6
2017*	78.5	40.5	2.2	30.5	51.6	2.8	38.9

* Estimate of the Institute of Agricultural and Food Economics – National Research Institute.

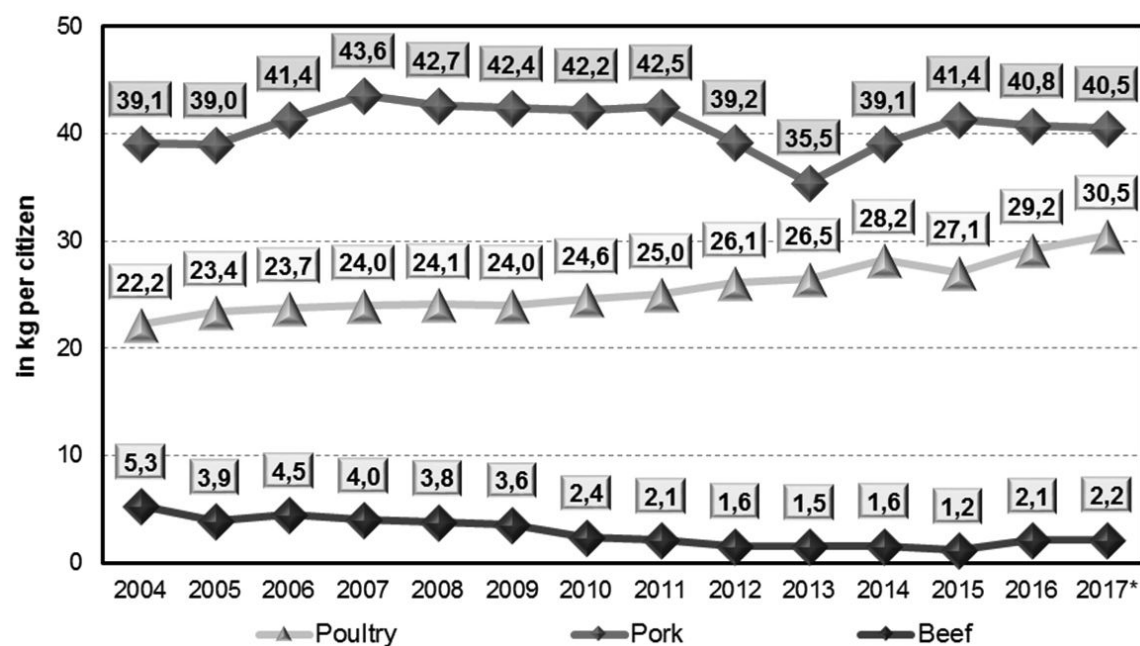
Source: own study based on the data of Statistics Poland (GUS) and the Institute of Agricultural and Food Economics – National Research Institute.

the years 2003–2005 the consumption of poultry increased by 19%, from 19.7 to 23.4 kg per capita.

In the years 2006–2007, the increase in poultry consumption was smaller than in the first two years of Poland's membership in the European Union. This was mainly a result of the increase in price competitiveness of pork. In 2007, the consumption of poultry in Poland amounted to 24 kg per capita, compared with 23.7 kg in 2006. In the years 2008–2009, the consumption of poultry in Poland was stable and remained at a level of approximately 24 kg per capita. The slowdown of the increase in poultry consumption was connected with the decrease in total demand for food as a result of the financial crisis which started in 2008 (Mieczkowski, 2015). After three years of stabilisation in domestic consumption, in the years 2010–2013 there was a rapid growth in consumption of poultry – up to 26.5 kg per capita. The growth of poultry consumption was driven by increased use thereof by mass caterers as well as the relatively slow rate of increase of retail prices compared with red meat, among other things. On the other hand, in 2013

there was a moderate increase in the retail prices of red meat, while the retail prices of poultry remained stable. The above-mentioned factors contributed towards maintenance of the price competitiveness of poultry as compared with red meat, which was the main factor stimulating growth in consumption. The increase in poultry consumption noted in the years 2010–2013 did not manage to fully compensate for the reduction in red meat consumption, which led to a decrease in total meat consumption to 67.5 kg per capita. In 2014, there was a recovery in the domestic demand for meat, driven by the decrease in retail prices of poultry and red meat. These factors led to a 6% increase in the balance sheet of poultry consumption in Poland, up to 28.2 kg per capita. The rise in poultry consumption was accompanied by growth in red meat consumption, which resulted in a 9% increase in the total balance sheet meat consumption to 73.6 kg per capita.

After a temporary decrease in poultry consumption in Poland in 2015, in the following year there was a further increase in domestic demand.



*Estimate of the Institute of Agricultural and Food Economics – National Research Institute.

Figure 2. Meat consumption in Poland

Source: own study based on the data of Statistics Poland (GUS) and the Institute of Agricultural and Food Economics – National Research Institute.

According to the balance sheet data of Statistics Poland (GUS), in 2016 the consumption of poultry in Poland amounted to 29.2 kg per capita and was 2.1 kg, i.e. 7.7%, greater than in 2015. The main factors contributing towards the increase in demand for poultry in 2016 were: growth of production and supply, absolute drop in prices and the cheapening of poultry as compared with red meat, as well as the increase in the population's income (IERiGŻ-PIB et al., 2017).

It is estimated that in the years 2017–2020 the upward trend in poultry consumption per capita in Poland will continue. However, the average rate of growth will likely be slower than in the years 2004–2016 due to the projected increase in domestic demand for beef and the rising retail prices of poultry. Further increase in poultry consumption will be driven by the rising domestic demand for more expensive species. In 2016, average consumption of geese, ducks and turkeys amounted to 0.21 kg per person, which constituted a 23.5% increase in relation to 2015, continuing the trend observed in the preceding years (IERiGŻ-PIB et al., 2018)³. In the years 2017–2020, we can expect an increase in household demand for duck, goose and turkey meat. The projected changes in consumption will be determined by the trend consisting in growth in the share of food with significant health benefits in the Polish food market and further increase in the population's income.

CONCLUSIONS

Other than export, the increase in poultry consumption in Poland after accession to the European Union was one of the main factors determining growth of the domestic poultry industry. In the years 2004–2016 the consumption of poultry increased by nearly 32%, from 22.2 k to 29.2 kg per capita. In 2017, poultry consumption was estimated to have been 30.5 kg per

capita. The increasing consumption of poultry was a result of its high level of price competitiveness as compared with red meat, dietary properties and change in the dietary habits in favour of low-calorie, low-fat diets. Despite the domestic consumption being high as it is, the level thereof will be on the rise until 2020, further driven by the increased demand for ducks, geese and turkeys, which are considered more expensive types of poultry.

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WELFARE FARMS IN POLAND AS AN EXAMPLE OF ENTREPRENEURIAL ACTIVITIES IN RURAL AREAS

Monika Wojcieszak, PhD¹

Faculty of Economic and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The purpose of the paper was to present the importance of welfare farms in Poland as a social element of mutual relations, connections and co-operation in local and regional development. The concept of welfare farms is characterised in the study and the main idea of their formation is presented. Examples of welfare farms in Poland as part of the first pilot project known as 'Zielona opieka – gospodarstwa opiekuńcze w woj. kujawsko-pomorskim' (Green care: welfare farms in the Kujawsko-Pomorskie voivodeship) have also been presented. It was also pointed out that social farming plays an increasingly important role in the contemporary development of rural areas. The paper was compiled using the desk research method and a classical analysis of documents was used. The choice of methods was determined by the availability of source materials, some of which were of primary or secondary nature (social farming literature, reports and public statistic documents). This paper also pointed to the fact that welfare farms are increasingly becoming a popular form of social service in rural areas. It also testifies to the entrepreneurship of farmers, because they offer not only accommodation and catering, but also care on their farms.

Keywords: welfare farms, rural areas, agri-tourism

JEL codes: Q10, Q19, Q13

INTRODUCTION

One of the challenges for contemporary Poland is the unfavourable demographic trend which includes a significant increase in the number of older people in society. Poland is the fastest ageing country in the European Union (Eurostat, 2018). The ageing society is a problem that is increasingly being undertaken by many researchers, e.g.: Press.UK, Di Iacovo and O'Connor (2009); Sempik, Hine and Wilcox (2010); Hassinka, Hulsink and Grin (2014); Matysiak and Michalska (2016); Balińska and Wojcieszak (2017); Kalinowski and Kozera-Kowalska (2017) stressed

that the elderly are untapped human capital. Their activation and presentation of interesting and attractive proposals for self-realisation are important. It is also necessary to design specific social security models for rural areas for this group of people. Welfare farms may be an answer to this aspect and are created in the area of multifunctional agriculture; the form of such management is part of social farming due to the specificity of activity. Przebórka-Skobiej (2015) noted that multifunctional agriculture produces other products in addition to food and raw materials as well as goods and services for the processing industry which there is a demand for. Multifunctional development

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, mwoj@up.poznan.pl, +48 787 280 095

of the countryside and rural areas may contribute to the fact that these areas accept and perform functions other than agricultural ones, i.e. tourist, residential, industrial functions, and currently also caring functions (Sadowski et al., 2015). Attention is also paid to the social aspect and therefore to social farming, which is defined by the European Economic and Social Committee as an approach combining two concepts, i.e. multifunctional agriculture and social services which means healthcare at the local level, contributing to the improvement of the well-being and social integration of people with special needs.

THEORETICAL BACKGROUND

The idea of the formation of welfare farms goes back to the second half of the 20th century. They first appeared in Europe in the post-war period in the mid-1990s. These types of farms have enjoyed considerable interest in many countries, including the Netherlands, France, Norway, Italy, Belgium, Germany, Austria, UK and the United States (Di Iacovo, 2014). Many researchers dealing with the social aspect in rural areas, i.e. Hassink and Dijk (2006); Hine, Peacock and Pretty (2008); Haubehofer et al. (2010); Sempik, Hine and Wilcox (2010), have noticed that in the nomenclature of literature, care in rural areas is variously called e.g. green care, agriculture for health, green care in agriculture; however, a common integral feature of these terms is to provide and ensure care. There are many definitions of welfare farms available in the literature; however, it is often referred to as social farming combining a range of services, including day or long-term care with elements of agricultural production and rearing (Hassink and Dijk, 2006; Dessein, 2007; Haubehofer et al., 2010; Williams and Randal-Smith, 2011; Leck et al., 2014). In general, term 'care farming' is a universal concept that reflects the diversity of operations and activities combined with the support of processes related to social well-being (Dessein, 2007). In Poland, the concept of creating welfare farms has been introduced recently. Care for the elderly, youth or children will constitute a new product that can be offered by agricultural and agri-tourist farms. Seniors, children, adolescents and adults can use the services offered on

the care farm facilities. The main task of these operators are activities based on ensuring contact with nature and staying in a natural environment that exerts a good influence on the well-being of humans (Dessein and Bock, 2010). Welfare farms can offer a form of rehabilitation and integration through participation in the performance of simple activities, e.g. taking care of animals, gardening, carrying out manual work jointly or developing contacts with people like them.

MATERIALS AND METHODS

Secondary data used for the purpose of this paper was retrieved from online sources, including materials prepared by the EU, state government and local government administration and other entities (including organisations of local communities in rural areas) involved in the development of social farming, and in particular in the creation and management of welfare farms. The analysis also included reports and studies prepared for the implementation of projects financed from EU funds as well as data from official statistics. The data method that was used was desk research using tabular and graphical presentation.

RESULTS AND DISCUSSION

More and more often, social agriculture is provided as one of the alternatives to classical agriculture, especially in European Union countries. The interest in such activity is the result of growing awareness and understanding of the role of agriculture and rural resources. Many authors (Krzyżanowska, 2010; Sikora, 2012; Bogusz and Kmita-Dziasek, 2015; Wiatrak, 2015; Zawadka, 2015; Sznajder, 2017) emphasise the importance of rural areas as places which can play a key role in improving the social, physical and the mental well-being of citizens. For farmers, social farming is an opportunity to provide new services and to expand and diversify their activities and to have a multifunctional role in society (Kamiński, 2017). This type of integration in the field of social and agricultural activities can provide farmers and their household dwellers with additional sources of income and contribute to improving the image of agriculture in the eyes of the public.

According to the forecasts of the Central Statistical Office, the population of Poland will be only 37.8 million in 2020, and only 36 million people in 2035. The information contained in numerous statistical studies indicates that in addition to the systematic decline in the population in Poland, there is also progressive ageing of the population. In the face of these changes, it was noticed that rural areas have enormous potential that can be used and which the elderly, single people, children and the youth can take advantage of. Farmers wanting to obtain non-agricultural income undertake entrepreneurial activities. One of such enterprises is establishing welfare farms. The main reasons for the development of care services provided on the basis of farms in rural and suburban areas may be the demand for care services and the search for new sources of income by farms. At the same time, it should be noted that the emergence of care farms in rural areas affect two aspects, i.e. the

problem of an ageing population and multifunctional rural development (Fig. 1).

The main clients of this type of facility may be elderly people, people with mental disabilities, people with reduced mobility, those leaving penitentiary institutions, children, young people, the unemployed and people who are burned out professionally (Kamiński, 2017). In Poland, in order for the farmer or householder to run a welfare farm, he/she must fulfil the condition regarding the appropriate legal form admissible in Polish legal legislation. In Poland, private farms are run by natural persons. In the case of taking up care activities, it is necessary to establish a new legal form i.e. running a welfare farm in the form of a social economy (foundation, association) or running a welfare farm as part of an economic activity. The frequency and duration of care provided by the farm may vary. Four forms of care can be distinguished: temporary stay without accommodation on the farm,

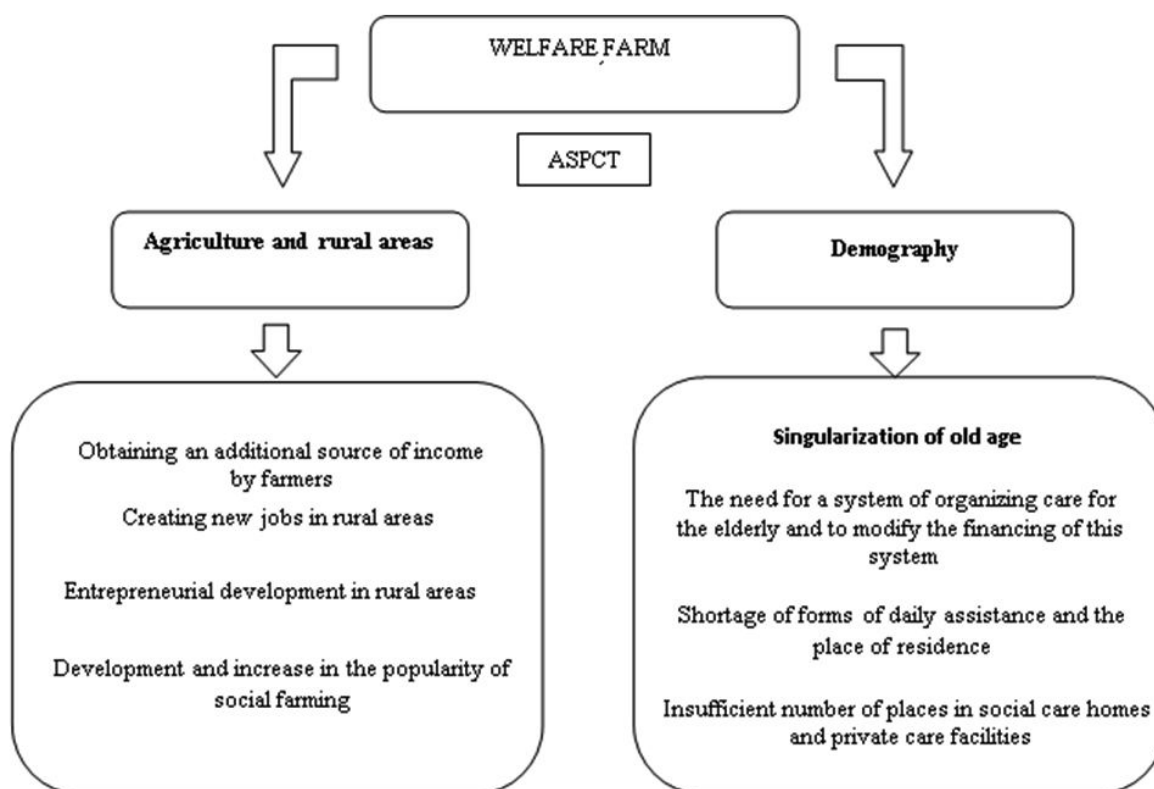


Figure 1. Reasons for the development of welfare farms

Source: own compilation based on materials by Król (2017). The idea of the development of social farming, including welfare farms in the world, Agricultural Advisory Center in Brwinów, Kraków branch.

temporary residence with accommodation, continuous stay without accommodation, continuous stay with accommodation. It should also be pointed out that welfare farms are an increasingly popular dimension of the entrepreneurial and social initiative of farmers. Awareness of an ageing society and the desire to obtain additional sources of financing have caused farmers modelling themselves on Dutch farmers to provide care services. In Poland, the first welfare farms were created as part of the project entitled 'Zielona opieka

– gospodarstwa opiekuńcze w woj. kujawsko-pomorskim' (Green care: welfare farms in the Kujawsko-Pomorskie voivodeship). The project is currently being implemented by public institutions, i.e. Kujawsko-Pomorski Ośrodek Doradztwa Rolniczego w Minikowie (Kuyavian-Pomeranian Agricultural Advisory Center in Minikowo) in partnership with Bory Tucholskie, the Local Action Group, as part of the Regional Operational Program of the Kujawsko-Pomorskie voivodeship for the years 2014–2020 (Table 1).

Table 1. Welfare farms in Poland as part of the project known as 'Zielona opieka – gospodarstwa opiekuńcze w woj. kujawsko-pomorskim' (Green care: welfare farms in the Kujawsko-Pomorskie voivodeship) [selected examples]

Welfare farm (name)	Scope of care (care hours)	Rooms used by person under care	Short characteristics of the person under care	Classes conducted on the farm for the persons under care
Wysoka	day care from Monday to Friday, from 8.00 to 16.00	living room with fireplace rest room kitchen dining room bathroom	dependent persons from all dispensary groups	needlework small library exercise equipment
Mokre		living room with kitchenette rest room bathroom toilet	people with physical disabilities, moving on crutches and walking frames people with food allergies people who require a special diet due to illness, e.g. diabetes, celiac disease	manual classes small library pets/animals needlework
Lubiewice		living room connected to the dining room and kitchenette rest room bathroom	people with physical disabilities, moving on crutches and walking frames people with sight dysfunction people with food allergies and requiring a specialist diet due to illness (e.g. diabetes)	Workshops (Christmas decorations) decoupage, scrap booking needlework and home decorating

Source: Own compilation on the basis of webpage information <http://www.opieka.kpodr.pl/pl/zielona-opieka/profile-gospodarstw> [Accessed 27.05.2018].

As part of the project, fifteen welfare farms were created in five districts: Świecie, Mogilno, Brodnica, Wąbrzeźno and Tuchola. These welfare farms provide care for 156 people (as at the end of 2017). The project involves developing care in small groups; currently, they are 5-person groups. Home care is provided to dependent persons by a qualified carer and volunteer, from Monday to Friday, 8 hours a day. Farms will provide: basic care, organising the time of the persons under care, minimum one hot meal and access to drinks and small meals, as well as access to newspapers and books².

CONCLUSIONS

In Poland, taking initiatives to create care homes as a new trend related to the so-called social farming is a little-known phenomenon. The essence of welfare farms presented in the paper is an ever-changing tourist offer of stay in rural areas and testifies to the entrepreneurship of farmers. As shown in the study, welfare farms are part of the concept of the so-called social farming which combines the idea of multifunctional and service-social agriculture with care at the local level. The idea of a welfare farm may in the future be a great development opportunity for many farms, because, firstly, it can generate additional income for these farms, and secondly, developing social services in rural areas can be an effective way to overcome many negative socio-economic phenomena.

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² Agroturytyka.kpodr.pl webpage [http://www.agroturytyka.kpodr.pl/pl/gospodarstwa-opiekuncze?eq\[gosp_rol13\]=1](http://www.agroturytyka.kpodr.pl/pl/gospodarstwa-opiekuncze?eq[gosp_rol13]=1) [Accessed 28.05.2018].

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THE ASSESSMENT OF EXPORT POTENTIAL OF AGRICULTURAL AND FOOD PRODUCTS IN THE VISEGRAD GROUP COUNTRIES IN THE YEARS 2005–2017

Krzysztof Firlej, PhD¹; Sebastian Kubala, MSc²

Faculty of Economics and International Relations, Cracow University of Economics

ABSTRACT

The foreign trade in agricultural and food products is a significant reflection of an economic situation occurring in the current functioning of agriculture, food industry and its individual trades in a given country. It is worth considering how the export of Polish agricultural and food products may be compared with the Visegrad Group countries in this area. The article deals with an attempt to assess the export potential of agricultural and food products in the Visegrad Group countries in the years 2005–2017 using a modified index for an assessment of a level of competitiveness in a foreign trade, that is the Revealed Comparative Advantage Index – RCA – by Balassa. The results of the study prove that the export of agricultural and food products in the Visegrad Group countries is vulnerable to economic trends, there is a significant degree of competitiveness regarding export of the food products of animal origin in these countries, and the greatest level of competitiveness of the foreign trade in the food products of plant origin regarding cereals, and the trade in fruit and vegetables is less and less important.

Keywords: foreign trade, agri-food industry, the Visegrad Group

JEL codes: E24, J24

INTRODUCTION

The agri-food industry is one of the most important sectors of agribusiness in Poland and it not only decides of a qualitative and quantitative volume of production of food goods but is also a guarantor that ensures food safety for all the citizens. Many years of research conducted by the Institute of Agricultural and Food Economics in Warsaw proved that the agri-food industry in Poland during the last three decades is characterised by permanent growth and may be an example of gentle and conflict-free movement

of its entities from the socialist to market economy. It should be emphasised that the agri-food industry enterprises complied with the European Union requirements regarding quality, sanitary and veterinary standards in short time. The continuous improvement of the position of products manufactured by the Polish food producers on the domestic and international markets was the measurable, practical effect of these activities. Soon after the accession of Poland to the European Union, the Polish enterprises became very important food producers operating both on the domestic and international markets. They overcame

¹ Corresponding author: Rakowicka 27, 31-510 Kraków, Poland, krzysztof.firlej@uek.krakow.pl, +4812 293 51 57

² Corresponding author: Rakowicka 27, 31-510 Kraków, Poland, sebastian.kubala@uek.krakow.pl, +4812 293 51 57

various barriers on the European Union market which contributed to the improvement of the quality of produced food as well as to strengthening the competitive position among other producer countries. With time the Polish food became not only recognisable on the international markets, but also admired and now it is becoming to win its due brand. Detailed research and analyses regarding the conditions, types and level of value of Polish exports of agri-food products have been conducted for many decades by experts from the Institute of Agricultural Economics and Food Economy in Warsaw, National Research Institute and others. Among the authors we can mention: Urban and Mroczek (2011), Szczepaniak (2011), Nosecka (2014), Ambroziak (2018), Hajdukiewicz (2016) and Pawlak (2014).

THE AGRI-FOOD PRODUCTS EXPORT FROM POLAND

The development of agri-food industry in Poland was accompanied by, more and more noticeable by the producers and economists, export of Polish food, which was defined as a kind of phenomenon. Slowly changed the opinions that the main advantages of Polish products enabling them to compete on the European markets were price of these products and labour costs. The positive developments in the Polish agri-food industry contributed to work efficiency improvement, modernisation of production methods and development of products. Polish food and above all its features shortly achieved the quality of products made in highly developed European Union countries. Within just 15 years since the accession of Poland to the European Union a priority objective of agri-food producers functioning for and in food industry should be to preserve its position on the international arena and tackle all emerging threats that may limit the industry. Unfortunately, in Polish economy a number of adverse events have to be taken into account, such as: increasing labour costs resulting in growth of price of products or decreasing demand for food in the European Union countries. As a significantly beneficial activities may be considered a transfer of knowledge and innovation diffusion, which will facilitate the development

of a good brand of Polish food that should be not only recognised but also renowned as natural (Firlej, 2017). As an area of research in the presented study the countries belonging to the Visegrad Group were selected; since 15 February 1991 the Visegrad Group has been a regional form of co-operation of four of Central and Eastern Europe countries – Poland, the Czech Republic, Slovakia and Hungary, and the principles that guided its creation resulted from neighbourhood, similar geopolitical conditions, shared history, tradition, culture and values. The inspiration for V4 was the intensifying co-operation in the common transformation and development of free market economy as well as, in a longer term, participation in a process of European integration (Ministerstwo Spraw Zagranicznych, 2016). The main aim of the study was to present the situation of the export of Polish agricultural and food products in comparison with the selected Visegrad Group countries as well as an assessment of agricultural and food products export possibilities in the Visegrad Group countries in the years 2015–2017.

MATERIALS AND METHODS

The main index used to assess the level of competitiveness in the foreign trade is the Revealed Comparative Advantage Index by Balassa – RCA (Balassa, 1965). The index is calculated in accordance with a formula:

$$RCA_i = \frac{X_{ij}}{\sum_{i=1}^n X_{ij}} : \frac{X_{iw}}{\sum_{i=1}^n X_{iw}}$$

where:

X_{ij} – export of i product by a given country j on m market;

X_{iw} – export of i product by a group of countries w on m market;

n – number of types of products.

According to the definition, the index determines the relative participation of a product group in an export of a given country to a participation of the same product group in an export of a comparative area. As presented in the interpretation, the value of the index

more than unity shall mean that the analysed country has a comparative advantage on the reference market. The value less than unity shall be interpreted as a lack of revealed comparative advantages in a trade of analysed product.

However, Balassa's competitiveness index has significant disadvantages due to the fact that it is bottom-up limited and its maximum values are unlimited, which may result in interpretation difficulties. This factor decides of difficulties in comparing competitiveness in marketing of different types of products. It is therefore appropriate to modify the formula as follows (Dalum, 1985; Laursen et al., 1985; Yeats, 1985):

$$RCA_k = \frac{RCA - 1}{RCA + 1}$$

where:

RCA_k – adjusted index of revealed comparative advantage;

RCA – relative comparative advantage index (Balassa's index).

The values of the adjusted index range from –1 to 1. The positive index values inform about the existence of the revealed comparative advantage in the export of a given product, negative values mean the lack of the advantage. At the same time the index

characterises the strength of the advantage. The values closer to unity indicate a greater advantage, the values approaching minus unity show a greater lack of advantage.

The main aim of the conducted studies was to present the level of competitiveness of a foreign trade of selected groups of agricultural and food products in the Visegrad Group countries, taking as a reference market the area of the European Union. The study is based on the statistical data regarding the international trade of the Czech Republic, Poland, Slovakia, Hungary and the European Union published by the International Trade Centre (ITC) for the years 2005–2017. In the conducted studies four groups of agricultural and food products were considered: meat and meat offal, dairy products, cereals, vegetables and fruit.

RESULTS AND DISCUSSION

In the years 2005–2017 in all the Visegrad Group countries there was an increase in the export of food products (Fig. 1). During that period the biggest growth of the food products export was in Poland by 386.5%, next in the Czech Republic (increase by 278.0%), in Hungary (increase by 259.8%) and in Slovakia (increase by 228.9%). The year 2009 is worth mentioning as the only year with a decrease in the level of export in all the Visegrad Group coun-

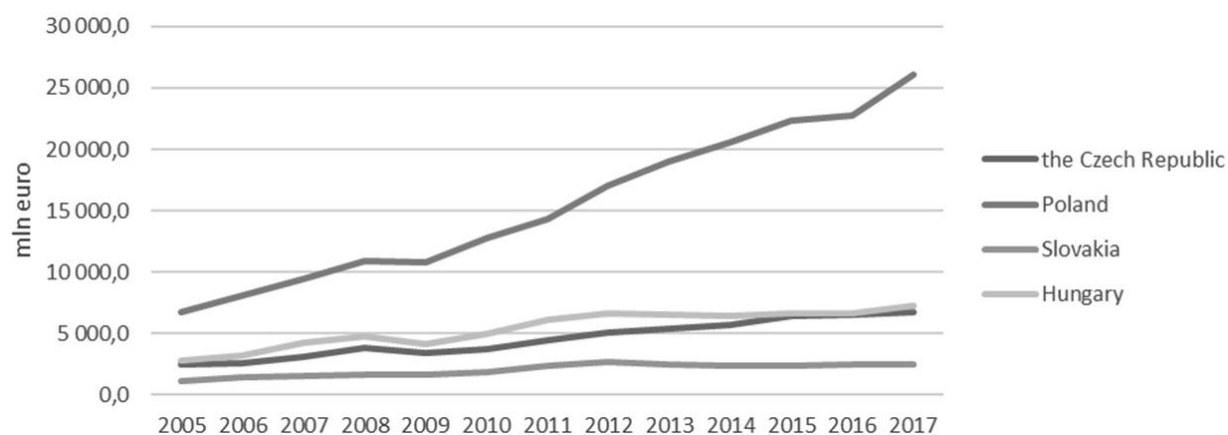


Figure 1. The amount of the export of agricultural and food products in the Visegrad Group countries in the years 2005–2007

Source: own studies based on the data of the International Trade Centre.

tries (the biggest in Hungary where the export value decreased by 12.6%, the smallest in Poland by 1.0%). The decrease proved the significant degree of vulnerability of the foreign trade of food products to the financial crisis.

It is generally acknowledged that the agri-food industry is competitive in a situation when a given country has the revealed comparative advantages. The level of the adjusted RCA index in the products of animal origin (Table 1) shows that in the group of meat and meat offal, in case of Hungary and Poland, in each studied year there is the competitive advantage in trade of these products but between 2017 and 2005 the level of competitiveness for Hungary decreased and increased for Poland. In case of the Czech Republic and Slovakia there is a lack of comparative advantages in trade of these products in the years 2005–2017 (in these countries in 2016 and 2017 the biggest negative values of the factor were noticed).

The opposite conclusions may be drawn after analysing the group of dairy products. In this group both Slovakia and the Czech Republic have the comparative advantages in the studied period (in case of Slovakia except 2012). However, it should be added that in the last years the values of the index was on the decrease to the level around the limit value deciding of the qualification to the specific group. Hungary in the years 2005–2017 showed a negative values of the indexes in spite of the fact that the value of the index between 2017 and 2015 increased by 0.102. Poland to 2010 showed the competitiveness in the foreign trade of dairy products. However, since then, there has been a trend of lesser and lesser importance in the circulation of dairy products.

In the second part of the study the groups of plant products are analysed, such as the cereals market and the fruit and vegetable market (Table 2). The significant level of competitiveness in the foreign trade in cereals is present in the Czech Republic, Hungary and

Table 1. The index of the relative comparative advantage in Poland in the studied groups of products of animal origin in the years 2005–2017 (reference area – EU market). The value of exports refers to the total value of trade with EU and non-EU countries

Year	Meat and meat offal				Dairy products			
	CZ	HU	PL	SK	CZ	HU	PL	SK
2005	-0.454	0.310	0.170	-0.162	0.159	-0.366	0.122	0.254
2006	-0.493	0.221	0.192	-0.344	0.243	-0.312	0.066	0.180
2007	-0.446	0.172	0.206	-0.346	0.249	-0.395	0.093	0.219
2008	-0.430	0.169	0.231	-0.341	0.195	-0.312	0.074	0.288
2009	-0.426	0.197	0.173	-0.437	0.183	-0.316	0.001	0.130
2010	-0.384	0.223	0.214	-0.170	0.158	-0.352	-0.019	0.133
2011	-0.406	0.184	0.232	-0.339	0.160	-0.337	-0.012	0.040
2012	-0.385	0.148	0.215	-0.270	0.127	-0.330	-0.036	-0.006
2013	-0.399	0.152	0.240	-0.291	0.120	-0.286	-0.042	0.089
2014	-0.418	0.179	0.208	-0.301	0.103	-0.281	-0.043	0.100
2015	-0.466	0.176	0.254	-0.358	0.053	-0.259	-0.089	0.099
2016	-0.501	0.197	0.248	-0.387	0.027	-0.248	-0.112	0.053
2017	-0.509	0.130	0.255	-0.500	0.049	-0.241	-0.075	0.061

Source: own studies based on the data of the International Trade Centre.

Table 2. The relative comparative advantage index in Poland in the studied groups of products of plant origin in the years 2005–2017 (reference area – EU market)

Year	Cereals				Fruit and vegetables			
	CZ	HU	PL	SK	CZ	HU	PL	SK
2005	0.442	0.641	-0.241	0.359	0.061	-0.418	0.093	0.180
2006	0.363	0.698	-0.306	0.569	0.084	-0.358	0.043	0.109
2007	0.336	0.739	-0.467	0.487	0.100	-0.441	0.073	0.114
2008	0.187	0.663	-0.652	0.233	0.043	-0.343	0.061	0.179
2009	0.370	0.650	-0.094	0.526	0.032	-0.334	0.004	0.014
2010	0.260	0.644	-0.332	0.373	0.035	-0.369	-0.032	0.002
2011	0.363	0.614	-0.425	0.399	0.024	-0.351	-0.020	-0.075
2012	0.363	0.626	-0.162	0.370	-0.010	-0.379	-0.012	-0.120
2013	0.252	0.559	-0.120	0.299	-0.010	-0.336	-0.030	-0.014
2014	0.316	0.573	-0.027	0.417	-0.031	-0.338	-0.063	-0.014
2015	0.285	0.602	-0.019	0.459	-0.088	-0.331	-0.128	-0.037
2016	0.336	0.595	0.005	0.516	-0.120	-0.342	-0.147	-0.073
2017	0.384	0.681	-0.112	0.549	-0.094	-0.316	-0.130	-0.056

Source: own studies based on the data of the International Trade Centre.

Slovakia (in 2017 the adjusted comparative index is about from the level of 0.384 for the Czech Republic to the level of 0.681 for Hungary). In case of Hungary in 2007 there was the highest level of the index in all the considered groups of products in the Visegrad Group countries amounted to 0.739. In Slovakia, since 2013 there has been a gradual increase of the level of competitiveness of the trade in this type of product (from the level 0.299 in 2013 to the level 0.549 in 2017).

As for the fruit and vegetable products, since 2012 there has been a lack of comparative advantage in the foreign trade in these products in all the Visegrad Group countries. The lowest level of the index in all the studied years was noticed in Hungary (the value of the index is around from -0.441 to -0.316).

Conducting the study of a pace of changes of the comparative advantage (Fig. 2) and at the same time the level of competitiveness in the studied groups of agricultural and food products it should be noticed that in case of the products of animal origin the for-

ign trade in meat and meat offal became more important in Poland and the foreign trade in dairy products became more important in Hungary (increase by respectively 50.0 and 34.2% between 2017 and 2005). In the remaining cases there is a decrease in a pace of changes, the biggest in case of meat and meat offal in Slovakia and in case of dairy products in Poland (the decrease respectively by 208.6 and 161.5% between 2017 and 2005).

In the studied groups of products of plant origin (Fig. 3) in case of cereals the increase of the level of competitiveness was noticed in Hungary, Poland and Slovakia (the biggest pace of changes between 2017 and 2005 was in Poland and amounted to 53.5%). In case of the fruit and vegetable products the improving situation was in Hungary. In the remaining countries there was a significant drop of the adjusted comparative index between the year 2017 and 2005, the biggest in the Czech Republic and Poland (respectively by 254.1 and 239.8%).

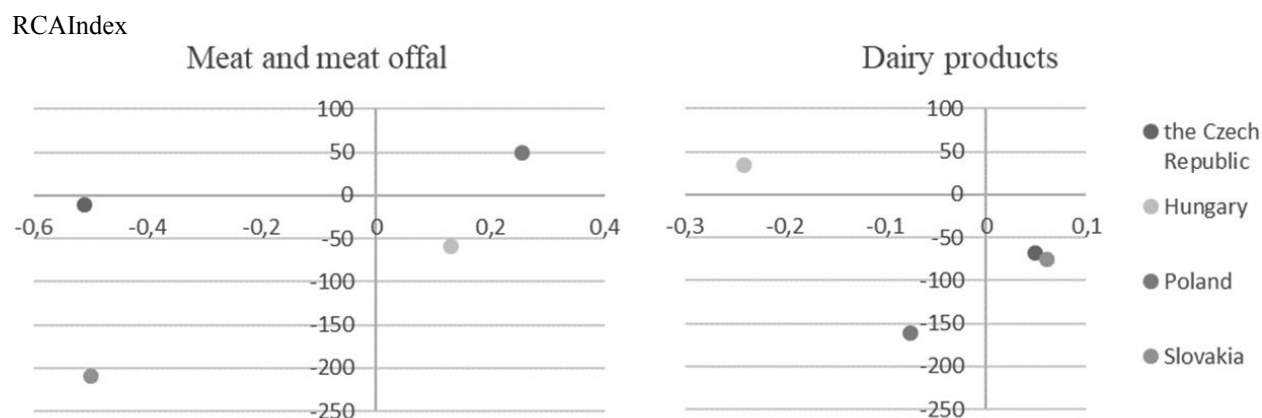


Figure 2. The RCA index in the export of products of animal origin in 2017 in the Visegrad Group countries and its changes compared to 2005 (reference area – EU market)

Source: own studies based on the data of the International Trade Centre.

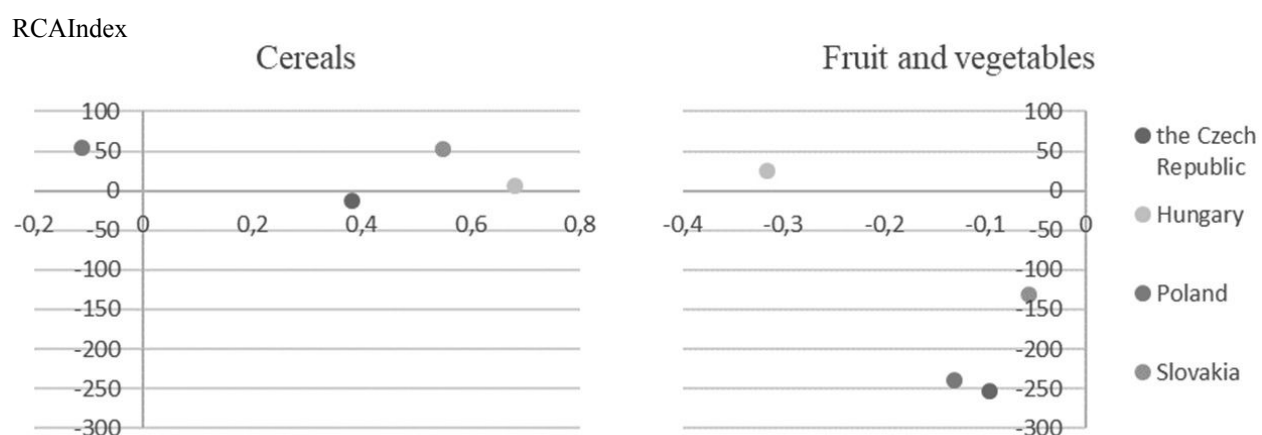


Figure 3. The RCA index in the export of products of plant origin in 2017 in the Visegrad Group countries and its changes compared to 2005 (reference area – EU market)

Source: own studies based on the data of the International Trade Centre.

CONCLUSIONS

The studies regarding the situation of the export of Polish agricultural and food products compared with the selected Visegrad Group countries and the export possibilities of food products in these countries in the years 2015–2017 enabled to formulate the following conclusions and proved that:

- the export of agricultural and food products in the Visegrad Group countries is vulnerable to economic fluctuations;
- there is a significant degree of competitiveness of the export of agricultural and food products of animal origin in the Visegrad Group countries. In the years 2005–2017 there was the comparative advantage in the marketing of meat and meat offal in case of Hungary and Poland and in case of dairy products in each studied year the trade in these products was competitive in Slovakia and in the Czech Republic;
- in case of agricultural and food products of plant origin the highest level of competitiveness

in the Visegrad Group countries in the foreign trade was in cereals where the significant level of the comparative advantages was noticed in the Czech Republic, Hungary and Slovakia. The less and less important was the marketing of fruit and vegetables (the negative values of the index in all the Visegrad Group countries since 2012);

- in the studied period in case of products of animal origin the importance of the export of dairy products declined the most, and in case of the products of plant origin – cereals (in both cases in three Visegrad Group countries a negative pace of changes was noticed).

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CHANGES IN THE LEVEL OF TECHNICAL AND SCALE EFFICIENCY OF THE FOOD SECTOR ENTERPRISES IN POLAND IN THE YEARS 2006–2016

Sylwester Kozak, PhD¹; Karolina Kossowska, BA²

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

This article empirically analyses evaluation of efficiency of Polish food producers. Technical and scale efficiency indices are measured using the non-parametric DEA method. The study is based on the annual financial reports of 51 sugar and confectionery producers operating in 2006–2016. The research revealed that technical efficiency of enterprises ranged from 82 to 93%, with the highest levels in periods of considerable increasing macroeconomic conditions in periods of 2006–2007 and 2013–2016. Most of companies characterised with the high efficiency and increasing return to scale. Throughout the entire period companies characterized with high scale efficiency at the interval of 87–93%.

Keywords: technical efficiency, DEA method, food sector

JEL codes: O3, O32, L660

INTRODUCTION

Technical and scale efficiencies are important parameters determining the profitable functioning of the enterprise and the sector in which it operates. Appropriate efficiency allows for proper transformation of the inputs into the outputs of the company's operations. In Poland, the food sector has experienced significant transformations after entering the European Union. The surviving competition from enterprises operating in other EU countries and the need to maintain and expand own market share have become strong motivations for improving the efficiency of operations. These goals were achieved, i.a. due to improvements in technology and methods of management, as well

as optimisation of operating costs and search for the economy of scale.

The goal of this article is to assess the level of technical efficiency (the VRS version) and scale efficiency of the food sector enterprises in Poland in 2006–2016. The non-parametric Data Envelopment Analysis (DEA) method was applied for measuring the efficiency of enterprises. The calculations were carried out using the STATA statistical programme (the DEA package). The research covers food sector enterprises of the subsection 'Production of sugar and confectionery products' (No 3113 according to the North American Industry Classification System – NAICS). The sector was chosen due to the relatively large group of presented enterprises, as

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, Sylwester_kozak@sggw.pl, +4822 593 42 49

² Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, k.kossowska@hotmail.com, +4822 593 42 49

well as significant weight and contribution to the production of the entire food sector. The research sample consists of 51 companies with the average value of the annual sales at PLN 350 million and the average value of assets at PLN 353 million. The enterprises have the status of: joint-stock company, limited liability company and co-operative. The annual financial data were downloaded from the EMIS database. According to the authors' knowledge, the research on the efficiency of enterprises operating in this section of the food sector is rather limited. This article fills in the missing gap and makes a significant contribution to efficiency research of the food sector.

The remaining part of the article has the following structure. The next section is a review of literature on the methods of measuring efficiency and their applications in the food sector. The next one presents the economic situation of the sector of production of sugar and confectionery in Poland and the research methodology, and the further presents the results and their discussion. The entire analysis is summarised in the conclusions.

EFFICIENCY OF FOOD ENTERPRISES – LITERATURE REVIEW

Efficiency is an important and useful measure of business performance. It indicates that with the growth of efficiency the competitiveness of the firm and its ability to preserve the market position increases. Efficiency assessment is considered as a complementary tool for the traditional firm evaluation basing only on financial indicators. Measurement of efficiency allows to synthetically evaluating the business management, including transformation of inputs into the outputs of the firm's operations.

The research by Chen et al. (2015) indicates that the measurement of the firm's effectiveness is crucial for the strategic assessment of individual economic sectors. It allows identifying the best contractors in the industry and their sources of competitive advantage. This measure extends the scope of the firm's evaluation, because focusing solely on financial indicators leads to underestimation of the assessment of the firm's market competitiveness.

The analysis of the technical and scale efficiencies of enterprises is an important part of the research evaluating their performance. Efficiency research has been particularly widespread since the 1980s, and its measurement is carried out using two basic groups of methods: parametric and non-parametric. The parametric group of methods: Thick Frontier Approach (Berger, Humphrey, 1991), Stochastic Frontier Approach (Aigner et al., 1977), Distribution Free Approach (Khoo-Fazari et al., 2013). They are based on estimation of the Cobb–Douglas production function, which defines the relationship between inputs and outputs of the production process. Non-parametric methods do not require any assumptions regarding the functional dependency between inputs and outputs of the firm's operation. The efficiency frontier is determined based on empirical data using linear programming. Non-parametric methods do not take into account the impact of random factors on the efficiency and do not include measuring potential errors. The basic non-parametric method is the Data Envelopment Analysis – DEA (Charnes et al., 1978).

The economic literature contains rather limited group of studies examining the production enterprises' performance with parametric or non-parametric efficiency measures. The most common method of evaluating of enterprises is the assessment using economic and financial indicators. These methods are often considered as fundamental analysis and include such measures as: labour productivity, profitability of assets and equity or the cost-effectiveness of the enterprise (Baran et al., 2016).

The study on the dairy sector in Poland in the period of 1999–2010 tested the technical and scale efficiency (Baran, 2013). Based on evaluation of 750 dairies the research indicates that the dairies operate with increasing scale efficiency and argues that further consolidation of the dairy sector might lead to an increase in effectiveness of the entire sector and improvement of its economic results.

Likewise Wiendlmeier (2001) examining milk processing enterprises in Germany indicates an existence of a favourable impact of the economy of scale on their performance. The study additionally states that the increase in the production scale could enable to achieve a significant reduction in the unit price of

dairy products. In turn, Rodmanee and Huang testing efficiency of the food industry enterprises in Thailand with the two-stage DEA analysis found that enterprises with low operating profitability show low efficiency as well (Rodmanee and Huang, 2013). In Poland the research conducted with non-parametric DEA method on the meat processing enterprises operating in 2006–2011 indicates that during this period their average efficiency had an upward trend (Jarzębowski, 2014).

SUBJECT AND METHODOLOGY OF RESEARCH

The performance of the sector of producers of sugar and confectionery products was rather improving during the period of 2006–2016 (Fig. 1). The sales of the sugar and sugar product producers rose from EUR 1.2 billion to 1.4 billion and the sales of the chocolate and sweets producers from EUR 0.5 billion to 0.8 billion. The only one drop in sales occurred in 2009, which could be considered as a result of the global financial crisis.

For investigating the changes in the efficiency of the producers of sugar and confectionery products the efficiency scores were calculated by the DEA method. The DEA method is a linear programming technique which is used for constructing a frontier

that could be used to evaluate the relative efficiency of identical decision making units (DMUs). For this reason the deviation of the DMUs from the idealised production output of the virtual DMU is captured. DEA might take into consideration either Constant Returns to Scale (CRS) applied by Charnes et al. (1978) or Variable Returns to Scale (VRS) elaborated by Banker et al. (1984). The CRS model assumes that enterprise transfers inputs into outputs in the same way irrespective to its scale of operation. Oppositely the VRS model assumes that with the increase of the scale of its operation the enterprise can transfer inputs into outputs more or less efficiently. Based on it we can recognise, respectively, increasing VRS model and the decreasing VRS model. Additionally DEA assumes the efficiency can be improved by reducing the inputs (input-oriented version) or increasing the outputs (output-oriented version).

In the current paper, the output-oriented VRS-DEA approach is employed. The choice is motivated by the fact that, apart from the maximising profits, the one of the most important goals of the food firms is to expand and maintain the market share. In addition, the review of literature indicates that input-oriented DEA should be used for the assessment of enterprises conducting regulated activities, e.g. energy or natural

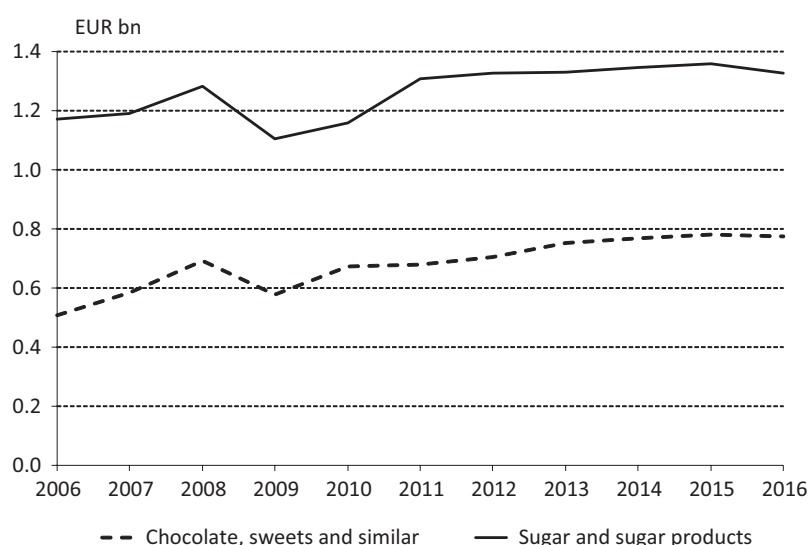


Figure 1. Sales of the producers of sugar and chocolate products in Poland

Source: own calculation based on EMIS data.

gas suppliers. In such cases, the production price is determined administratively and the efficiency can be improved by minimising inputs. The output-oriented DEA is recommended for evaluation of the majority of market oriented enterprises (Murillo-Zamorano, 2004).

The VRS-DEA efficiency score for the i -th food sector enterprise is calculated by solving the following problem (Coelli et al., 2005):

$$\begin{aligned} \min_{\theta, \lambda} \theta & \quad (1) \\ \text{Subject to } -y_i + Y\lambda & \geq 0 & \quad (2) \\ \theta x_i - X\lambda & \geq 0 & \quad (3) \\ N1' \lambda = 1 \quad \text{and} \quad \lambda & \geq 0 & \quad (4) \end{aligned}$$

where:

- y_i – vector of outputs;
- x_i – vector of inputs;
- $N1$ – unitary vector with the $N \times 1$ dimension;
- λ – vector of constants with the $N \times 1$ dimension.

The computed parameter θ lies between 0 and 1. The computed efficiency score is equal to 1 if the entity is considered as efficient and otherwise inefficient. λ is the assigned weight to an entity.

RESULTS AND DISCUSSION

The first stage of the data analysis involves calculation of the scale efficiency and the technical efficiency in the version of Variable Return to Scale (VRS). Taking into account the studies of (Chen et al., 2015) and (Rodmanee and Huang, 2013) the following variables were included into calculation of the efficiency scores:

- Input 1: cost of material and products sold (PLN thousand);
- Input 2: cost of operation (PLN thousand);
- Input 3: fixed assets (PLN thousand);
- Output 1: sales (PLN thousand);
- Output 2: gross profit (PLN thousand).

The results indicate that technical efficiency of sugar and confectionery producers were high and relatively stable during the analysed period (Fig. 2). Two significant drops in the technical efficiency appeared in 2008 and 2011–2012, what could be considered, among others, as a probable result of the financial crisis of 2008–2009, the euro public finance crisis of 2011–2012 and the disturbance in the Polish food market affected by the EU sanctions imposed on the Russia Federation.

The analysed sector operates with a high though more variable scale efficiency. Its values falling below 0.9 indicate that there is still ability to take advan-

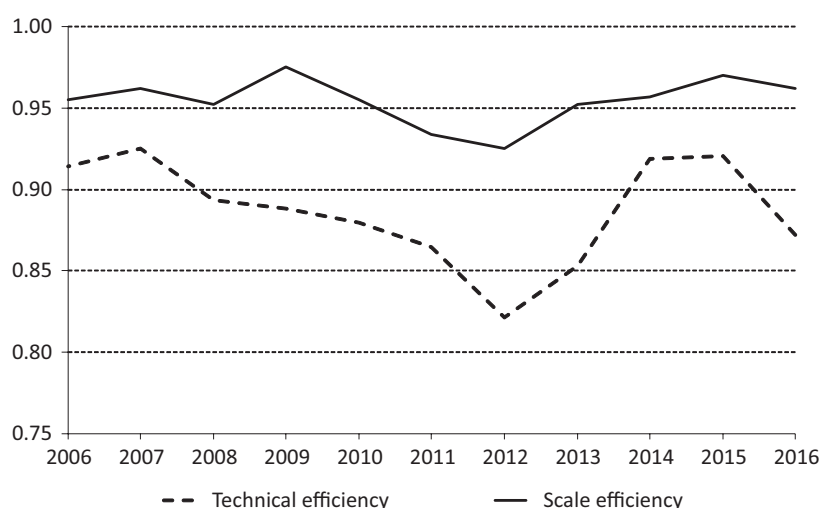


Figure 2. Technical (VRS) and scale efficiencies of the sugar and confectionery producers

Source: own calculation based on EMIS data.

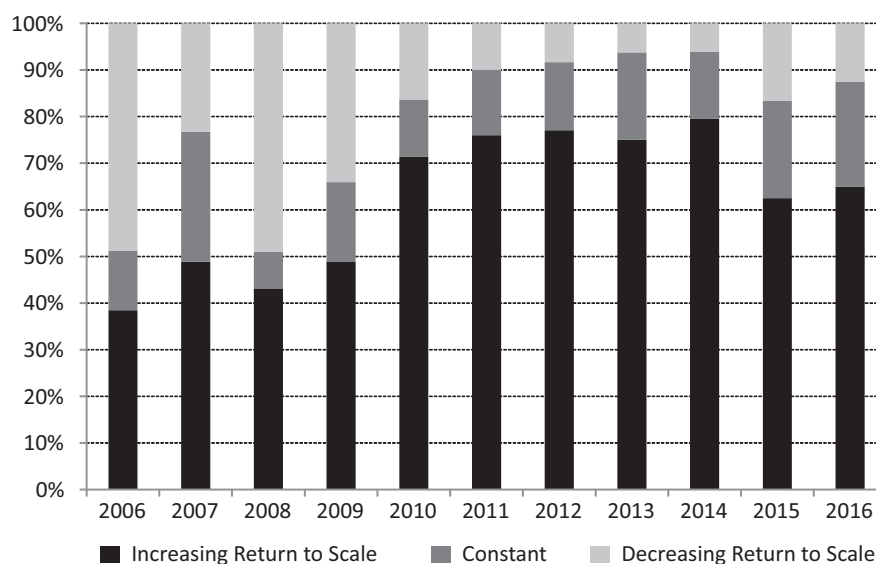


Figure 3. Distribution of types of returns to scale of the sugar and confectionery product producers

Source: own calculation based on EMIS data.

tage of consolidation in the sector and to increase the scale of operation of individual entities. Especially such opportunity appears after the year 2009. In this period most of enterprises operated with the increasing return to scale (Fig. 3).

CONCLUSIONS

The study on the technical and scale efficiency of sugar and confectionery product producers operating in Poland in 2006–2016 draws to the following conclusions:

- Enterprises operate with high and stable technical efficiency ranging between 82 and 93% and its value is in some extent impacted by the macroeconomic environment and the performance of the entire food sector;
- The sector shows high, though significantly variable scale efficiency. However enterprises have ability to take advantage from increasing scale of their operations and improve their economic performance. The results indicate that there is still room for further consolidation in the sector.
- Most of enterprises operate in the increasing return to the scale and have possibility to expand their operations and improve their competitiveness.

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DELIVERING CONSUMER VALUES BY CONSUMER FOOD COOPERATIVES – A CASE OF TWO TYPES OF COOPS FROM POLAND

Kiryll Zahkarov, Msc¹; Mariusz Maciejczak, PhD²

¹ Faculty of Economics, Sumy National Agrarian University

² Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

Consumer choice of a particular type of retail outlet greatly depends on the consumer values that the outlet provides. The aim of this research was to address specific consumer values created by consumer food cooperatives in general, and in addition to examine the difference in the consumer values provided by two major types of such coops in Poland. It is argued that consumer food cooperatives provide customers with unique blend of values, different from those of consumer cooperatives in general due to their close bond with agriculture and environment. Such coops could deliver their customers not only economic or hedonic values but also an additional environmental ones. The environmental values are prevailing in participatory type of coop, while the supermarket type can deliver better the economic values.

Keywords: consumer food cooperative, utilitarian values, hedonic values, environmental values, participatory cooperative, supermarket cooperative, Poland

JEL codes: P13, Q13

INTRODUCTION

Historically, motivation for members and non-members to buy from consumer food cooperatives (CFCs) is changing together with emergence and development of the global food network, and the extent to which these coops provide specific values (Maciejczak, 2014). Before the emergence of global food market, the so called utilitarian values, that are economical and functional values, were the most important for customers. Today the hedonic values i.e. emotional, symbolic, social, epistemic, conditional

or environmental seem to prevail (Finch, Trombley and Rabas, 1998).

The combination of customer values is dynamic and constantly changing in overall customer motivation. In recent decades the non-economic values are gaining more popularity and importance. However, the CFCs driven solely by non-economic values showed lesser vitality (Stephenson, 1963; Gliekman, 1977; Bilewicz and Spiewak, 2016).

A number of a consumer cooperative definitions can be found in the scholarly works. For example, Mikami (2010) defines a consumer cooperative simply

¹ Corresponding author: Herasym Kondratiev 160, Sumy, Ukraine, kyrillz@gmail.com, +380095 615 84 71

² Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, mariusz_maciejczak@sggw.pl, +4822 593 42 35

as 'a firm in which ownership to the firm is given to the customers of the firm'. Additionally, O'Sullivan and Sheffrin (2003) give a wider definition, for them: 'a consumer cooperative is a cooperative business owned by its customers for their mutual benefit. It is a form of free enterprise that is oriented toward service rather than pecuniary profit'. Yet there was very little attempt paid to the characteristic and definition of such economic entity as a consumer food cooperative. Zakharov and Maciejczak (2018) define modern CFC as a voluntarily organisation, aimed at eliminating middleman and buying quality food and related items directly from producers. The main task of a consumer food cooperative is to supply quality food or related items to the customers at the lowest price possible, while supporting local farmers with fair pay for their produce.

In Poland CFCs do not enjoy such diversity of organisational forms as those in other countries as the USA, for example. However, two distinct types of CFCs are now firmly established in the country: participatory cooperative and supermarket cooperative. Present Polish cooperatives are incorporating for their current needs the existing models that were developed in Europe and the USA. The first documented CFCs appeared in Fenwick, UK, in 1769 (Fairbairn, 1959), soon other CFCs got established in the country (Webb, 1930). The first CFCs, according to other scholars, were founded in Rochdale, UK (Greenberg and Watts, 2009), in 1844 (Fairbairn, 1959). Those first CFCs were solely of supermarket cooperative type. In the USA first cooperatives were established in the beginning of 20th century, and by 1960s a 'new wave' or participatory cooperatives emerged (Streed, Cliquet and Kagan, 2017). While supermarket cooperatives are based on the 'Rochdale model' and are aimed mostly at reducing costs of food (Thompson, 1994), participatory cooperatives are based not only on the 'Rochdale model' but also on the latest left-wing and environmentalist movements and tendencies (Hoyt, 1995).

There are certain differences in how North American and Western European scholars address the issue of CFCs. North American researchers focus on the competitive capacity of the CFCs, on their capitalisation, internal cooperation, and ability to create

an egalitarian and sustainable local food network (Kloppenburger et al., 1996; Buttel, 1997; Allen et al., 1999; Mancino and Parliament, 2001). At the same time European researchers focus on the food safety and organic food certification, rural development and agricultural policy, especially when it comes to Common Agricultural Policy reform (Lowe, Buller and Ward, 2001; Grey, 2000; Goodman, 2003). British researchers are also focusing on the role of food distribution chains in sustainable development and sustainable consumption (Evans, 2011; Davies, 2014).

This difference comes from the fact, that the US CFCs are mostly for-profit ones, therefore issues of capitalisation and market competitiveness are among first priorities for them, while European CFCs are mostly small non-profit entities. Europe has a larger number of the small family farms, thus 'farmer-city customer' relations are among priorities for the European scholars. Topics, that are of equal interest for both American and European scholars are those of embeddedness, urban agriculture development, localism and social relations in terms of food consumption (Jarosz, 2000; Sage, 2003).

First documented CFCs in Poland appeared in 1930 (Chyra-Rolicz, 1985, 1992), but after the WWII this cooperatives ceased to exist, or were incorporated into more formalised soviet type consumer cooperatives. CFCs made their comeback in Poland in early 2010. Initially there were about 30 attempts to establish such cooperatives (Bilewicz, 2017). Those the very first CFCs established in Poland around 2010 were more focused on eliminating middleman from food supply chain, although in the following years they became more focused on supplying quality food to its members, or as Sage (2003) called it 'a good food'. By 2018 about half of the 'new wave' coops, established in 2010 still operate in Poland's food market, though holding an insignificantly small share of the food market. Those CFCs were initially entirely based on the participatory cooperatives model. However, later one of the cooperatives – 'Dobrze', has changed to a supermarket coop model and is successfully operating and consistently growing now. Another purely 'ideological', extremely socially-wing coop ('Warszawska'), after it's membership

dropped to mere 17 members in 2017, decided to follow the suit and adjust their structure to that 'supermarket' model too. Detailed overview of the CFCs movement in Poland has been described by Maciejczak and Zakharov (2018). They stressed that due to the voluntary character based on networking activities they are subject to adjustment processes, which under the umbrella of the democratic governance, are focused on adaptive actions.

Thus, it can be observed that modern CFCs around the world are based on the contrary driving forces of pragmatism and idealism, which differently impact each particular cooperative and are changing over the time. While pragmatic drivers were more important for the first CFCs, and for those organised in 1930–1960, the idealistic drivers and food safety concerns are becoming the main drivers for the modern CFCs members (Sage, 2003; Bos and Owen, 2016; Streed, Cliquet and Kagan, 2017). Some scholars compare egoistic versus altruistic member motivation for joining CFCs (Birch, 2018), on the contrary the others call it idealistic versus pragmatic or hedonic values (Streed, Cliquet and Kagan, 2017).

The basic research problem is, however, to find out which values drive the consumers to join on different level – as a member or non-member, the modern CFCs in Poland, and if these values depend on the type of such cooperative.

MATERIALS AND METHODS

The purpose of this paper is to identify specific set of values of CFCs that are the driving factors for consumers, forcing them to join such cooperatives or to buy from them. Based on the literature review the values has been identified. In order to verify to which extend the diagnosed values are provided, two CFCs from Warsaw, namely 'Dobrze' and 'Grochowska', were visited and participant observations have been performed. It was assumed that the participant observation combines participation in the operation of the organization being studied with maintenance of a professional distance that allows adequate observation and recording of data. Participant observation underscores the person's role as participant in the social setting that is observed

(Holloway, 1997). The CFCs selected for the case study have been chosen due to three reasons. Firstly, they were selected because of their proven vitality (both co-ops have been successfully operating since 2010 without any set-backs), secondly due to their dynamic development ('Dobrze' has grown from two founders in 2010 to almost 400 members in the beginning of 2018 and it has opened two new shops over that period of time; while 'Grochowska' has grown from 1 founder in 2010 to 700 members in the beginning of 2015 and it later split into several daughter co-ops, with 'Grochowska' remaining a mother-cooperative), and finally as per the diversification of their activities ('Grochowska' takes part in a re-socialisation project as well as in Community Supported Agriculture (CSA) Study Visits project and it organised a food sharing hub in Warsaw, while 'Dobrze' takes part in sociological research project and organises lectures on CFC and CSA. Both coops are now actively involved in the creation and maintenance of the CSAs).

RESULTS AND DISCUSSION

Identifying customer values provided by CFCs

Based on the literature review the values the CFCs provide for their consumers have been identified. The commonly used conceptual definition of a consumer value was given by Hollbrook (1999) and it stresses out that the value is relativistic, interactive, preferential, and experiential. Vargo and Lusch (2007) are also emphasizing subjectiveness of a customer value, stating that the value is 'determined by the beneficiary'. Based on the reviewed scholarly works it can be stated that presently there are three main approaches to the customer values definition: utilitarian, hedonic and multi-dimensional. For example, Babin, Darden and Griffin (1994) and Holbrook (1999) note that the utilitarian approach sees a customer as a problem-solver, driven by rationality, and is focused on task-related characteristics. On the other hand the hedonic approach is focused on the purchase and consumption process itself. It emphasizes the value of the shopping process itself as an emotional, social and entertainment activity. The presented research is built mostly on the theoretical background, developed by

Finch, Trombley and Rabas (1998) and Talonen et al. (2016) who research and present customer values as a combination of utilitarian and hedonic values, and apply their conceptual framework to the consumer cooperatives in particular.

Due to the specific nature of Polish CFCs, and first of all, their non-profit nature, the values that they provide to it's customers would be somewhat different from those of a commercial enterprise. According to (Talonen et al., 2016) consumer cooperative creates following two groups of values coming from their customer ownership nature. The first one covers utilitarian values: economic value and functional value. The second one is hedonic values: emotional and experiential value and symbolic and social value. Finch, Trombley and Rabas (1998) also defines two more values of consumer cooperatives: epistemic values and conditional values. As CFCs are closely

linked to natural environment preservation for they help to minimise negative social, environmental, economic and health impacts of global food distribution network (Feenstra, 1997; Seyfang, 2006; Williams et al., 2012; Sumner, McMurtry and Renglich, 2014). Natural environment preservation can be added as an additional value that could be connected to public goods (Maciejczak, 2009), to the values suggested by Talonen and Finch. The classification of customer values is presented in Table 1.

Even though the consumer values of consumer cooperatives in general have been addressed by scholars in recent years (Feenstra, 1997; Finch, Trombley and Rabas, 1998; Talonen et al., 2016), previous discussion has not addressed CFCs as such. Moreover, due to the close connection of consumer cooperatives with agriculture, specifically with sustainable agricultural techniques (Sage,

Table 1. Classification of customer values, produced by modern consumer food cooperatives

Values	Descriptions
Utilitarian values	
Economic value	Monetary savings, value for money, best trade-off between price and overall benefits (Talonen et al., 2016).
Functional value	Quality, convenience, finding the right product at the right time and place (Finch, Trombley and Rabas, 1998; Talonen et al., 2016).
Hedonic values	
Emotional and Experiential value	Exploration, entertainment, aesthetics, playfulness, escapism and enjoyment, pleasure and emotional experience of the consumption process itself (Finch, Trombley and Rabas, 1998; Talonen et al., 2016).
Symbolic and social value	Status and self-esteem, social value, self-expression (Finch, Trombley and Rabas, 1998; Talonen et al., 2016).
Epistemic value	The ability to arouse curiosity, provide novelty or satisfy one's desire for knowledge (Finch, Trombley and Rabas, 1998).
Conditional value	The ability to provide alternative choice, depending on situation and set of circumstances faced by the customer (Finch, Trombley and Rabas, 1998).
Environmental value	
Public values	The ability to provide customer with external benefits, such as cleaner environment (Maciejczak, 2009), the ability to take part in environment preservation and support of traditional heritage of the regions by supporting farmers who practice environment-friendly or traditional production techniques (own elaboration).

Source: own elaboration based on: Finch, Trombley and Rabas (1998); Maciejczak (2009), Talonen et al. (2016).

2003), CFCs deliver its customers additional value, namely environmental value, that can be classified as both economical value due to external benefits that it creates (Maciejczak and Zakharov, 2011) and the hedonic value because of the satisfaction that it gives to CFCs customers by their participation in natural environment and traditional culture preservation (Bilewicz and Spiewak, 2016).

The ability of CFCs to provide customer values – the comparison of two coops of different type from Warsaw

It should be pointed out that different types of the CFCs can produce different blend of consumer values. Two types of the CFCs has been compared – supermarket type CFC 'Dobrze' and participatory type CFC 'Grochowska', both located in the capital city of Warsaw. CFC 'Dobrze' not only supplies food but operates a shop for both members and non-members, where salaried shop assistances and other staff serve customers and therefore are selling their labour for the monetary reward. This is the only partially commercialised cooperative, they follow all internationally accepted cooperative principles (Hoyt, 1996) equally, putting special stress on education. The CFC 'Grochowska' primarily is a food cooperative that is growing into some sort of multi-functional community cooperative, encouraging its members to mutually supply all sorts of services, such as car sharing, tool sharing, language lessons and other sorts of mutual help or exchange of goods and services. This is the only cooperative that doesn't follow the first principle of voluntary and open membership – the membership is voluntary, but not open – new members have to be approved by the management. The most important principle for them is concern for community, the second most important principle is education. As for the rest – they are equally important.

Both coops showed rather poor performance in terms of economic value as their prices are not much different from those of conventional supermarkets, while in terms of symbolic and social, epistemic and conditional values both types of the cooperatives showed very good performance, as well as in terms of emotional and experiential value – however, this value is delivered to a lesser degree in case of non-

member customers of the supermarket CFC 'Dobrze', as they are not involved in voluntary work. In terms of functional value, the CFC 'Dobrze' has shown undoubtedly better performance thanks to the presence of actual shops with regular opening hours, while the CFC 'Grochowska' only provides its customers with a collection point opened one day a week. In terms of environmental value 'Grochowska' showed better performance as it distributes wider range of agricultural products, thus supporting larger number of organic or traditional farms. The ability of the researched two CFCs from Warsaw to provide the customer values discussed here, are presented in Table 2.

CONCLUSIONS

The consumer food cooperatives provide an alternative source of food purchase compared to mainstreamed large scale networks driven by super or hypermarkets. The ability of such alternative networks to develop depends on the extent to which they provide values to both their members and their consumers. It is argued that the researched CFCs can provide their customers with their own specific blend of values, different from those of consumer cooperatives in general. Through the fact that the consumers of the researched cooperatives are more closely attached to sustainable agricultural production, these CFCs could deliver their customers also additional value. This value can be described as an environmental value. It can be classified as both an economic and also as a hedonic value. It was found that the environmental values are prevailing in participatory type of coop, while the supermarket type can deliver better the economic values.

Against the background of the limited existing literature on the topic, this paper contributes to the studies on the drivers of development of CFCs, and explores the present basis of their functioning. It is undoubted, that the both selected coops can give their customers an enhanced scope of values, compared to that of the conventional supermarkets in Poland. Therefore the further research is needed in order to verify the scope to which the values contribute to CFCs consumers' satisfaction.

Table 2. The ability to provide consumer values by CFC 'Grochowska' and CFC 'Dobrze'

Supermarket type coop – CFC 'Dobrze'	Participatory type coop – CFC 'Grochowska'
Economic value	
The agricultural produce prices are similar to those in supermarkets or just slightly lower, however prices for non-members are normally higher than in supermarkets.	The agricultural produce prices are similar to those in supermarkets or just slightly lower comparing to those in supermarkets.
Functional value	
The presence of the actual shops, located in the city centre and usual opening hours, as well as experienced staff make functional value of the coop similar to that of usual supermarket, however lower number of customers makes purchasing process quicker that gives this type of the coop in Poland certain advantage.	The absence of the actual shops, and ability to make purchases only once a week gives this type of the coop strong disadvantage, however the coop can provide its customers with wider selection of products, as it is not limited by shop's floor space.
Emotional and experiential value	
The necessity of volunteer job provide wealth of emotional and experiential value to members and some degree to its non-member customers.	The necessity of volunteer job provides wealth of emotional and experiential value.
Symbolic and social value	
The coop provides symbolic and social value to both members and non-members to a full degree.	The coop provides symbolic and social value to a full degree.
Epistemic value	
The coop provides epistemic value to both members and non-members to a full degree.	The coop provides epistemic value to a full degree.
Conditional value	
The coop provides conditional value to both members and non-members to a full degree.	The coop provides conditional value to a full degree.
Environmental value	
The coop's policy of buying only 'ecological' or traditionally grown produce generates certain environmental value.	The coop's policy of buying only 'ecological' or traditionally grown produce generates certain environmental value. The coop claims to supply wider variety of products, involving bigger number of the 'good food' suppliers, thus delivering better environmental value.

Source: own elaboration.

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PART 2

AGRICULTURAL MARKETS IN THE ERA OF INTEGRATION AND GLOBALISATION

GLOBAL DIFFERENCES IN LABOUR PRODUCTIVITY IN THE AGRIBUSINESS

Aldona Mrówczyńska-Kamińska, PhD¹; Bartłomiej Bajan, MSc²

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The purpose of this paper is to assess the global differences in labour productivity in the agribusiness. The relationship between a country's economic development level (measured as GDP per capita) and labour productivity in the agriculture and across the entire agribusiness was measured in 39 countries around the world (which are entered to the World Input-Output Database and for which the relevant I/O tables were prepared) in 2000 and 2014. The input-output analysis, employed as the main research method, enabled the calculation of value added in the agriculture and elsewhere in the agribusiness. The results suggest the existence of a positive linear association between agribusiness labour productivity and economic development level, as corroborated by previous observations. In turn, two separate groups are noticeable in the relationship between agricultural labour productivity and the level of development of a country. In the first group of countries, agricultural labour productivity grows fast as the economy grows whereas in the second group, the growth rate of labour productivity clearly decreases as the economy grows. This study is a part of the discussion on the global agricultural development model which, on the one hand, calls for increasing the productivity of agricultural labour and, on the other, shows a need to reduce environmental degradation.

Keywords: agribusiness, labour productivity, economic growth

JEL codes: O13, Q00, Q01

INTRODUCTION

Because repeatable processes are an inherent part of the economy, the researchers have tried to explore the economic transformation patterns since the very beginning of the economic theory. One of the main, empirically proven economic principles is the variability of contributions and roles of different sectors (agriculture, industry, services) in function of economic development levels (Kuznets, 1973). As the development processes advance, the national economy becomes dominated by modern industry and services,

whereas the share of sectors directly related to food manufacturing tends to decline (Kuznets, 1976). The agriculture sector becomes primarily a supplier of products to be processed. Also, the supply and service areas (which provide the agriculture sector with productive inputs) start to exert an increasingly powerful impact on food manufacturing. As a consequence of increasingly stronger links between economy sectors related to food manufacturing, the agribusiness emerges as a distinct system (Davis and Goldberg, 1957).

The essential condition for economic growth is the increase in labour productivity. For the agricul-

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, mrowczynska-kaminska@up.poznan.pl, +4861 846 63 74

² Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, bartlomiej.bajan@up.poznan.pl, +4861 846 63 79

ture, this usually means greater environmental degradation resulting from large quantities of fertilizers or pesticides, for instance (Pearce, 2002). Therefore, some communities call into question the continuous pursuit of general productivity, including labour productivity. These are the conclusions that may be drawn, for instance, from the sustainable development concept which places environmental aspects on an equal footing with socio-economic factors (Goodland, 1995). The agricultural policies implemented by developed countries increasingly often, and to an increasingly greater extent, put much emphasis on the environmental aspect, as illustrated by the example of successive reforms of the European Union's Common Agricultural Policy or the American Farm Bill as well as in the United Nations environmental programs (Dokurno, Fiedor and Scheuer, 2016).

Therefore, the purpose of this paper is to assess the differences in labour productivity in agribusiness around the world which are related to country's development level. Also, the research attempts to answer the question whether the current agribusiness development state provides grounds to believe that the economy may continue to grow despite a concurrent decline in the growth rate of agricultural labour productivity. This study is a part of the discussion on the global development model for the agriculture and agribusiness which, on the one hand, calls for increasing the productivity of agricultural labour and, on the other, shows a need to reduce environmental degradation.

THEORETICAL BACKGROUND

The objective of each economic development strategy is to move from an agriculture-based economy to one not dominated by the agricultural sector. Consequently, in poorly developed countries, the contribution of agriculture to the GDP usually ranges from 40 to 60%, and the share of population employed in the agricultural sector is 50 to 80%. However, such an intensive use of resources results in low productivity levels (Johnston and Mellor, 1961). As the incomes grow, the population spends more and more on goods related to non-agricultural sectors of the economy. As a consequence, a part of the labour force moves to these very sectors; although less people work in ag-

riculture, they still must produce food to address the needs of the society (Mellor, 1982). The conclusion from the above argument is that the increase in agricultural productivity is not only necessary but also inevitable. This is particularly important in the context of the forecasted growth of global population and related challenges faced by the 21st century society. Obviously, the above does not mean labour productivity is the only driver of growth. The transformation of the food economy is affected by various aspects, regarded as the driving forces and the restrictions and barriers which may be grouped into exogenous and endogenous factors. Exogenous factors include the country's development level, the contribution of agriculture to GDP and the level of food expenditure whereas endogenous factors include the employment share of agriculture, farm structure, production scale and labour productivity (Tomczak, 2004).

The abovementioned principles of agricultural development are reflected in the concept proposed by Davis and Goldberg (1957) who define agribusiness as a combination of all agricultural production operations together with the production and distribution of the entire flow of supply in productive inputs and production services intended for the farms, as well as all operations related to trading, storage, processing and distribution of agricultural products. Agribusiness is composed of 3 spheres: sphere 1 means the industry sectors which deliver productive inputs and services to the agriculture and food sectors (provisioning); sphere 2 means agriculture; sphere 3 means the food sector (Davis and Goldberg, 1957). As the economy grows, the importance of specific components of the food production chain changes. The trend resulting from the world agriculture development patterns suggests that non-agricultural links gain in importance to the detriment of the agriculture itself. Specifically, this means an increased share of sphere 3 and sphere 1 with a decline in sphere 2 (Wilkin, 2001).

The above relationships are corroborated by the global agriculture development path, a concept by Tomczak (2004) which presents several patterns, including a positive linear association between agricultural labour productivity and national development level around the world in 1995–1997 (Tomczak, 2004). The research presented in this paper focuses

on that very relationship, in the context of both the agriculture and the entire agribusiness.

MATERIALS AND METHODS

The analysis covered all countries entered to the World Input-Output Database (WIOD) for which the corresponding I/O tables were prepared, except for Cyprus, Malta, Luxembourg and Taiwan³. The input-output analysis, employed as the main research method, enabled the calculation of output in the agriculture and elsewhere in the agribusiness as per the formula proposed by Woś (1979):

$$X_A = x_r + x_p + \sum_{i=1}^n x_i b_{ir} + \sum_{i=1}^n x_i b_{ip}$$

with:

X_A – output of agribusiness,

x_r – output of agriculture,

x_p – output of the food industry,

x_i – output of industry (sector) i which is related to the agriculture and food industry ($i + 1, 2, \dots, n, n \neq r, p$) and is indirectly involved in food production,

b_{ir} – coefficient specifying the flow of products and services from industry (sector) i to the agriculture, expressed as a percentage of intermediate demand of industry (sector) i ,

b_{ip} – coefficient specifying the flow of products and services from industry (sector) i to the food industry, expressed as a percentage of intermediate demand of industry (sector) i .

Just as in the case of output, the same method was used to calculate the value added in agribusiness. The product and service I/O coefficients were used to determine the size of labour force engaged in agribusiness production. Data from the WIOD Socio-Economic Accounts was used for that purpose. In turn, labour productivity was calculated based on value added per person engaged, and the level of economic development was measured as per capita GDP in purchasing

power parities (in USD). GDP figures were retrieved from the World Bank database. The calculations were based on data from 2000 and 2014, the initial and final year for which I/O tables were calculated in the WIOD database (2016 Release). With this approach, it is possible to trace the evolution, if any, of the development path of the global agriculture (and of the entire agribusiness) in a longer term perspective.

RESULTS AND DISCUSSION

The theoretical assumptions would suggest that – because of higher labour productivity in non-agricultural spheres – the agribusiness as a whole demonstrates a higher labour productivity than the agriculture itself. While most calculations shown in Table 1 confirm the above, there is a small group of countries where labour productivity in agriculture comes very close to (or sometimes even exceeds) that of agribusiness as a whole. This becomes particularly evident when looking at 2014 figures recorded in Australia, Canada, United States and Slovakia. The first three countries are often cited as an example of a highly industrialized agriculture characterized by high levels of production intensity (Cockfield, Mushtaq and White, 2012; Parcerisas and Dupras, 2018); this suggests a positive correlation between production intensity and labour productivity. In all countries surveyed, labour productivity levels grew from 2000 to 2014 in all spheres of agribusiness. At the same time, labour productivity is on average higher in the food industry. However, there are many countries where the highest levels of labour productivity are reported in the provisioning sphere. This may be caused by many factors, primarily including the national agribusiness development model, its structure and links to other sectors of the economy.

The research suggests that a linear relationship exists between labour productivity in agribusiness as a whole and economic development levels. The above conclusion can be drawn based on both 2014 data (as shown in Fig. 1) and 2000 data⁴.

³ Because of their small area or geographic location, these countries are not representative for this study.

⁴ In 2000 and 2014, for these values, the coefficient of determination (R²) was 0.88 and 0.86, respectively. Both of these levels suggest the model is well fitted. The Pearson correlation coefficient is positive and high (0.94 in 2000 and 0.93 in 2014) for both features. This means the agribusiness labor productivity grows as the economy grows.

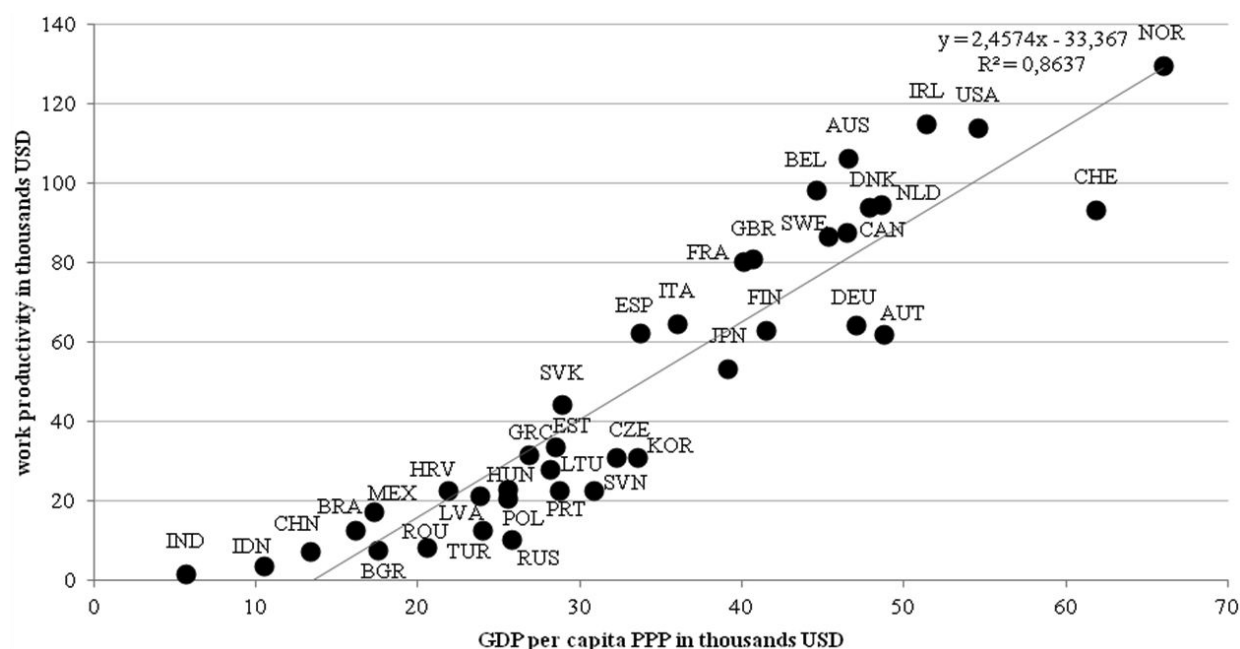


Figure 1. Relationship between agribusiness labour productivity and GDP per capita in 2014

Source: own elaboration based on World Bank data and WIOD.

Norway, the most developed of the countries considered, had a GDP per capita of over USD 66,000 in 2014 while also demonstrating the highest productivity of labour in the agribusiness as a whole (USD 130,000 per person engaged). At the other end of the spectrum, India has the lowest GDP per capita of all the countries surveyed (not in excess of USD 6,000 in 2014), and demonstrates the lowest productivity of agribusiness labour (ca USD 1,000 per person engaged). The relationship between economic growth and productivity may be reciprocal because a potential increase in value added results in improved labour productivity; at the same time, a higher value added directly contributes to increasing the GDP (as a component thereof). This path of agribusiness development requires labour productivity to be increased. However, according to data in Table 1, it does not necessarily have to grow at an even rate across all agribusiness spheres. Note also that different sectors of the economy which compose the agricultural sector rely on labour inputs to a various extent.

This is particularly noticeable in highly developed countries which report considerable differences in labour productivity between different spheres

of the agribusiness. For instance, labour productivity in the Irish food industry in 2014 was USD 214,000 per person engaged. Meanwhile, in the United States – the country with the most similar development level of all the countries surveyed – it was USD 142,000. In Ireland, in the same year, labour productivity in agriculture was at a relatively low level of USD 33,000 per person engaged while in the United States it was as much as USD 112,000. Both countries recorded the most similar levels of labour productivity in the provisioning area, with USD 121,000 and USD 105,000 in Ireland and in the United States, respectively.

This is particularly important for the agriculture itself as an increase in labour productivity often has an adverse environmental impact. As shown by this study, already in 2000, some countries who experienced economic growth reported a smaller growth rate of agricultural labour productivity compared to other countries. In 2000, the coefficient of determination of a linear model with these two features was 0.67. This suggests the model is satisfactorily explained by the linear trend, though to a lesser degree than for the agribusiness as a whole. Figure 2, based

Table 1. Labour productivity in different agribusiness spheres in 2000 and 2014 (value added per person engaged)

Specification	Provisioning		Agriculture		Food industry		Agribusiness as a whole	
	USD thousand							
	2000	2014	2000	2014	2000	2014	2000	2014
Australia	37	107	32	110	46	100	37	106
Austria	48	90	12	23	42	89	28	62
Belgium	50	107	34	57	51	106	47	98
Brazil	7	19	2	7	8	20	3	13
Bulgaria	4	14	2	4	3	15	2	8
Canada	43	85	28	83	56	94	41	86
China	2	10	1	5	4	25	1	7
Croatia	12	30	4	11	2	34	6	22
Czech Republic	12	35	8	25	13	33	11	31
Denmark	51	105	38	65	50	100	47	94
Estonia	9	38	5	29	7	30	7	33
Finland	47	95	14	24	41	90	30	63
France	47	89	30	54	52	93	43	80
Germany	41	75	24	34	36	61	36	64
Greece	28	45	10	15	28	59	17	32
Hungary	10	27	4	19	8	23	7	23
India	1	4	0.4	1	1	2	1	2
Indonesia	1	4	1	2	4	21	1	4
Ireland	52	121	20	33	60	214	40	115
Italy	44	76	27	47	46	73	38	64
Japan	65	66	16	19	99	100	49	53
Latvia	8	31	2	9	10	26	5	21
Lithuania	8	35	2	12	9	46	5	28
Mexico	22	34	4	6	27	43	10	17
Netherlands	44	87	39	74	65	145	46	94
Norway	68	165	17	55	47	125	47	130
Poland	13	36	2	8	11	31	5	20
Portugal	23	47	5	7	18	45	10	23
Romania	5	17	1	3	11	52	2	8
Russia	5	24	1	4	4	25	2	10
Slovakia	9	39	7	63	8	32	8	44
Slovenia	21	49	5	9	21	41	11	22
South Korea	24	43	10	19	26	50	14	31
Spain	30	64	22	44	31	85	27	62
Sweden	53	109	19	28	55	113	42	88
Switzerland	66	139	15	30	58	130	38	93
Turkey	15	25	3	8	15	32	6	13
United Kingdom	46	84	35	43	62	113	49	81
United States	66	105	43	112	91	142	67	114

Source: own elaboration based on WIOD data.

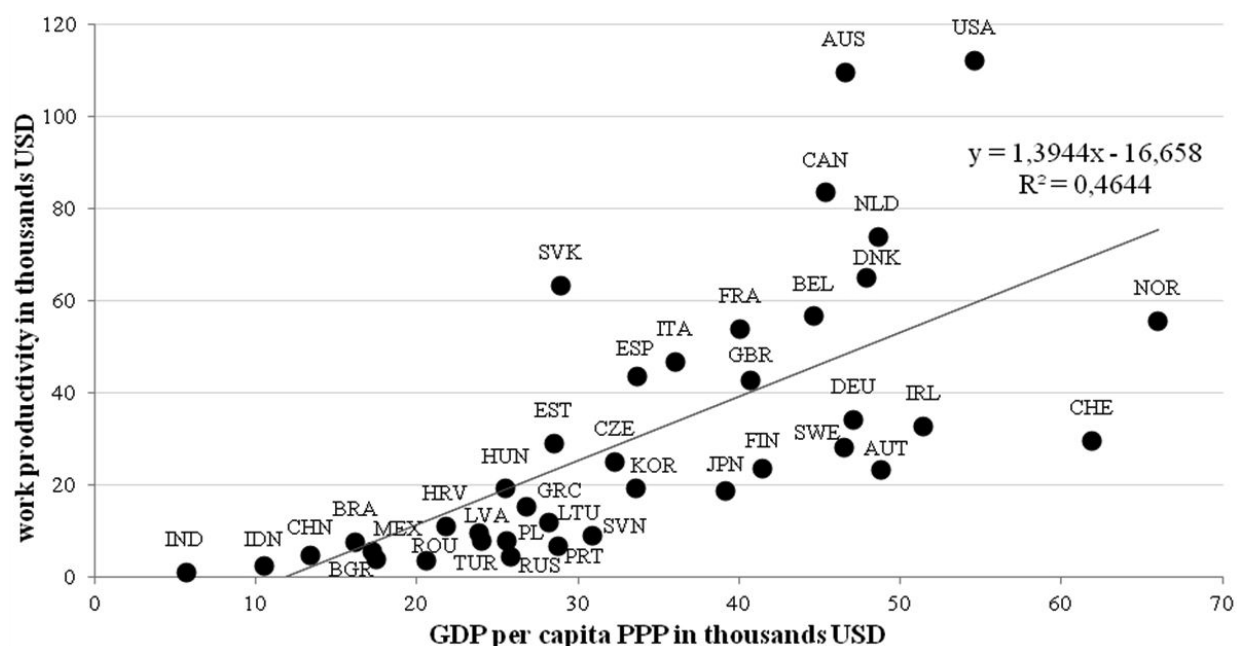


Figure 2. Relationship between agricultural labour productivity and GDP per capita in 2014

Source: own elaboration based on World Bank data and WIOD data.

on 2014 data, clearly shows two separate groups of countries with different work productivity in agricultural.

A group of countries which include the United States, Australia, Canada, the Netherlands and Denmark demonstrate a high level of agricultural labour productivity (much above USD 60,000). In turn, in another group which includes Ireland, Germany, Austria and Sweden, labour productivity is considerably lower, reaching a level of up to USD 40,000⁵. Note also that both groups are at a similar level of economic development, with a per capita GDP ranging from USD 45,000 to USD 55,000. These figures suggest the countries may choose between a faster or slower growth of agricultural labour productivity. However, the following question needs to be considered: if low levels of agricultural labour productivity were characteristic for all highly developed countries, would the output of agricultural raw materials be enough to

address the demand in the context of such issues as population growth? This is an important problem because the answer to that question should offer a clear direction for the development of agriculture and of the entire agribusiness for the countries which embark on this path (i.e. those with a low per capita GDP and a low level of labour productivity). However, note that according to the agribusiness development presented in this paper, the economy cannot grow if the increase in labour productivity in different spheres of agribusiness (including the agriculture) is completely stopped.

CONCLUSIONS

The analysis demonstrated the existence of two development paths for the agriculture and agribusiness in the context of labour productivity gains. On the one hand, there is a group of countries where agricultural

⁵ The second group could also include Norway and Switzerland with labor productivity levels of USD 55,000 and USD 30,000, respectively. However, both of these countries report a much higher GDP per capita.

labour productivity grows fast as the economy grows, while on the other, there are countries where labour productivity grows at a much slower rate. Interestingly, as the economy grows, labour productivity increases linearly in the entire agribusiness. This suggests that an important role is played by non-agricultural areas where labour productivity contributes to the linear nature of the agribusiness development path. The development level of non-agricultural areas of agribusiness depends on multiple factors and differs considerably from one country to another. Therefore, it is difficult to identify a unique general pattern for labour productivity.

This study is a part of the discussion on the development model for the global agriculture and the entire agribusiness which, on the one hand, calls for increasing the productivity of agricultural labour and, on the other, shows a need to reduce environmental degradation which is often the consequence of gains in labour productivity. Whether the countries at lower levels of socio-economic development will follow the road paved by countries around the world characterized by a fast increase in labour productivity, or will they choose a totally different development path in the food manufacturing area, remains an open question. And there is no obvious answer to that. It can only be concluded that work productivity will be a milestone for both development paths, and the growth rate will be by far lower if the sustainable growth paradigm is adopted.

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COMPARATIVE ANALYSES OF HEALTH ECONOMICS INDICATORS IN THE EUROPEAN UNION AND TURKEY

Ali Unsal, PhD candidate, Lecturer¹; Ewa Stawicka, PhD²

¹ Management and Organization Department, Bilecik Şeyh Edebali University

² Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

In this paper, Turkey and the European Union countries are compared on health economics indicators such as health expenditure per capita, health expenditure as a percentage of GDP, life expectancy and infant mortality rate. The aim of this study is to determine the position of Turkey comparing to the European Union countries on the basis of health indicators. Result of this study shows that Eastern EU countries as well as, Turkey in particular should allocate more share for health from their health spendings to get better health outcomes.

Keywords: core health indicators, European Union countries, health expenditures

JEL codes: O1, I15

INTRODUCTION

Health spending is quantifying of the final consumption of health services and goods including personal healthcare such as curative health care and communal services such as prevention and public health services (OECD, 2013).

Physical, psychological and social health condition of a population have direct effect on its economic development (Grosse and Harkavy, 1980; Musgrove, 1993). Supposing that, if a person's health worsen, it would be impossible for her/him to maintain even her/his daily routine. The same, goes for a population; it is impossible for a population which comprise of unhealthy individuals to be productive and product any value-added production. When an individual or country spend on health, two kind of economic output will be obtained from this spending. First, waste

of economic resources will be avoided since illnesses will be averted thanks to preventive health services and second, productivity of individuals will be increase. Therefore, health spending cannot be regarded as consumption spending, it should be regarded as capital expenditure.

In this study, health expenditure indicators and some other core health indicators such as life expectancy at birth, infant mortality are discussed in order to compare the European Union Member States and Turkey as a European Union candidate as well as to detect strengths and weaknesses of Turkey's health system.

HEALTH SPENDING

There is a strong relationship among income level of a country and its health expenditures, since income

¹ Corresponding author: Osmaneli, 11500 Bilecik, Turkey, ali.unsal@bilecik.edu.tr, +90545 771 71 01

² Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, ewa_stawicka@sggw.pl, +4822 593 41 82

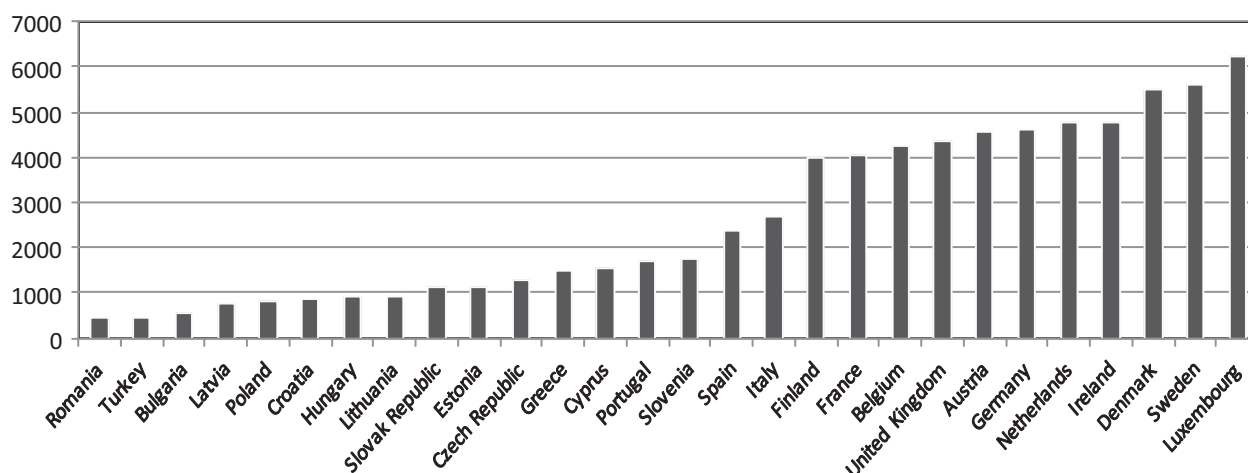


Figure 1. Health expenditure per capita in 2015 (USD)

Source: World Bank Databank (2015).

elasticity of health is high (Di Matteo, 2003; Farag et al., 2012). Preventive health care services and cosmetic health care services are accepted as luxury goods while primary, emergency and treatment health services are accepted as necessary goods (Hansen and King, 1996). That is why it is not surprising that countries such as Luxemburg, Sweden and Denmark took places near the top with such spending per capita more than USD 5,000. Turkey took place at second last after Romania with spending USD 453 per capita. Figure 1 shows health expenditure of the EU countries and Turkey in the year 2015.

In order to understand health expenditure level of countries we need to also consider health expenditures as a percentage of gross domestic product (GDP). Because sometimes, health expenditure as a share of GDP can be high while health expenditure per capita is low and vice versa. For instance, Luxemburg's health expenditure per capita is quite high (USD 6,236), while its health expenditure as a share of GDP is only around 6%. This can be cause of the very high level of GDP of Luxemburg and the number of its inhabitants. Figure 2 shows health expenditure as a percentage of GDP of the EU countries and Turkey in the year of 2015.

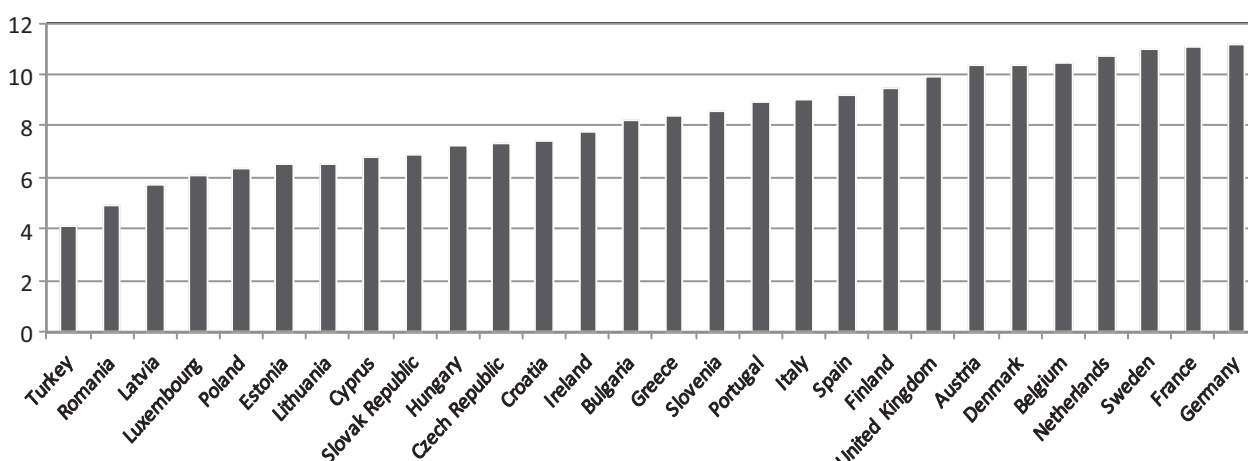


Figure 2. Health expenditure as a percentage of GDP in 2015 (USD per capita)

Source: World Bank Databank (2015).

Germany, France and Sweden are the countries which allocate the biggest share from their GDP for health spending with more than 11% among EU countries. Turkey is the country which allocates the lowest share from its GDP for health spending with around 4%. Other Eastern EU countries such as Romania, Latvia, Poland, Estonia, Lithuania, Cyprus, Bulgaria, Croatia, the Slovak Republic and the Czech Republic have lower both per capita expenditure (USD 2,789) and share of GDP (8.28%) than average of the EU countries.

CORE HEALTH INDICATORS

There is no accurate indicator which measures the performance of health systems since it is difficult to determine the output of health systems. In the literature, health condition of a population is tried to be measured by specific measurements called core health indicators (Murray, Govindaraj and Musgrove, 1994). This core health indicators are used for making comparison between countries (Çevik, 2013). These indicators not only demonstrate health condition of a country but also demonstrate level of its development.

Life expectancy at birth

Life expectancy at birth is an indicator which measured for each country and each genders and it can be

defined as how long, a new-born can expect to live, on average, if current death rates do not change. Figure 3 shows life expectancy at birth in EU countries and in Turkey.

As it seen at Figure 3, Mediterranean countries such as Spain and Italy have longest life expectancy years and Northern EU countries such as Sweden and Netherlands follow them respectively. Turkey and other Eastern EU countries such as Latvia, Lithuania, Bulgaria, Romania, Hungary, Croatia, Poland, the Slovak Republic, Estonia and the Czech Republic have lower life expectancy years than average of the European Union (79.4).

Infant mortality rate

The Infant mortality rate is the number of deaths in the first year of life occurring among the live births in a population during one year and it is measured per 1,000 births (OECD, 2017). This rate is the most important indicator that shows development level of a country. Figure 4 shows infant mortality rates of the EU countries and Turkey.

Figure 4 demonstrates an unacceptable rate for Turkey in the context of the European Union standards. In Turkey, almost 12 per thousand infant die before their first year of life. Most of Eastern EU countries such as Romania, Bulgaria, the Slovak Republic, Hungary, Latvia, Poland, Lithuania and Croatia have bigger mortality rates than European Union average (3.74).

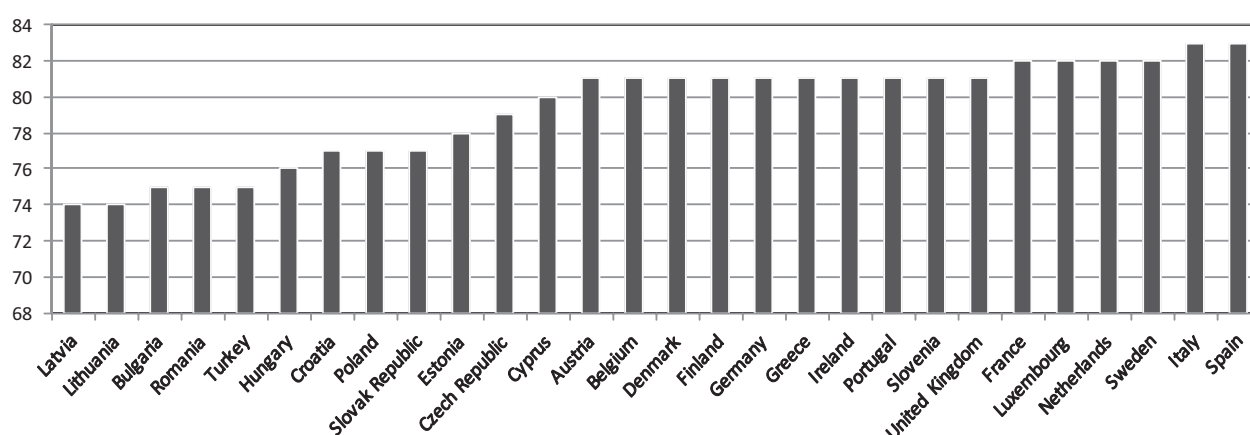


Figure 3. Life expectancy at birth in 2015 (years)

Source: World Bank Databank (2015).

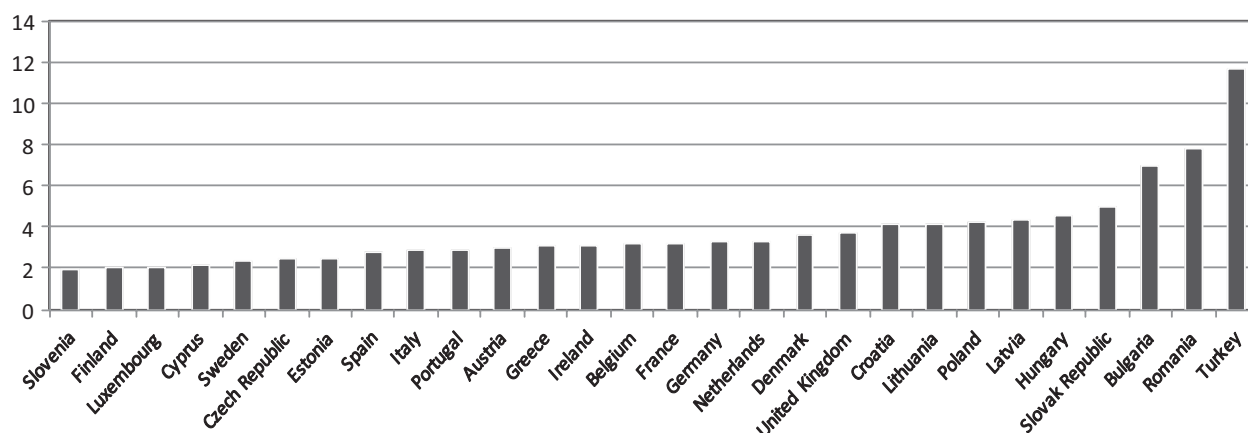


Figure 4. Infant mortality rate in 2015 (per 1,000 births)

Source: World Bank Databank (2015).

CONCLUSIONS

As a result, it is clearly seen that Turkey is the country that spends least for health among all EU countries. In return for such health spendings, it is not surprise that Turkey took the last place in infant mortality rates among all Europe and fall behind from the average of EU countries in life expectancy at birth.

As it mentioned before, main goal of paper is to compare EU countries and Turkey in terms of health indicators as well as to detect strengths and weaknesses of Turkish health system. According to findings, it can be clearly said that there is no strengths for Turkey's health indicators in comparison with EU countries. Turkey is at the last place along with Romania with regard to health expenditure per capita and health expenditure as a percentage of GDP indicators among the EU countries. These two countries have very similar health expenditure rates, however, Turkey has far worse infant mortality ratio than Romania does. This circumstance demonstrates two facts. First, Turkey not only spends less for health but also it wastes resources which are allocated for health. This fact may indicate that Turkish health system does not work properly. Second fact is that; health of populations is effected by several non-economic factors most particularly by life style.

Results of this study supports the literature (Tuyuoğlu and Tekin, 2009; Çevik, 2013; Öngel, Altındağ

and Öngel, 2014; Yalçın and Çakmak, 2016; Sayılı et al., 2017) which demonstrates strong correlation between health spendings and health outputs such as infant mortality and life expectancy. Therefore, Eastern EU countries, notably Turkey, should re-determine their priorities and increase the share of health spending from their GDP.

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REASONS FOR INTERNATIONALIZATION OF POLISH FOOD INDUSTRY COMPANIES

Joanna Baran, PhD¹

Faculty of Economics Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

The primary aim of this article is to identify the reasons for internationalization of Polish food industry companies. As a part of empirical studies, we carried out interviews with managers at 52 of food industry companies. Poland's accession to the EU, the managers' experience gained on foreign markets and geographical proximity of foreign markets were the main determinants of internationalization for the respondents. For food industry companies, EU markets are the most attractive while export activities constitute the most common form of internationalization.

Keywords: internationalization, food industry, companies

JEL code: F20

INTRODUCTION

Nowadays, internationalization of companies is a very intense process. Nonetheless, it should be emphasized that different industries have different reasons that encourage internationalization in companies, different methods of participating in foreign markets as well as different scopes of relationships with foreign partners (Witek-Hajduk, 2010). Poland's accession to the EU has resulted in many opportunities and risks for Polish food industry companies with respect to internationalization. Opportunities include: facilitated access to the EU market for Polish entrepreneurs, increased attractiveness of Polish companies for foreign investors and partners and better opportunities of obtaining financial resources by Polish companies (Baran, 2016). On the other hand, the primary risks include easier access to the Polish market for a larger number of offerors, increased intensity of competition and introduction of new legal regulations (Baran, 2015).

Faced with these changes, Polish food industry companies had to increase their competitiveness. One of the methods of improving competitiveness was to increase the geographical reach of their business, which involved expanding to foreign markets.

The main objective of this article is to identify the reasons for internationalization of Polish food industry companies. Furthermore, the article indicates which markets are perceived by entrepreneurs as the most attractive and which factors on these markets have the largest impact on the adjustment of strategies to conditions at host markets.

THEORETICAL BACKGROUND

Internationalization is a complex phenomenon that can be analysed from various perspectives and with respect to different dimensions (economic, scientific, political and legal, sociocultural) (Müller, 2004). Internationalization can be analysed across three

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, joanna_baran@sggw.pl, +4822 593 40 60

scales: macro (internationalization of economies), mezzo (internationalization of markets/industries) and micro (internationalization of companies) (Ladi, 2006). Oczkowska emphasizes that internationalization of companies is a function of reasons and tendencies of companies to expand internationally, and to invest in their development outside the borders of their home country as well as to establish foreign partnerships as a part of other forms (Oczkowska, 2007). On the other hand, Rymarczyk presents a simple definition of company internationalization, namely that it is 'any type of business operated by a company abroad' (Rymarczyk, 2004). Upon analysing the definitions of internationalization, we can conclude that internationalization is commonly seen as:

- a stage-based process of a company's development on foreign markets (Johanson and Vahlne, 1990),
- a process of developing business networks on international markets (Johanson and Mattsson, 1988),
- international exposure of a company's resources (Andersen, 1997),
- geographical expansion of business reach to foreign markets (Hollensen, 2004),
- specific forms of internationalization (Rymarczyk, 2004),
- a process of formulating and implementing strategies (Hill, 2013).

It can be noticed that Polish researchers present a rather broad approach to defining internationalization. Most authors assume that we can speak of a company's internationalization beginning with its commencement of business on a foreign market.

The literature also presents various forms of entry to foreign markets; for example, according to Gorynia, these forms include exporting and importing goods, cooperative relationships with foreign partners (including non-capital forms: licence, franchise, management and investment contracts, capital forms and international strategic alliances), or independent operation of business abroad in the form of a local office or branch (Gorynia, 2007).

Moreover, the literature distinguishes between active and passive internationalization, as well as internal and external internationalization. Active interna-

tionalization concerns various types of a company's international expansion; on the other hand, passive internationalization is defined as establishing different economic relationships with foreign partners but without operating a business outside the home country. This type of internationalization can include importing goods, purchasing licences from a foreign partner, etc. (Gołębiowski and Witek-Hajduk, 2000; Gorynia 2000). Internal internationalization is based on the development of import activities, while external internationalization is related to a company's expansion to foreign market using export activities (Luostarinen and Hellman, 1993; Welch and Luostarinen, 1993).

Reasons for internationalization of companies can be determined using the theory of transaction cost, the eclectic theory of international production of Dunning, multi-stage theories of internationalization (in particular, the Uppsala model of Johanson, Wiedersheim-Paul and Vahlne) and network-based theories of internationalization developed by Johanson and Mattsson (Johanson and Wiedersheim-Paul, 1975; Dunning, 1988; Johanson and Mattsson, 1988; Johanson and Vahlne, 1990). The aforementioned theories cover issues related to, e.g. the process of internationalization, selection of forms of internationalization, reasons for conducting export activities and direct foreign investments, and selecting a business location abroad.

MATERIAL AND METHODS

To collect data, we used the method of interviewing managers of food industry companies. Interviewees were chosen randomly. The sampling frame was the database of the national business register (REGON) kept by Statistics Poland (GUS). The database included food industry companies meeting the following criteria:

- 50 or more employees,
- not branches of foreign companies,
- the process of internationalization has occurred at the company.

The first criterion resulted from the fact that large and medium enterprises have dominant share in international trade and direct international investments.

The second and third criteria were due to the purpose of this research, i.e. the desire to identify the reasons of internationalization of companies that took such action autonomously. Interviews with 52 respondents were carried out in March 2018. The descriptive, tabular and graphical methods were used to present the results of the research.

RESULTS

The first stage of research consisted in identifying the forms of internationalization used by the companies under consideration. Almost all studied companies indicated export activities as their main form of internationalization (51 answers) – Table 1. Moreover, about 50% of studied companies declared engaging in import activities. Joint production ventures were operated by 13% of studied companies. As a part of other forms of internationalization, the respondents also indicated licence agreements with foreign partners as licensors or licensees (8% each) and joint trading ventures and trade branches (10 and 8% respectively).

In the next stage of the research, the respondents were asked to indicate the main reasons of expanding to foreign markets (Fig. 1). The main reasons for internationalization of food industry companies included

Poland's accession to the EU (4.24) and managerial experience on foreign markets (4.18). The respondents also stated that they considered the geographical proximity of a foreign market (4.02), the availability of cheaper raw materials (4.0) and factors of production (3.9). The respondents' least important grounds for internationalization were marketization of host country economies (3.51) and internationalization of the company's trade agents (3.47). However, attention should be paid to the fact that the companies indicated that the growing homogeneity of needs and requirements of buyers on foreign markets was deemed a less significant factor (3.51).

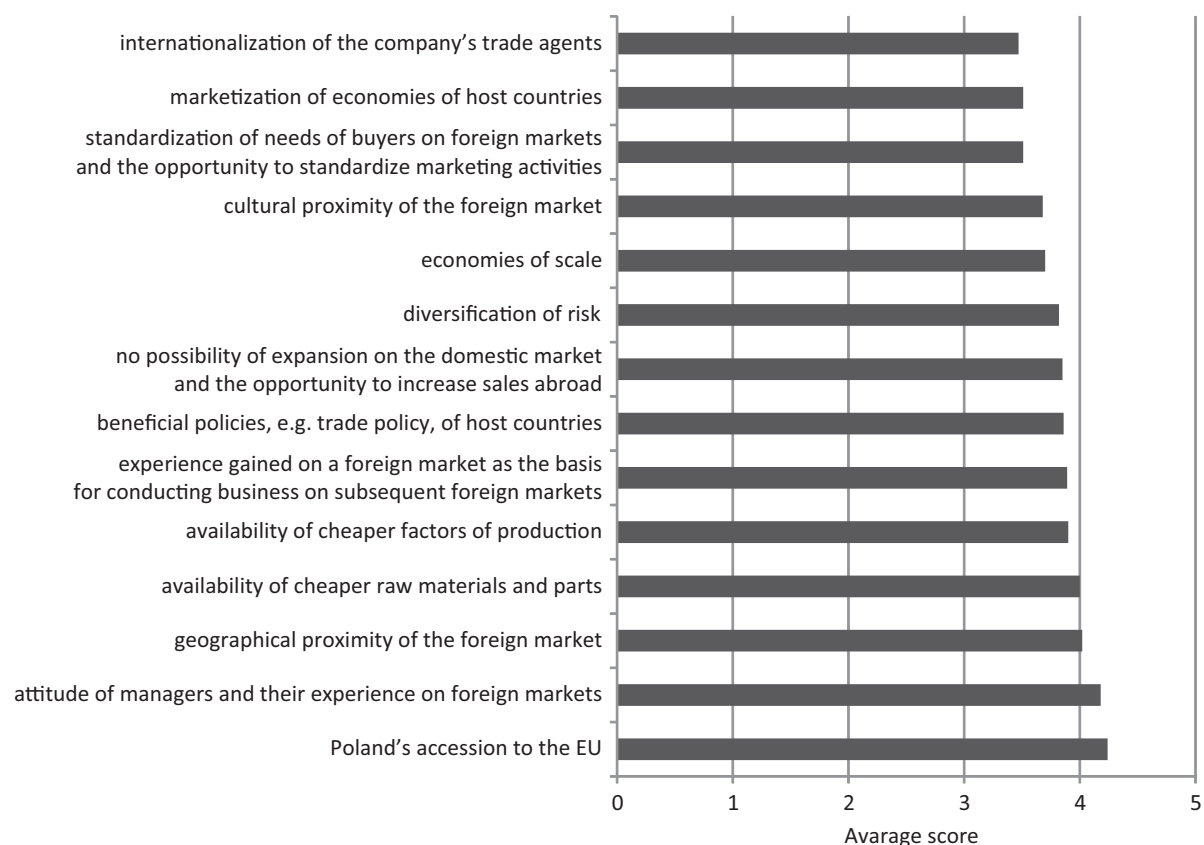
Enterprises which decided to expand to a given foreign market must view this market, on the one hand, as attractive and, on the other hand, as a market with low business risk. According to this research, EU markets are the most attractive to food industry companies (Table 2). The attractiveness rating of other markets was similar and below average.

We can assume that companies are more predisposed to adapt their strategies to conditions on markets rated by them as the most attractive. Therefore, during the final stage of the research, we asked the respondents to indicate factors that had the largest impact on their change of strategy and the need to adjust to local conditions when expanding to EU

Table 1. Forms of internationalization used by the food companies in examined units ($n = 52$)

Forms of internationalization	Number of answers	%
Export activities	51	98
Import activities	28	54
Licence agreements with a foreign partner–licensor	4	8
Licence agreements with a foreign partner–licensee	4	8
Franchise agreements with a foreign partner–franchisor	0	0
Franchise agreements with a foreign partner–franchisee	0	0
Joint production ventures	7	13
Joint trading ventures	5	10
Trade branch	4	8
Production branch	1	2

Source: own calculations based on interview questionnaire.



Score ranging from 1 to 5, where: 5 – definitely important, 4 – important, 3 – neither important nor unimportant, 2 – unimportant, 1 – definitely unimportant.

Figure 1. Reasons for internationalization in the respondents' opinion ($n = 52$)

Source: own calculations based on interview questionnaire.

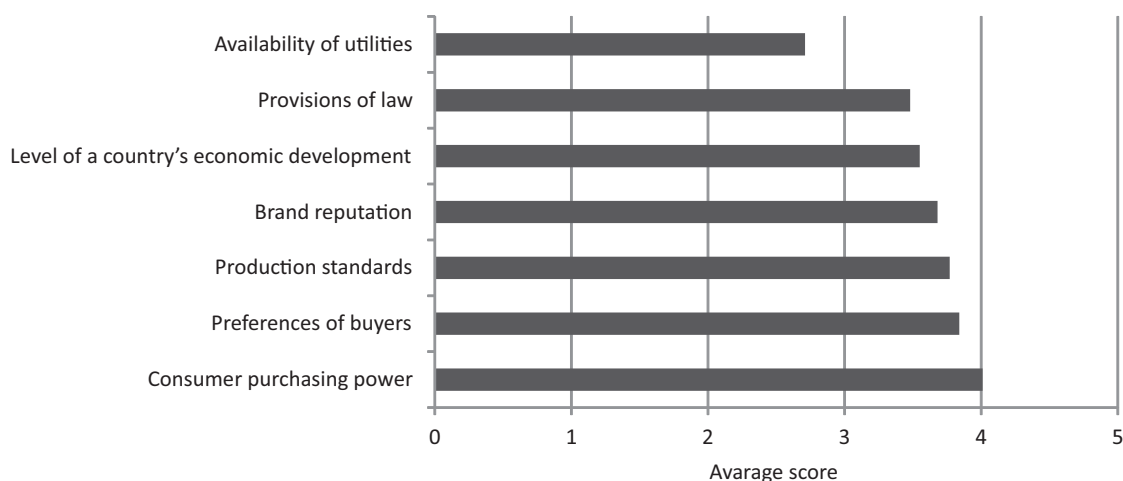
Table 2. Market attractiveness and risk rating in the respondents' opinion ($n = 52$)

Markets	Market attractiveness rating	Market risk rating
Poland	2.56	2.14
EU countries	2.44	2.07
Russia	1.65	1.61
Asian countries	1.62	1.92
Other countries	1.61	1.61

3 – high market attractiveness, 2 – average attractiveness, 1 – low attractiveness; 3 – low market risk, 2 – average risk, 1 – low risk.
Source: own calculations based on interview questionnaire.

markets. Consumer purchasing power and their preferences had the largest influence on the studied companies' adaptation of strategies to conditions of an EU market (Fig. 2). Production standards and brand

reputation were also deemed factors that significantly stimulate the adaptation of strategies to conditions in EU countries. Availability of utilities was deemed a less important factor (Fig. 2).



Score ranging from 1 to 5, where: 5 – definitely important, 4 – important, 3 – neither important nor unimportant, 2 – unimportant, 1 – definitely unimportant.

Figure 2. Factors determining the adjustment of strategy to conditions on EU markets

Source: own calculations based on interview questionnaire.

CONCLUSIONS

Internationalization of companies is a multifaceted and complex phenomenon. Depending on the industry where a given company operates, reasons and models of internationalization vary. The research conducted at Polish food industry companies allowed us to reach the following conclusions:

- the main factors determining internationalization in this sector were Poland's accession to the EU, the managers' experience gained on foreign markets and geographical proximity of foreign markets;
- the most attractive market for studied companies was the Polish market and, among foreign countries, EU markets;
- factors that encourage the adaptation of strategy to conditions on EU markets the most are the purchasing power and preferences of consumers, as well as production standards;
- business risk on the Polish and EU markets is perceived as average, while on the Russian and Asian markets it is seen as above average.

It can be stated that the process of internationalization at Polish food industry companies is conducted in stages and is related to gradual changes in their presence on foreign markets, i.e. according to multi-stage theories of internationalization. It can be assumed

that this process will continue to develop rapidly in the sector under consideration, which is why this research should continue, searching for, among other things, factors determining the adoption of a given model of internationalization by companies and relationships between the levels of active and passive internationalization of companies.

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ROLE OF THE EU, THE USA AND BRICS COUNTRIES IN GLOBAL TRADE IN GOODS AND SERVICES AND SELECTED DETERMINANTS

Dawid Jabkowski¹, MSc; Norbert Szalaty², MSc; Weronika Wyduba³, MSc

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The aim of this paper is to present changes in the role of EU countries, the USA and BRICS countries in international trade of goods and services and selected macroeconomic determinants of trade exchange in the analysed countries in the years 1960–2015 together with the projection of potential development of the situation until 2070. Investigated macroeconomic trade conditions included population size, GDP, GDP per capita and the inflation rate. Naive forecasting methods were used to estimate selected characteristics, as well as export and import volumes, considering their development trends. The analyses showed that currently, the largest global trade centres, i.e. the EU and the USA, are losing their share in global GDP. Their share in global exports and imports is decreasing to the advantage of BRICS countries. The simulation up to 2070 showed that the trends observed in previous years may be increasing, while the position of the EU and the USA in world trade may be weakening.

Keywords: international trade, exports, imports, population size, GDP, inflation rate, the EU, the USA, BRICS countries

JEL codes: F15, F17, F50

INTRODUCTION

The BRICS group is an association composed of Brazil, Russia, India, China and South Africa. O'Neill, the author of the BRICS acronym, stated that by 2050 BRICS countries will become global powers (O'Neill, 2001; Gosh, 2013). This means that these countries will compete and constitute a counterbalance to the current major players in the global economy, i.e. EU countries and the USA. Such trends have been observed since the mid-1990s. The growing political significance and economic potential of BRICS countries was discussed e.g. in The BRICS Report (2012),

as well as by Nassif, Feijo and Araújo (2016) or Siddiqui (2016).

In 1995, the total share of the EU and the USA in the global exports of goods and services was approx. 51.5% (40 and 11.5%, respectively; Czarny and Folfas, 2015), while in 2015 it decreased to 44.3% (33.7 and 10.6%, respectively). As it was reported by Czarny and Folfas (2015), the share of BRICS countries in global exports in the same period increased by 10 pp (from 6 to 16%). In absolute terms, the EU and the USA, in a period of 20 years (1995–2015), increased the value of their exports 3-fold, while for BRICS countries it was 11-fold, which means that

¹ Corresponding author: Wojska Polskiego 28, Poznań, Poland, dawid.jabkowski@up.poznan.pl, +48 723 858 996

² Corresponding author: Wojska Polskiego 28, Poznań, Poland, norbert.szalaty@up.poznan.pl, +4861 846 63 78

³ Corresponding author: Wojska Polskiego 28, Poznań, Poland, weronika.wyduba@up.poznan.pl, +4861 846 63 78

world exports are changing their location (Pawlas, 2015). Similarities of a comparable direction may also be observed for GDP. In 1995, the EU and the USA participated in the generation of GDP in 58% (30 and 28%, respectively; Czarny and Folfas, 2015), while 20 years later the joint share of these countries in global GDP decreased to 48% (22 and 24%, respectively). In the same period BRICS countries increased their share in global GDP by 14 p.p. (from 8% in 1995 to 22% in 2015). It clearly results from the above that the balance of powers on the international market is changing. The Transatlantic Trade and Investment Partnership (TTIP) between the USA and the EU, which before the change of the American policy introduced by Trump's administration had been treated as a remedy to strengthen the cross-Atlantic bridge, may be considered an attempt to reinforce the weakening position of EU and US economies (Czarny and Folfas, 2015; Pawlak, 2017). In this context we may ask questions concerning factors, which have caused these current changes and may stimulate further changes in the international position of the countries under study. Thus, the aim of this paper is to present changes in the role of EU countries, the USA and BRICS countries in the international trade of goods and services and selected macroeconomic determinants of trade exchange between the investigated countries in the years 1960–2015 along with the projection of the potential development of the situation in this respect by the year 2070.

THEORETICAL BACKGROUND

The development of trade was initiated by several factors, which later led to international trade expansion. Literature sources on the subject present various divisions of these factors. Porter divided them into two groups: micro- and macroeconomic, thus creating the so-called Porter's National Diamond (Porter, 1990; Bieńkowski, 2008). In turn, Rymarczyk (2006) presented an approach, in which he distinguished structural, technological, institutional and cyclical factors. The first category comprises differences in natural resources, mineral deposits, labour and capital resources (Budnikowski, 2003). The development of trade is also considerably affected by technological

factors such as the Digital Revolution or industrial revolutions, which generated strong stimulants for economic growth (Budnikowski, 2003; Rymarczyk, 2006). A significant element in this group is connected with scientific and technological cooperation, the aim of which is to provide links between science and economy, e.g. R&D. The importance of technological progress and innovation in shaping market shares was discussed by Schumpeter (1936) and Fagerberg (1987, 1996). Institutional factors include, among other things, the political system, the economic policy of a given country or international agreements (treaties, contracts) (Pelkmans, 2001; Rymarczyk, 2006). A solid foundation for the development of trade is also provided by cyclical factors (Budnikowski, 2003; Rymarczyk, 2006). Internal cyclical factors are connected with specific characteristics and conditions of individual economies, differentiating the predispositions of countries towards specific directions of international specialisation, while external factors are a result of development of international division of labour, resulting from structural transformations in the economy as a whole (Rymarczyk, 2006). Another approach to factors affecting the trade policy was given by Misala (2005), who distinguished long- and short-term factors. In turn, Bożyk (2008), when referring to the conditions for the development of trade exchange, focused on the differences in natural conditions, in the level of industrialisation as well as technological standard. This paper will discuss selected quantitative structural and cyclical factors, determining the development of exports and imports (selected factors are widely taken into account in the analyses of trade development in developing countries, including BRICS, see e.g. Gururaj, Satishkumar and Aravinda Kumar (2016), whereby it is necessary to underline that the value of GDP and the share in global GDP are modified e.g. by technological factors, whereas the participation in global trade depends, to a considerable extent, on institutional factors.

MATERIALS AND METHODS

The analyses were based on literature on the subject and secondary data of the World Bank. The descriptive analysis and the deduction method were applied

in this study. Naive forecasting methods were used to estimate the population size, GDP, export and import volumes for the year 2070, considering their development trends (Cieślak, 2005). The selected method assumes that the forecasted variable increases/decreases from period to period by a certain constant value d :

$$\hat{y}_T = y_{T-1} + d$$

The value d was determined based on mean annual increments of the variable in the collected statistical material taking into consideration fluctuations of the variables in the years 2000–2015 (Błaszczuk, 2006).

$$d = \frac{\sum_{i=1}^{T-2} (y_{i+1} - y_i)}{T - 2}$$

The projection adopted a simplifying assumption that in future periods the development trend observed in the years 2000–2015 will continue. This approach is used, among others, in FAOSTAT projections and is sufficient to capture the direction of changes in the forecasted variables and their potential impact on the share in global trade.

RESULTS AND DISCUSSION

In 1960, the largest volume of goods was exported from the European Union. These exports, amounting to USD 66 billion, accounted for over 42% of world exports (Table 1). Despite the 100-fold increase in the value of exports from the EU by the year 2015, the share of this group of countries in global exports decreased to 34%. A similar situation was observed in the USA where, in 1960, the value of exports at USD 27 billion was equivalent to 17% of global exports, while in 2015, after an almost 90-fold increase to USD 2.3 trillion, accounted for as little as 10% of world exports. At the same time, in BRICS countries, the value of exports not only increased, but also the share of this group of countries in world exports increased from 5% in 1960 to 17% in 2015. A very high dynamic for the increase in trade turnover in BRICS countries was observed in the years 2000–2012, when exports increased 6-fold and imports increased 8-fold, respectively (Pawlas, 2015). The conducted projection shows that, by 2070, the share of BRICS countries in world exports may increase to 19%, whereas that of EU countries and the USA may decrease to approx. 32.5% and a little below 10%, respectively (Table 1).

Table 1. Values of trade in goods and services and shares of the EU, the USA and BRICS countries in world exports and imports in the years 1960–2070

Item	Exports (USD billion)			Share in global exports (%)			Imports (USD billion)			Share in global imports (%)		
	1960	2015	2070	1960	2015	2070	1960	2015	2070	1960	2015	2070
World	157	21 310	63 828	100	100	100	159	20 835	62 633	100	100	100
EU	66	7 172	20 808	42.1	33.7	32.6	68	6 608	18 673	42.7	31.7	29.8
USA	27	2 264	6 346	17.2	10.6	9.9	23	2 786	7 720	14.3	13.4	12.3
BRICS, including:	8	3 573	12 315	4.8	16.8	19.3	8	3 151	11 274	5.1	15.1	18.0
Brazil	1	232	755	0.7	1.1	1.2	1	254	692	0.7	1.2	1.1
Russia	0	392	1 109	0.0	1.8	1.7	0	281	939	0.0	1.4	1.5
India	2	421	1 646	1.0	2.0	2.6	3	470	1 756	1.6	2.3	2.8
China	3	2 431	8 539	1.6	11.4	13.4	3	2 046	7 612	1.7	9.8	12.2
RSA	2	96	266	1.4	0.5	0.4	2	100	275	1.2	0.5	0.4

Source: the author's study based on World Bank data. Retrieved from: <http://databank.worldbank.org/data/home.aspx> [Accessed 05.04.2018].

It may be stated that world exports are shifting from the previously largest trade centres to BRICS countries, the share of which in total exports of goods and services is increasing. Such a trend was also observed by Skrzyp (2016); moreover, it may continue in the future.

An analogous situation is observed in the imports of goods and services. In the 1960s, imports from the EU were dominant, accounting for almost 43% of world imports. In 2015, the share of the EU in global imports was already by almost 10 percentage points lower, while it is forecasted that by 2070, despite an increase in absolute import value, it may drop to less than 30% (Table 1). The role of the USA in global imports may decrease from 14.3% in 1960 to 12.3% in 2070. The opposite situation may be reported for BRICS countries which, in the years 1960 and 2015, had a 5 and 15% share in global imports, while in 2070 their participation may amount to 18%. For this reason, it may be concluded that the role of BRICS countries is increasing and these countries are stabilising their position on the international market (Zalwski, 2013).

A key determinant for trade exchange is associated with population size. Together with a rise in the number of inhabitants of a given country, domestic demand is growing, resulting in the need to increase domestic production (using domestic or imported resources) and/or the need for imports. Assuming the occurrence of the effects of scale and advantageous specialisation this growth stimulates exports, contributing to a growing share in world trade. Such a situation is being forecasted for BRICS countries, in which the population size is increasing more dynamically than in the EU or the USA. In 1960, the world population constituted approx. 3 billion people, while in 2015 it was almost 7.4 billion, of which almost 45% were living in BRICS countries (Table 2). According to this forecast, in 2070, the global population may be approx. 12 billion, with 4% (460 million) living in the USA, 5% (590 million) in the EU and 38% (4.6 billion) – in BRICS countries (Table 2). Russia is the only country, which may experience a decrease in population size in 2070 in relation to the figure in 2015. The forecast also shows that, in 2070, India and not China (as until recently) may be the most popu-

Table 2. Selected macroeconomic conditions for trade of the EU, the USA and BRICS countries in the years 1960, 2015 and 2070

Item	Population size (million)			Share in global population (%)			GDP (USD trillion)			Share in global GDP (%)			GDP per capita (USD thousand)		
	1960	2015	2070	1960	2015	2070	1960	2015	2070	1960	2015	2070	1960	2015	2070
World	3 034	7 355	11 902	100	100	100	1.4	74.5	212.3	100	100	100	0.5	10.1	17.8
EU	409	510	588	13	7	5	0.4	16.3	38.1	26	22	18	0.9	32.0	64.8
USA	181	321	463	6	4	4	0.5	18.0	46.9	40	24	22	3.0	56.2	101.2
BRICS, including:	1 326	3 085	4 570	44	42	38	0.1	16.7	62.4	9	22	29	0.1	5.4	13.7
Brazil	72	206	318	2	3	3	0.0	1.8	5.6	1	2	3	0.2	8.8	17.6
Russia	120	144	135	4	2	1	.	1.4	4.7	.	2	2	.	9.5	35.0
India	449	1 309	2 244	15	18	19	0.0	2.1	8.0	3	3	4	0.1	1.6	3.6
China	667	1 371	1 779	22	19	15	0.1	11.1	43.3	4	15	20	0.1	8.1	24.3
RSA	17	55	93	1	1	1	0.0	0.3	0.8	1	0	0	0.4	5.8	8.6

Source: the author's study based on World Bank data. Retrieved from: <http://databank.worldbank.org/data/home.aspx> [Accessed 05.04.2018].

lous country worldwide. Despite an increase in population size, in most investigated countries, their share in world population may be decreasing. Exceptions in this respect may be India and RSA which are experiencing very high birth rates. In 1960, the inhabitants of India accounted for approx. 15%, in 2015 – 18%, while in 2070 they may account for 19% of the global population.

A major economic factor stimulating demand, also including foreign goods, is connected with the level of GDP and disposable income of a population. In 1960, the highest gross domestic product was generated in the USA. It amounted to USD 0.5 trillion, which accounted to almost 40% of world GDP. At that time, the EU generated 26%, while for BRICS countries it was 9% of global GDP (Table 2). In 2015, the GDP value for the three investigated economies was uniform and amounted to USD 16–18 trillion, which was equivalent to 22–24% of world production. The simulation for the year 2070 indicates the highest GDP for BRICS countries (USD 62.5 trillion), which would generate 30% of global GDP, a 22% share of the USA (USD 47 trillion) and an 18% share of the EU (USD 38 trillion). This analysis shows that the role of the USA and the EU measured by GDP is decreasing to the advantage of BRICS countries. Although GDP values for the EU and the USA were increasing in the analysed years, their respective shares in the generation of global gross product was

decreasing. To a considerable extent this was caused by China which, starting from the 1980s, has been experiencing a very high, frequently double digit growth rate in GDP, as reported by e.g. by Gwiazda (2013) and Sulmicki (2015). It is likely that, in 2070, the GDP for China may exceed the EU GDP. Interesting conclusions are provided by the analysis of GDP per capita. Throughout the entire investigated period, the highest GDP per capita was recorded in the USA, a country with the smallest population among investigated entities. In 1960, it was USD 3 thousand, in 2015 USD 56 thousand, while in 2070 it may exceed USD 100 thousand (Table 2). All BRICS countries, in terms of their GDP per capita, are located around the world mean (USD 450 in 1960, 10 thousand in 2015 and according to the forecast – 18 thousand in 2070). The dynamic development of BRICS countries has resulted in a significant increase in the demand for raw materials in these countries. Since production may not satisfy demand, these countries are forced to continuously increase imports, which is reflected in the growing shares of this group of countries in world imports (Skrzyp, 2016).

Inflation is an important factor determining the cost leadership of individual countries on regional and world markets. Its increase, through changes in price relationships, causes a reduction of exports and an increase in imports from/to a given country, and thus leads to a trade deficit, which in the short term

Table 3. Inflation rates in the EU, the USA and BRICS countries in the years 2000–2016 (%)*

Item	2000	2002	2004	2006	2008	2010	2012	2014	2016
World	3.6	3.1	3.7	4.5	8.9	3.5	3.8	2.5	1.7
EU	3.2	2.3	2.3	2.6	4.2	1.7	2.7	0.2	0.2
USA	3.4	1.6	2.7	3.2	3.8	1.6	2.1	1.6	1.3
Brazil	7.0	8.5	6.6	4.2	5.7	5.0	5.4	6.3	8.7
Russia	20.8	15.8	10.9	9.7	14.1	6.9	5.1	7.8	7.0
India	4.0	4.4	3.8	6.1	8.4	12.0	9.3	6.6	4.9
China	0.3	-0.8	3.9	1.5	5.9	3.3	2.6	2.0	2.0
RSA	5.3	9.2	1.4	4.6	11.5	4.3	5.7	6.1	6.3

* Time range of this set of data is dependent on the availability of reliable and internationally comparable data.

Source: author's study based on World Bank data <http://databank.worldbank.org/data/home.aspx> [Accessed 05.04.2018].

can be considered a manifestation of lack of competitiveness of the economy on international markets. In the analysed years, creeping inflation from 3 to 5% was recorded. An exceptional year in this respect was 2008, the year of the economic crisis, when the inflation rate reached almost 9% (Table 3). Economies of the EU and USA are closely interconnected, thus the level of inflation in these economies was comparable. In the years 2000–2016, inflation in China fluctuated from –0.8 to 5.9%, reaching deflation twice, while becoming an increasingly solid trade partner for other major economic centres. The economies of Brazil, India, RSA and Russia were less stable on an international scale and inflation fluctuations in those countries were greater, as they experienced walking inflation and in some years – galloping inflation. It was particularly evident in Russia (over 20% inflation in 2000). Russia is a specific economy, since its economic potential is mainly based on oil, the price fluctuations of which may stimulate an increase in inflation. Considering the above-mentioned facts, it can be concluded that, in the long-term perspective, the rate of economic growth is a decreasing function of the inflation rate, and its relatively high level recorded in BRICS countries may cause a slower pace of their current dynamic development.

CONCLUSIONS

Changes in the balance of powers on the international market have been observed since the 1990s. The EU, the USA and BRICS countries are the three main trade centres on a global scale and jointly have over a 60% share in global exports and imports. However, these analyses showed that the current largest global trade centres, i.e. the EU and the USA, are losing their share in global GDP. Their share in world exports and imports is also decreasing to the advantage of the dynamically developing BRICS countries. The growing importance of Brazil, Russia, India, China and RSA, on an international scale, was determined, among other things, by dynamic population growth and an increase in GDP of these countries, while the strengthening of the economic position of China was also connected with the relatively low inflation rate among the countries of this group. The comparative

advantage of BRICS countries on the international market were largely influenced by price and cost advantages, resulting mainly from lower labour costs than in the EU and USA. The observed, increasingly solid change in the balance of economic forces seems irreversible. The simulation up to 2070 has shown that the trends reported in previous years may continue and the position of the EU and the USA in world trade will weaken in relation to the BRICS block.

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TRANSFER OF EXTREME RISK BETWEEN SELECTED EU WHEAT MARKETS

Małgorzata Just, PhD¹

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The aim of this study was to analyse the transfer of extreme price risk between selected EU milling wheat markets in the years 2005–2015. Extreme price risk (value at risk) was estimated using the ARMA-GARCH-EVT models. In turn, the risk transfer phenomenon was identified using the Granger causality in risk test according to Cheung and Ng, the Granger test in relation to logarithmic price increments exceeding values at risk and the quotient of these increments and values at risk. Results of these tests indicate the effect of extreme price risk transfer on the EU milling wheat markets in the years 2005–2015. The market from which the risk was most frequently transferred was the wheat market in France, while the wheat markets in Poland and in Germany were those, onto which the risk was most frequently transferred.

Keywords: spillover effect, Granger causality in risk, value at risk, wheat prices

JEL codes: C58, Q11

INTRODUCTION

The market for milling wheat is a major agricultural produce market in the European Union. The leading EU wheat producers include France, Germany, Great Britain and Poland. In turn, the key futures market (characterised by the greatest liquidity) for wheat in Europe is the futures market for futures contracts listed on the Euronext exchange in Paris. For the entities on the agricultural market it is essential to determine the mechanism transmitting the price risk between wheat markets due to high fluctuations in wheat prices, since extreme price variations constitute the greatest threat and chance for business entities. Extreme price risk refers to events characterised by low probability of occurrence and high losses incurred

when they take place (Jajuga, 2007). These events on the markets are caused by the release of surprising information, economic crises, natural disasters and spillover from other markets (Faldziński, 2014). Results of empirical studies indicate that wheat markets within the EU are interrelated (Rembeza, 2009; Hamulczuk and Łopaciuk, 2013; Hamulczuk, 2015). For this reason we may observe transfer of the extreme price risk between wheat markets within the EU. Studies conducted to date have analysed primarily causality between cash prices for wheat and cash and futures prices for wheat in Europe and the USA. Thus the aim of this study was to supplement research to include the analysis of extreme price risk transfer between selected milling wheat markets in the European Union.

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, m.just@up.poznan.pl, +4861 846 62 14

MATERIALS AND METHODS

This study used time series for average weekly milling wheat prices from selected EU countries (Integrated Agricultural Market Information System) and closing quotes for futures contracts for milling wheat from the Euronext exchange in Paris in the period from 3 January 2005 to 6 December 2015. All prices were synchronised, supplementing missing data with arithmetic means from the preceding and successive prices in relation to the missing price. The countries for analyses (France, Germany, Poland) were selected based on the volume of wheat production and availability of data on prices. Analyses were conducted on weekly percentage logarithmic increments of prices, which were established from the formula $r_t = 100 \ln(P_t / P_{t-1})$, where P_t denotes an average weekly price of wheat in time t . Considering the properties of logarithmic wheat price increments (the occurrence of autocorrelation and the effect of ARCH, leptokurtosis and skewness of distributions), the extreme price risk (values at risk) on the wheat markets were determined using the peaks over threshold approach with volatility models (ARMA-GARCH-EVT models). In turn, in order to detect the phenomenon of risk transfer the Granger test for causality in risk according to Cheung and Ng was used. In order to confirm the results of this test additionally the Granger test was applied in relation to extreme logarithmic price increments and the quotient of these increments and values at risk. The effect of lags of one and two weeks were investigated.

In order to apply causality tests we need to determine values at risk. Let X_t and Y_t denote stationary stochastic processes with discrete time and let $\mathcal{F}_{XY,t-1} = \{X_{t-j}, Y_{t-j}, j = 1, 2, \dots\}$ be a set of information available in time $t - 1$, and $\mathcal{F}_{Y,t-1} = \{Y_{t-j}, j = 1, 2, \dots\}$ will be a set of the same information excluding information on process X_t . The term value at risk (VaR) denotes the percentage loss in commodity value. Formally the value at risk at the level of tolerance α for the long (short) position in a commodity is a number opposite to the quantile of order α (quantile of order

$1 - \alpha$) for the conditional distribution Y_t (Doman and Doman, 2009): $P(Y_t \leq -VaR_{Y_t}(\alpha) | \mathcal{F}_{Y,t-1}) = \alpha$, $(P(Y_t \geq VaR_{Y_t}(1 - \alpha) | \mathcal{F}_{Y,t-1}) = \alpha)$. This paper investigated percentage logarithmic increments in wheat prices r_t . It was assumed that r_t are generated by the process (Doman and Doman, 2009) $r_t = \mu_t + \sigma_t \varepsilon_t$, where: $\mu_t = E(r_t | \mathcal{F}_{r,t-1})$, $\sigma_t^2 = \text{var}(r_t | \mathcal{F}_{r,t-1})$, $\varepsilon_t \sim iid(0,1)$. Thus VaR were expressed for the long and short positions using the respective formula:

$$VaR_{r_{t+1}}(\alpha) = -\mu_t(1) - \sigma_t(1)F_{\varepsilon_t}^{-1}(\alpha),$$

$$VaR_{r_{t+1}}(1 - \alpha) = \mu_t(1) + \sigma_t(1)F_{\varepsilon_t}^{-1}(1 - \alpha), \quad (1)$$

where:

$\mu_t(1)$, $\sigma_t(1)$ – forecasts for one period ahead, respectively, for the conditional mean and conditional standard deviation;

$F_{\varepsilon_t}^{-1}(\alpha)$, $F_{\varepsilon_t}^{-1}(1 - \alpha)$ – quantile ε_t of order α and $1 - \alpha$, respectively.

In this study respective ARMA models were fit to the conditional mean and GARCH models with Student's t -distribution or skewed Student's t -distribution for conditional standard deviation. The ARMA and GARCH models are described e.g. in Doman and Doman (2009). Next the peaks over threshold model was used to model distribution tails for standardised residuals from the GARCH model (assuming 12.5% observations to be extreme observations). This made it possible to model only distribution tails instead of entire distributions, i.e. more accurate estimation of distribution tails. A detailed description of this method (GARCH-EVT models) is presented in (McNeil and Frey, 2000). Values at risk were determined for the long and short positions in wheat (the left and right distribution tails for wheat price increments) for the level of tolerance of 0.1.

The Granger test was conducted based on the determined values at risk. In the causality concept introduced by Granger (1969) it is assumed that X_t is the Granger causality for Y_t , if current values Y_t may be estimated more accurately using past values X_t than without them (at the unchanged remainder informa-

tion) (Osińska, 2006). In the Granger test a null hypothesis is verified, in which it is assumed that X_t is not the Granger cause for Y_t in the following form (Osińska, 2006): $\sigma^2(Y_t|F_{XY,t-1}) < \sigma^2(Y_t|F_{Y,t-1})$, where σ^2 denotes variance of the prediction error. If inequality is not satisfied, X_t is the Granger cause for Y_t . Two models are estimated in this test:

$$Y_t = \alpha_0 + \sum_{j=1}^k \alpha_j Y_{t-j} + \sum_{j=1}^k \beta_j X_{t-j} + \eta_t,$$

$$Y_t = \alpha_0 + \sum_{j=1}^k \alpha_j Y_{t-j} + \varepsilon_t, \quad (2)$$

where:

- $\alpha_0, \alpha_j, \beta_j$ – parameters of the model;
- η_t, ε_t – random components;
- k – order of lag.

The next stage consists in the verification of the null hypothesis that all coefficients β_j are equal to zero, which corresponds to the hypothesis on a lack of Granger causality. In this study linear regression models were estimated for extreme logarithmic wheat price increments on a given market. The price increments exceeding values at risk ($Y_t \leq -VaR_{Y_t}(\alpha)$, $Y_t \geq VaR_{Y_t}(1-\alpha)$) were considered extreme logarithmic price increments, while the other observations were ascribed the zero value. The test variant with the Fisher-Snedecor statistic was applied (Osińska, 2006):

$$F = \frac{(S^2(\varepsilon_t) - S^2(\eta_t))/k}{S^2(\eta_t)/(T - 2k - 1)}, \quad (3)$$

where:

- $S^2(\eta_t), S^2(\varepsilon_t)$ – square sum of residuals for the models presented in equation (2);
- T – sample size.

At the correctness of the null hypothesis the F statistic has the Fisher-Snedecor distribution with k and $T - 2k - 1$ degrees of freedom.

In the next stage of the study the Granger causality in risk test was conducted. The concept was introduced by Hong, Liu and Wang (2009). The occurrence of the Granger causality in risk means that the

presence of high risk on one market makes it possible to more accurately estimate the occurrence of a similar risk on another market. This paper verifies the null hypothesis that X_t is not the Granger cause in risk for Y_t of the form (Hong, Liu and Wang, 2009):

$$E(I_{Y,t}|F_{Y,t-1}) = E(I_{Y,t}|F_{XY,t-1}), \quad (4)$$

where $I_{Y,t}$ denotes the indicator function, which for the long or short positions in the commodity assumes the value of one, respectively, when the logarithmic price increments exceed values at risk, while otherwise it takes the value of zero. When equation (4) is not met X_t is the Granger cause in risk for Y_t . This study was conducted using the Granger causality in risk test according to Cheung and Ng (1996):

$$CHN = T \sum_{j=1}^k r^2(j), \quad (5)$$

where:

- T – sample size;
- $r(j)$ – estimator of the coefficient of cross-correlation $\rho(j)$ between $I_{X,t}$ and $I_{Y,t}$;
- k – the order of delay.

The CHN statistic for the correct null hypothesis takes the distribution convergent to $\chi^2(k)$.

RESULTS AND DISCUSSION

It is generally accepted that the method to determine values at risk provides good estimations when the number of exceedances of the estimated value at risk by empirical logarithmic price increments is consistent with the assumed level and the distribution of exceedances is uniform. The quality of estimations for the value at risk for logarithmic wheat price increments for the level of tolerance equal to 0.1 was evaluated using the Kupiec test (Kupiec, 1995), Christoffersen test (Christoffersen, 1998), Christoffersen and Pelletier test (Christoffersen and Pelletier, 2004). Results of these tests are presented in Table 1. Taking into consideration the results of the three tests it may be stated that all the estimations of values at risk were of good quality. The share of exceedances was close to the assumed level and the exceedances were uniformly distributed.

Table 1. The evaluation of the VaR estimation quality

Item	Germany		France		Poland		Euronext in Paris	
	Left tail	Right tail	Left tail	Right tail	Left tail	Right tail	Left tail	Right tail
ET	57	57	57	57	57	57	57	57
T_1	52	56	62	56	58	60	61	63
LR_UC	0.481	0.016	0.495	0.016	0.023	0.185	0.321	0.705
p-value	0.488	0.900	0.482	0.900	0.878	0.667	0.571	0.401
LR_CC	2.742	0.066	0.579	0.473	0.305	2.805	3.617	0.884
p-value	0.254	0.968	0.749	0.789	0.858	0.246	0.164	0.643
LR_D	0.423	0.102	0.829	0.457	0.083	3.836	0.023	1.500
p-value	0.516	0.750	0.363	0.499	0.773	0.050	0.879	0.221

ET (T_1) – the expected (empirical) number of exceedances of the estimated VaR by the actual logarithmic prices increments; LR_UC (LR_CC, LR_D) – Kupiec (Christoffersen, Christoffersen and Pelletier) test statistic; in bold grey font – rejection of the null hypothesis Kupiec test: the share of VaR violations by actual logarithmic prices increments is compliant with an assumed α (Christoffersen test: the share of VaR hits by actual logarithmic prices increments is compliant with an assumed α and the exceedances are independent – the first hit; Christoffersen and Pelletier test: the duration of time (in weeks) between the violations of VaR by actual logarithmic prices increments is independent) for the significance level of 0.1.

Source: own study.

Table 2 presents results of the Cheung and Ng test for the wheat long and short positions for delays of one and two weeks, respectively. Irrespective of the position occupied on the wheat market, the hypothesis on a lack of the Granger causality in risk for lags of one and two weeks for the pairs of wheat in France–wheat in Germany; wheat in France–wheat futures at the Euronext exchange; wheat futures at the Euronext exchange–wheat in Germany was rejected (at the level of significance of 0.05). In view of the fact that the analysed test ascribes identical weights to all the delays we need to state that significant correlation coefficients are indicated by considerable fluctuations in the test statistic. This means that the extreme price risk was transferred from the wheat market in France to the wheat market in Germany for lags amounting to one and two weeks, while it was transferred to the market of futures listed at the Euronext exchange only for the 1-week lag. The wheat market in Germany was the recipient of risk from the wheat futures market in Paris for lags of one and two weeks. Moreover, it was found that the wheat market in Poland was the recipient of risk from the wheat

market in Germany in the case of extreme price hikes and from the wheat market in France in the case of extreme price drops for the 1-week lags.

Results of the Granger test conducted for the extreme logarithmic wheat price increments and the quotient of these increments and values at risk are presented in Table 3. Results of these tests confirmed the existence of the Granger causality in relation to extreme price reductions and hikes for the following pairs: wheat in France–wheat in Germany; wheat in France–wheat futures on the Euronext exchange; wheat futures on the Euronext exchange–wheat in Germany; wheat in Germany–wheat in Poland in the case of extreme price hikes. Additional tests indicated that extreme wheat price hikes on the cash and futures markets in France and extreme price reductions for wheat in Germany may have been the Granger causality for extreme hikes and reductions in wheat prices in Poland.

Generally it may be observed that the transmission of risk on the wheat market in Poland was observed more often in the case of short positions. In view of the fact that average wheat wholesale prices for wheat

Table 2. Results of the Cheung and Ng test

Item	Lag	Left tail		Right tail	
		1	2	1	2
~F->G	CHN	29.890	36.736	34.773	39.235
	p-value	0.000	0.000	0.000	0.000
~G->F	CHN	0.382	1.550	1.419	1.482
	p-value	0.536	0.461	0.234	0.477
~F->P	CHN	6.683	6.799	0.913	1.817
	p-value	0.010	0.033	0.339	0.403
~P->F	CHN	0.010	1.549	1.786	1.787
	p-value	0.921	0.461	0.181	0.409
~F->E	CHN	51.929	52.326	63.681	63.691
	p-value	0.000	0.000	0.000	0.000
~E->F	CHN	0.520	2.619	0.125	0.135
	p-value	0.471	0.270	0.723	0.935
~G->P	CHN	1.674	1.781	7.777	7.778
	p-value	0.196	0.410	0.005	0.020
~P->G	CHN	0.186	5.864	1.999	2.000
	p-value	0.666	0.053	0.157	0.368
~G->E	CHN	1.291	1.728	0.009	0.131
	p-value	0.256	0.421	0.924	0.937
~E->G	CHN	9.578	12.358	23.424	26.297
	p-value	0.002	0.002	0.000	0.000
~P->E	CHN	1.689	1.692	1.041	2.072
	p-value	0.194	0.429	0.308	0.355
~E->P	CHN	1.541	1.552	2.118	2.644
	p-value	0.214	0.460	0.146	0.267

F (G, P, E) – logarithmic increases in prices of wheat in France (in Germany, in Poland, contracts on the Euronext exchange); in bold black (grey) font – rejection of the null hypothesis on the lack of Granger causality in risk for the significance level of 0.05 (0.1).

Source: own study.

Table 3. Results of the Granger test

Item	Lag	Variant with extreme prices increments				Variant with the quotient of extreme prices increments and VaR			
		Left tail		Right tail		Left tail		Right tail	
		1	2	1	2	1	2	1	2
~F->G	F	36.282	22.979	29.160	20.554	35.290	21.138	20.616	20.110
	p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
~G->F	F	0.875	0.911	1.409	2.118	0.571	1.104	1.189	0.405
	p-value	0.350	0.403	0.236	0.121	0.450	0.332	0.276	0.667
~F->P	F	1.075	0.537	6.374	5.460	3.336	1.907	1.745	6.885
	p-value	0.300	0.585	0.012	0.004	0.068	0.149	0.187	0.001
~P->F	F	0.160	0.075	0.513	0.380	0.027	0.081	1.651	0.772
	p-value	0.689	0.928	0.474	0.684	0.869	0.923	0.199	0.463
~F->E	F	98.306	48.873	264.331	132.933	63.031	31.348	140.400	70.175
	p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
~E->F	F	0.873	1.783	1.594	2.952	0.010	1.079	0.150	0.126
	p-value	0.351	0.169	0.207	0.053	0.922	0.341	0.699	0.882
~G->P	F	2.597	6.984	20.992	10.133	0.688	7.724	13.374	6.782
	p-value	0.108	0.001	0.000	0.000	0.407	0.000	0.000	0.001
~P->G	F	0.207	1.054	2.706	2.815	0.013	0.917	0.462	1.027
	p-value	0.649	0.349	0.101	0.061	0.908	0.400	0.497	0.359
~G->E	F	1.889	1.027	6.273	3.863	0.891	0.488	1.305	0.835
	p-value	0.170	0.359	0.013	0.022	0.346	0.614	0.254	0.435
~E->G	F	3.329	4.137	30.100	15.083	6.025	4.767	26.986	14.518
	p-value	0.069	0.016	0.000	0.000	0.014	0.009	0.000	0.000
~P->E	F	1.387	1.186	1.927	1.086	1.714	0.917	1.301	0.799
	p-value	0.239	0.306	0.166	0.338	0.191	0.400	0.254	0.450
~E->P	F	0.021	0.022	6.102	2.845	2.261	1.237	11.760	5.951
	p-value	0.884	0.978	0.014	0.059	0.133	0.291	0.001	0.003

F (G, P, E) – logarithmic increases in prices of wheat in France (in Germany, in Poland, contracts on the Euronext exchange); in bold black (grey) font – rejection of the null hypothesis on the lack of Granger causality for the significance level of 0.05 (0.1).

Source: own study.

purchased by companies in Poland were considered here, we may infer that 'adverse' events (for purchasing entities) with limited probability of their occurrence are more frequently transferred between markets. Moreover, it may be inferred that risk transfer occurs from larger wheat markets to smaller ones.

CONCLUSIONS

The results of the presented tests showed the occurrence of the effect of extreme price risk transfer on milling wheat markets in the European Union in the years 2005–2015. The wheat market in France was the market, from which risk was transferred most frequently, while markets, onto which risk was transmitted were wheat markets in Poland and in Germany. The study covered the period of drastic hikes and drops of wheat and futures contracts for wheat prices during the economic and financial crisis. The study should therefore be extended for the next years. The obtained information on the mechanism of extreme risk spillover on the EU wheat markets may be applied to provide more accurate estimations of the extreme wheat price risk.

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COMPARATIVE ADVANTAGES OF THE POLISH AGRIFOOD SECTOR ON THE US MARKET

Karolina Pawlak, PhD, Associate Professor¹

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The aim of this paper is to identify the level and changes in comparative advantages of the Polish agri-food sector on the US market in 2004–2017. The following indicators were used in the comparative advantage analysis: Balassa's Revealed Comparative Advantage (RCA), Vollrath's Revealed Competitiveness (RC), the Revealed Symmetric Comparative Advantage (RSCA) and the Lafay's Trade Balance Index (TBI). A product mapping scheme based on the level of comparative advantage (RSCA) and export specialisation (TBI) was made. This study was supplemented with the analysis of values for the trade balance and shares of individual groups of products in the structure of Poland's exports to the US. The analyses showed that, in the years 2004–2017, Poland attained high comparative advantages in trade with these assortment groups, which were characterised by the relatively highest shares in the structure of exports to the US, as well as generated a high and frequently improving positive trade balance.

Keywords: comparative advantage, agri-food products, export, import, Poland, USA

JEL codes: F10, F14, Q17

INTRODUCTION

Competitiveness is a crucial issue in the European agri-food market, both at the regional and international level. The competitive capacity of particular economies or their sectors is affected by an extensive set of factors, which – assuming the criterion for the dependencies of respective factors on a given analysed country – may be divided into internal, directly dependent on the country, and external, more or less independent of that country. According to Sulmicki (1977), external factors are manifested in the quantitative and qualitative population size and structure, natural and capital resources, as well as applied economic governance

style, whereas external factors comprise a wide range of both economic (structural, technical and technological, economic cycle) and non-economic conditions (political and institutional). Referring to the latter group of factors, one of the most significant events affecting the competitive performance of the agri-food sector, both of the EU as a regional grouping and its individual member states, was connected with EU enlargement incorporating Central and Eastern European countries in 2004. The enlargement opened free trade possibilities for 12 more countries and led to an increase in trade flows and a rise in product demand (Török and Jámbor, 2013), creating new opportunities for all EU countries, while intensifying competition

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznan, Poland, pawlak@up.poznan.pl, +486 848 75 76

among countries within the Single European Market, as well as markets outside the EU.

In addition to the changes in domestic policies, foreign policy resulting in the processes of negotiation or establishment of new free trade areas, has had a considerable impact on the competitive position of the agri-food sectors of EU member states, including Poland. Next to the EU-Canada Comprehensive Economic and Trade Agreement and free trade agreements negotiated with South Korea, Singapore, Vietnam and the Ukraine, the Transatlantic Trade and Investment Partnership (TTIP) has gained particular attention of the general public in EU countries. In Europe, the liberalisation of agricultural and food trade has been in the centre of the debate. The abolishment of trade barriers would give both the US and the EU an opportunity to increase their market shares and strengthen their international competitive position (Francois et al., 2013; Bureau et al., 2014). However, at the same time, in view of the differences in the production potential of the agricultural sector in EU member countries and the US (Pawlak, 2015) as well as cost leadership of American producers, questions have been raised whether in the free trade area EU producers will be able to meet the challenge of competitive pressure imposed by US agriculture. Such concerns have also been voiced in relation to the agricultural sector in Poland, characterised by less favourable production ratios, lower labour and capital productivity, as well as a lower scale of market concentration processes than observed in the US agricultural sector. Simulation analyses show that the establishment of the free trade area between the EU and US may result in the effect of the creation of Polish-American agri-food trade while the impact of the TTIP agreement on Poland's trade with other main partners may be limited (Hagemejer, Michałek and Pawlak, 2016). In view of the above, it is crucial to identify the key groups of products in agri-food trade between Poland and the US and those with comparative advantages, which may potentially become the foundation of an advantageous export specialisation. Thus, the aim of this paper is to identify the level and changes in comparative advantages of the Polish agri-food sector on the US market in 2004–2017.

THEORETICAL BACKGROUND

The concept of competitiveness does not have one universally applicable definition. Competitiveness is a relative, multidimensional concept and can be assessed for different time horizons, on different entity levels and based on different theories (Porter, 1990; Siggel, 2006; Latruffe, 2010; Pawlak, 2013). According to Porter (1990), sustainable competitive advantage is the fundamental source for above-average performance in the long run. In line with Porter's viewpoints, in this paper, competitiveness of the agri-food industry is defined as the sustained ability to attain profitable gains and maintain market share in export markets, in which the industry is active (cf. Wijnands, van Berkum and Verhoog, 2015).

As competitiveness is a broad concept there is no general agreement on how to measure it precisely. Measurement can identify revealed performance, relying on such indicators as market performance, trade success, revealed comparative advantage indicators, etc. (Latruffe, 2010). The trade theory suggests that a nation's competitiveness is based on the concept of comparative advantage. It should be stressed here that the development of contemporary theories of trade did not limit the importance of the classical concept for comparative advantages in the explanation of the directions and structures of agricultural trade (Pawlak, 2013). The foundations provided by Ricardo and the Heckscher-Ohlin model, with the assumptions of free, unrestricted trade and perfectly competitive markets, for the concept of the comparative advantage, postulate that trade flows are the result of differences in production possibilities between countries and that a country will specialise in the production of a good, for which it has a cost advantage (Reed and Marchant, 1992; Latruffe, 2010). Such a concept is useful when measuring international competitiveness. Trade related indicators, including revealed comparative advantage indices, are typically ex-post measures, useful to demonstrate the competitive performance of a country or a sector of national economy. Although they are not able to outline the source of the advantage, they provide a clear framework for the entire competitive situation (Siggel, 2006).

MATERIALS AND METHODS

The research was based on data of the European Statistical Office (Eurostat), retrieved from the ComExt database. The methods of descriptive analysis, analogies and comparisons, as well as the deductive approach were employed in the research.

The following indicators were used in the comparative advantage analysis: Balassa's Revealed Comparative Advantage (RCA), Vollrath's Revealed Competitiveness (RC), the Revealed Symmetric Comparative Advantage (RSCA) and the Lafay's Trade Balance Index (TBI). All above-mentioned indicators were appropriately adapted to the requirements of the analysis of bilateral relations. The first one (RCA) reflects the relation of the share of exports for the analysed product in the world/regional trade to the share of exports for the entire sector in the world/regional trade and it is determined according to the formula (Balassa, 1965): $RCA_{ij} = RXA_{ij} = (X_{ij} / X_{ik}) / (X_{nj} / X_{nk})$, where X – export, i – analysed country, j – analysed product/group of products, k – all commodities, n – reference country/countries. Values of the RCA indicator exceeding one indicate an advantageous competitive situation, while lower values demonstrate a lack of comparative advantage. Since the Balassa index facilitates estimation of comparative advantage only based on the value of exports, in order to make the analysis more objective, Vollrath's revealed competitiveness index (RC) was also calculated, which being a difference of natural logarithms of the revealed comparative advantage

in exports (RCA = RXA) and an analogously determined index of revealed comparative advantage in imports (RMA), at the same time takes into consideration the import and export situation of a given country (Vollrath, 1989): $RC_{ij} = \ln(RXA_{ij}) - \ln(RMA_{ij})$. A positive RC value indicates a competitive advantage, while its negative value shows a respective adverse competitive situation.

The next part of the analysis presented in this paper uses the 'product mapping' analytical tool. This tool facilitates the division of the entire set of exported products into four groups according to two selected indicators: RSCA and TBI (Fig. 1). The Revealed Symmetric Comparative Advantage (RSCA) by Dalum, Laursen and Villumsen (1998) is an indicator of comparative advantage and the Trade Balance Index (TBI) by Lafay (1992) is an indicator of export-import activities (Smutka et al., 2016). The RSCA index, calculated from the formula: $RSCA_{ij} = (RCA_{ij} - 1) / (RCA_{ij} + 1)$, may fall within the interval of $[-1, 1]$, with values lesser than zero indicating a lack of comparative advantage and more noticeably demonstrating such an advantage (For more information on the properties of RSCA in comparison to other measures of international trade specialization see Laursen, 2015). The TBI measure assumes values within the interval of $[-1, 1]$ and it is determined according to the formula (Lafay, 1992): $TBI_{ij} = (X_{ij} - M_{ij}) / (X_{ij} + M_{ij})$. Positive values of the index indicate export specialisation of a given country and typically reflect a trade surplus, whereas negative values show a lack of specialisation and the net importer

RSCA > 0	Group B Comparative advantage Net-importer (RSCA > 0 and TBI < 0)	Group A Comparative advantage Net-exporter (RSCA > 0 and TBI > 0)
RSCA < 0	Group D Comparative disadvantage Net-importer (RSCA < 0 and TBI < 0)	Group C Comparative disadvantage Net-exporter (RSCA < 0 and TBI > 0)
	TBI < 0	TBI > 0

Figure 1. Product mapping scheme based on the level of comparative advantage and export specialisation
 Source: Widodo (2009).

position of a given country for a specific product or group of products.

The analysis of comparative advantage was conducted at the level of a group of products identified following the Combined Nomenclature (CN) in two periods of analysis: 2004–2006 and 2015–2017, which provided an answer to the question whether the commodity structure of trade in agri-food products from Poland to the US was consistent with the principle of comparative advantage and whether it may be considered rational in this respect.

RESULTS AND DISCUSSION

In 2015–2017, the value of export of agri-food products from Poland to the US reached about EUR 421 million, while the import of agri-food products from the US to Poland exceeded the value of EUR 161 million (Table 1). In 2017, for Poland, the US were the first non-EU export partner and ranked 5th in terms of imports (ComExt-Eurostat, 2018), while the value of a positive balance in bilateral turnover amounted to almost EUR 260 million. In trade, between Poland and the US, food preparations were dominant, in the years 2015–2017, accounting for almost 55% of total exports and 65% of imports (Table 1). In terms of the importance in trade structure, live animals and animal origin products ranked second. What is essential, in the years 2004–2017, the value of their exports to

the US market increased over 7-fold, to EUR 142 million, while their share in exports increased by almost 22 percentage points, reaching over 33% and proportionally reducing the importance of prepared foodstuff. In imports of agri-food products from the US an opposite trend was observed – despite an increase in the absolute import values, the importance of animal origin products decreased to the advantage of an increasing share of food industry products. However, it should be noted here that nearly 50% of the value of imports from the US market resulted from the purchase of by-products of the food industry, animal fodder, tobacco and beverages rather than basic foodstuff (Table 2).

Based on the determined RCA values, it may be stated that, in the years 2004–2006, Poland had revealed a comparative advantage on the US market in the exports of all groups of products classified at that time as key products in the structure of exports (Table 2). The most advantageous competitive situation was observed in the exports of milling industry products, preparations of meat, as well as cocoa and cocoa products. Excluding the first of the above-mentioned groups of products, in the period until 2017, comparative advantage generated in exports to the US market were considerably strengthened. Moreover, the competitive position of Poland was also significantly improved in the exports of cereal preparations, sugar confectionery and dairy products, which

Table 1. Commodity structure of trade in agri-food products between Poland and the US by CN sections in 2015–2017

CN section	Export			Import			Trade balance (EUR million)
	EUR million	%	2004–2006 = 100	EUR million	%	2004–2006 = 100	
Live animals; animal products	142.2	33.8	709.4	33.8	20.9	220.1	108.4
Vegetable products	46.1	11.0	227.1	21.1	13.1	151.2	25.0
Animal or vegetable fats and oils	1.3	0.3	155.4	2.3	1.4	190.0	–1.0
Prepared foodstuff; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes	230.9	54.9	190.1	104.3	64.6	428.0	126.6
Total	420.6	100.0	258.6	161.5	100.0	294.2	259.1

Source: ComExt-Eurostat database, own calculations.

Table 2. Comparative advantage of the Polish agri-food sector in relation to the US market and the share of individual product groups in the total value of trade between Poland and the USA

Specification	CN code	2004–2006				2015–2017			
		RCA	RC	Share in the total value of export (%)	Share in the total value of import (%)	RCA	RC	Share in the total value of export (%)	Share in the total value of import (%)
Live animals	01	3.48	2.49	0.3	0.1	1.57	0.90	0.1	0.0
Meat and edible meat offal*	02	0.11	−4.34	0.2	1.5	×	×	25.8	0.0
Fish and crustaceans, molluscs and other aquatic invertebrates	03	0.18	−3.45	3.5	19.6	0.21	−3.13	4.2	20.0
Dairy produce	04	9.42	4.49	5.2	0.6	113.82	9.47	2.3	0.0
Products of animal origin n.e.c.	05	0.51	−1.37	3.1	6.2	1.68	1.04	1.5	0.9
Live trees and other plants	06	2.94	2.15	0.6	0.2	2.02	1.41	0.2	0.1
Edible vegetables	07	4.42	2.97	1.5	0.3	8.29	4.23	3.6	0.4
Edible fruit and nuts	08	0.06	−5.65	0.8	13.8	0.08	−4.97	0.6	7.6
Coffee, tea, maté and spices	09	1.90	1.28	0.5	0.3	102.85	9.27	1.1	0.0
Cereals	10	0.03	−7.05	0.0	1.2	0.43	−1.71	0.3	0.7
Products of the milling industry	11	164.69	10.21	8.5	0.1	116.43	9.51	4.8	0.0
Oil seeds and oleaginous fruits	12	0.08	−5.12	0.5	6.7	0.11	−4.34	0.4	3.1
Lac; gums, resins and other vegetable saps and extracts	13	0.01	−8.89	0.0	2.9	0.01	−9.35	0.0	1.0
Vegetable plaiting materials; vegetable products n.e.c.	14	0.39	−1.86	0.0	0.0	0.02	−8.18	0.0	0.0
Animal or vegetable fats and oils	15	0.23	−2.93	0.5	2.2	0.22	−3.07	0.3	1.4
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	16	78.60	8.73	23.2	0.3	1 288.10	14.32	14.0	0.0
Sugars and sugar confectionery	17	14.73	5.38	3.7	0.3	100.99	9.23	3.1	0.0
Cocoa and cocoa preparations	18	44.94	7.61	5.9	0.1	2 164.57	15.36	10.8	0.0
Preparations of cereals	19	15.17	5.44	5.5	0.4	221.03	10.80	3.9	0.0
Preparations of vegetables, fruit or nuts	20	12.54	5.06	7.6	0.6	1.82	1.19	8.9	4.9
Miscellaneous edible preparations	21	0.15	−3.76	3.7	24.1	0.24	−2.86	2.9	11.9
Beverages, spirits and vinegar	22	4.27	2.90	25.0	5.9	0.59	−1.04	10.8	18.3
Residues and waste from the food industries; prepared animal fodder	23	0.00	−11.76	0.0	3.0	0.04	−6.70	0.5	13.5
Tobacco and manufactured tobacco substitutes	24	0.00	−12.56	0.0	9.8	0.00	−17.06	0.0	15.9

* In the years 2015–2017 values of RCA and RC could not be determined due to the marginal volume of US exports to the EU, which was not recorded in Eurostat statistics.

Source: ComExt-Eurostat database, own calculations.

in the years 2015–2017 accounted jointly for almost 10% value of food exports from Poland to the US. In the years 2015–2017, a high comparative advantage was also obtained in the exports of meat and edible meat offal, generating for Poland over 1/4 of total revenue from exports of agri-food products to the US (values of RCA and RC could not be determined due to the marginal volume of US exports to the EU, which was not recorded in Eurostat statistics). In turn, the weakening comparative advantage in the exports of fruit and vegetable preparations to the US is disturbing, particularly since the exports of this group of products increased 3-fold in the analysed period, while concerns are also raised by the loss of a strong competitive position in the exports of both non-alcoholic and alcoholic beverages, which accounted for almost 11% of total food exports from Poland to the US. It needs to be stressed that, in the years 2004–2017, Poland strengthened its competitive position on the US market in the case of products, which generated almost 75% of total revenue from exports. Similar conclusions were provided

for by the analysis of values for Vollrath's revealed competitiveness indexes (RC). The level of comparative advantage, recorded in the years 2004–2017, was primarily related to the scope of market protection, including both tariff and non-tariff barriers to trade, and the changes in competitiveness in the period considered followed changes in price relations due to the exchange rate for the Polish zloty (PLN) to the US dollar (USD).

Positioning of products based on the levels of comparative advantage and the degree of export specialisation confirmed the finding that, in the years 2004–2017, Poland enjoyed a high comparative advantage in trade for these assortment groups accounting for the relatively highest shares in the structure of exports to the US, as well as generated a high and frequently improving positive trade balance (excluding beverages, spirits and vinegar; Fig. 2).

In the years 2004–2006, among products ranking high in exports to the US market (min. 3.5% value of exports), only in the case of fish and crustaceans (CN 03), a lack of comparative advantage was not

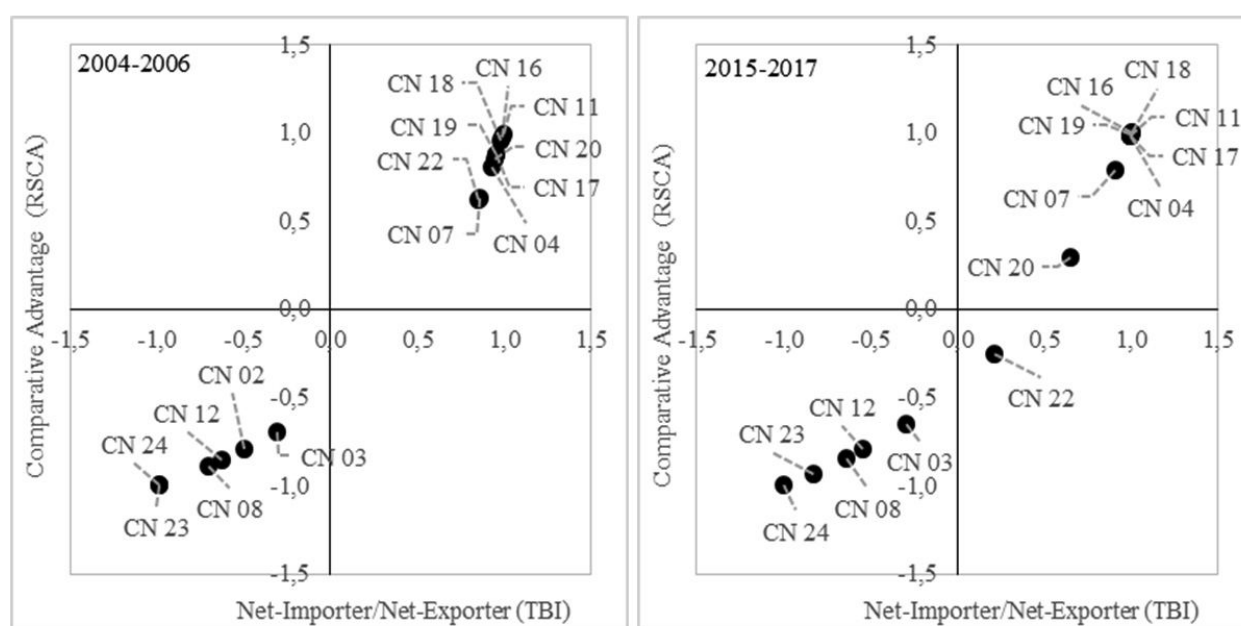


Figure 2. Product mapping scheme for selected agri-food product groups exported from Poland to the US by level of comparative advantage and export specialisation in 2004–2006 and 2015–2017 (Widodo's method)

Source: ComExt-Eurostat database, own calculations.

conducive to initiating export specialisation, while their exchange was connected with a trade deficit. In the years 2004–2006, the groups of products, in the exchange of which Poland generated the highest comparative advantage and attained the position of net exporter, accounted jointly for almost 88% of total exports of agri-food products to the US and provided a trade surplus of EUR 137.5 million, exceeding by 30% the positive total trade balance (Table 3).

Although, in the years 2015–2017, the share of the most competitive assortment groups in Polish exports to the US market decreased to 80%, in their exchange, the recorded trade balance was almost 2.5-fold greater than in the years 2004–2006 (EUR 326 million). Positioning of products according to the Widodo method also confirmed the weakening of the competitive position of Poland in the exports of fruit and vegetable preparations (CN 20) and beverages and spirits (CN 22) to the US, i.e. the findings resulting from the analysis of the Balassa and Vollrath's indexes. While the latter groups of products recently still generated a positive trade balance, in comparison to the years 2004–2006, it was decreasing, thus Poland was losing its previous comparative advantage. The assortment groups, for which due to a lack of advantage no export specialisation was attempted (CN 03, CN 08, CN 12, CN 23, CN 24), in both analysed periods were imported, accounting for 85% (2004–2006) and 75% (2015–2017) of total expenditure for

food imports from the US. The value of imports for these groups of products exceeded the value of their exports by over EUR 83 million and by approx. 1/3 reduced the total value of trade balance.

CONCLUSIONS

The analyses showed that, in the years 2004–2017, Poland attained a high comparative advantage in trade with assortment groups which were characterised by the relatively highest shares in structure of exports to the US, as well as generated a high and frequently improving positive trade balance. In turn, imports predominantly involved products with no comparative advantage, which is consistent with the classical principle of comparative advantage. It may be stated that the attained comparative advantage was sources of an advantageous export specialisation and, from this point of view, the commodity structure in trade of agri-food products of Poland with the US may be considered rational. However, it needs to be observed here that apart from meat, preparations of meat and preparations of fruit or vegetables, neither agricultural raw materials nor products of the basic branches of the food industry were exported from Poland to the US. In turn, imports included products complementary to domestic production and to a considerable extent were necessary. Analysis of the commodity structure of trade showed that the US market, at a relatively small role

Table 3. The share of individual groups resulting from product mapping in the total value of trade between Poland and the US and their trade balance

Item	2004–2006			2015–2017		
	Share in the total value of export (%)	Share in the total value of import (%)	Trade balance (EUR million)	Share in the total value of export (%)	Share in the total value of import (%)	Trade balance (EUR million)
Group A	87.6	9.0	137.5	80.0	6.5	326.2
Group B	×	×	×	×	×	×
Group C	3.1	6.2	1.7	11.1	19.0	16.2
Group D	9.3	84.8	–31.4	8.8	74.5	–83.3
Total	100.0	100.0	107.7	100.0	100.0	259.1

Source: ComExt-Eurostat database, own calculations.

for the agri-food sector on a macro scale, is crucial for several branches of the Polish agri-food industry, including e.g. fish, meat, fruit and vegetable, confectionery and spirit industries.

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THE MARKETS OF POTATOES AND SUGAR BEETS IN POLAND BEFORE AND AFTER ACCESSION TO THE EUROPEAN UNION. AN ATTEMPT TO COMPARE

Andrzej Czyżewski, Full Professor¹; **Dariusz Czakowski**, PhD²

¹ Faculty of Economics and Management, University of Zielona Góra

² Faculty of Law, Administration and Economics, Kujawy and Pomorze University in Bydgoszcz

ABSTRACT

The article attempts to identify the dynamics and direction of the root plant market development in Poland in the period before and after accession to the European Union by defining resource-efficiency relations related to the cultivation of potatoes and sugar beet. The research was carried out in the years 1994–2016. Based on them, it turned out that despite the progressive process of concentration and specialization of production on the market of root crops in Poland, income efficiency (without subsidies), especially in the case of sugar beets, decreased significantly. In addition, the area of cultivation of both potatoes and sugar beet was systematically decreasing, which was partially compensated by the improvement in crops. As a result of these adjustments, sugar beet harvests were at a similar level throughout the entire period considered, while potato production decreased.

Keywords: root crop market, sugar market, potato market, European integration

JEL codes: Q11, Q13

INTRODUCTION

Despite the favourable soil quality and favourable climatic conditions for the growth of root crops in Poland, since the early nineties, we have seen a sharp decline in their harvest and crop area. The number of growers also decreased significantly (Czakowski and Czyżewski, 2017), which is typical for many countries from Eastern Europe after the collapse of socialism (Prishchepov et al., 2012). A characteristic feature of root crops, in comparison to other field crops, is high capital intensity and labour consumption of production. In addition, they require planting at large

intervals from each other, due to the large yield. Although many plants include rooted sunflower, swede, carrot, chicory, fodder beets, and turnip, trench crops are the key factors in the structure of crops in Poland in potatoes and sugar beets (Stańko, 2013). The aim of this study is to identify the dynamics and direction of the root plants market in Poland, taking into account the similarities and differences between the potato and sugar beet markets, in the period before and after accession to the European Union. This will be achieved by the determination of production results and the dynamics of prices and incomes on the potato and sugar beet market.

¹ Corresponding author: Podgórna 50, building A-O, 65-246 Zielona Góra, a.czyzewski@wez.uz.zgora.pl, +4868 328 25 55

² Corresponding author: Toruńska 55-57, 85-023 Bydgoszcz, Poland, d.czakowski@kpsw.edu.pl, +4852 321 11 88

THEORETICAL BACKGROUND

This article is part of the canon of works related to the issue of state interference in free market economy. Due to the fact that agriculture is included in the real economy sphere, the change of its institutional and economic environment as well as broad financial support should determine its permanent structural transformations (Poczta, 2009). However, due to the specific dissimilarity of this sector from other branches of the national economy, conditioned primarily by the compulsion of food consumption and specificity, a key production factor in agriculture, which is land, adaptation processes in the agricultural sector are difficult (Tilman et al., 2002; Czyżewski and Matuszczak, 2011). It is worth adding that despite fears Polish agriculture turned out to be competitive within the EU (Gorton et al., 2001; Wigier, 2014).

MATERIALS AND METHODS

The research was carried out in the years 1994–2016. The choice of a relatively long period was associated with an attempt to show the adjustments that took place on the markets surveyed in the period after Poland's accession to the European Union. The source data used in the work came from the Institute of Agricultural Economics and Food Economy and the Central Statistical Office. Purchase prices for potatoes and sugar beet as well as the financial results of agricultural holdings have been expressed in real prices, i.e. nominal prices adjusted by the consumer price index of goods and services. The base year was adopted in 2016. To achieve the intended research goal, among others dynamic indexes (used to compare the phenomena discussed in time) and analysis of Pearson's linear correlation, which allowed to determine the strength, direction and significance of relationships between selected variables related to the cultivation of potatoes and sugar beet. Using cost-absorption ratios, calculated as the ratio of total costs to production value and income efficiency, which was defined as the ratio of income from activity to total costs, the effectiveness relations were determined.

RESULTS AND DISCUSSION

The abolition of trade barriers between Poland and EU countries led to the harmonization of the price level between the domestic and EU agricultural market, and also guaranteed greater stabilization (Czakowski, 2017). In 2016, real purchase prices of potatoes were 41% lower than in 1994 (Fig. 1). It is worth noting that potato prices grew very quickly in 1991–1994, not included in the analysis, faster than in the case of cereals. This accelerated the process of replacing potatoes as animal feed by crop plants (Chotkowski, 2008). On the other hand, real purchase prices of sugar beets decreased by 35% in the analysed period. It is worth mentioning that due to the numerous regulations on the sugar market, sugar beet prices were also dependent on intervention policy instruments. The effect of these activities was visible in 2004, when after the accession to the EU there was a sharp increase in sugar beet prices in Poland, due to the need to adjust domestic prices to the minimum prices in the Community (Hryszko and Szajner, 2013).

On the potato market in Poland in the post-accession period there was a significant decrease in the average annual crop area (Table 1). In addition, the average annual size of potato harvests dropped significantly with relatively small increase in average annual yield. The above changes are the effect of declining demand. The demand for potatoes for feeding them was the most drastic. Due to low prices on meat markets and pressure to optimize costs, they have become an expensive way to provide nutritional value in relation to feed grains (Czakowski, 2016). In addition, consumer demand has also decreased. It is worth notice that this was determined by the drop in the consumption of unprocessed potatoes, whose increase in processed food consumption was not able to compensate.

The scale of sugar beet cultivation in the analysed period was determined by a number of regulations and instruments on the sugar market, which include, inter alia: production quotas, duties, income support for growers. The reform of the 2006/2007 season was particularly important, as a result of which the number of sugar factories in Poland decreased from

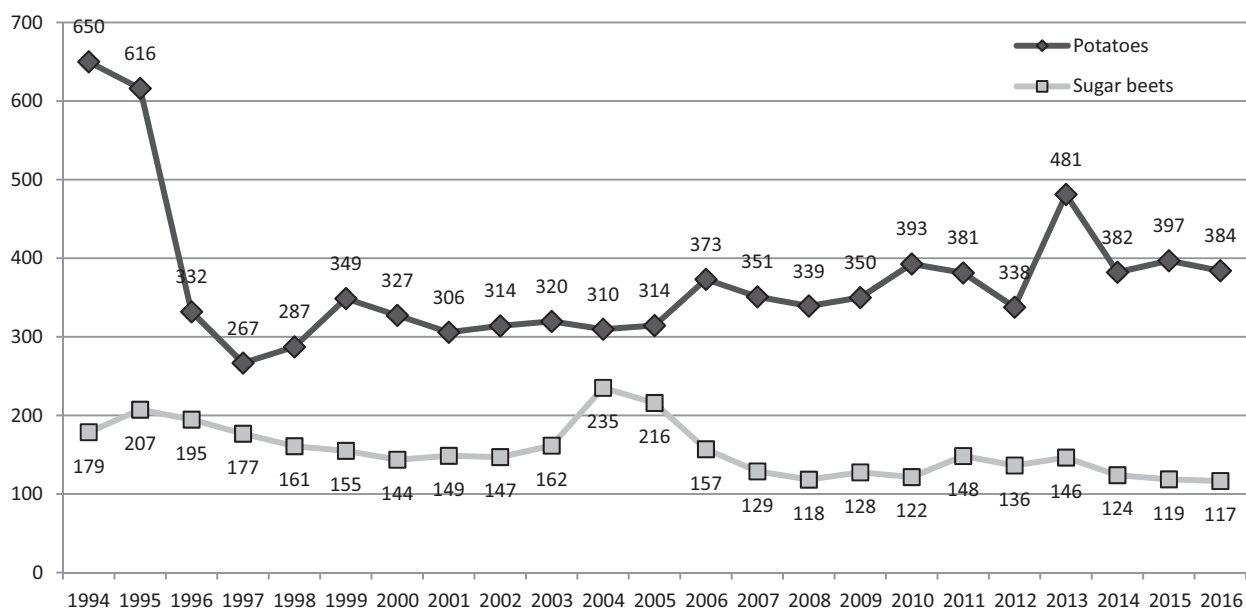


Figure 1. Purchase prices of potatoes and sugar beets in Poland in 1994–2016 (base year = 2016)

Source: GUS (1995–2017).

Table 1. Average annual area of cultivation, yield, and harvest of potatoes and sugar beet in Poland in 2004–2016

Specification	Potatoes	Sugar beets				
	area of cultivation (thous. ha)	crops (tonne/ha)	harvest (million tonnes)	cultivation area (thous. ha)	crops (t/ha)	harvest (million tonnes)
Average for years 1994–2003 (1)	1 244.40	174.70	21.47	366.70	353.30	13.61
Average for years 2004–2016 (2)	453.85	213.62	9.40	216.46	540.15	11.53
Dynamics index (2) / (1) (1994–2003 = 100)	36	122	44	59	153	85

Source: GUS (1994–2016).

78 to 18, and the production limit was introduced. In relation to the above, the sugar market in Poland has the structure of a classic oligopoly (Szajner, 2014). Sugar beet harvest in 2004–2016 was 15% lower than in the period 1994–2003. This indicates that the increase in yield did not compensate for the reduction in production as a result of a smaller crop area, but still Poland is one of the top producers of sugar in EU (Smit et al., 2017).

Financial results of farms clearly indicate that the increase in the income from producers activity on the sugar beet market was affected by subsidies stimulating production (Czakowski, 2015). Without them, the producers' income in the post-accession period, just like on the potato market, would be smaller than before accession (Fig. 2).

It is also worth notice that on the potato market the real costs as well as the value of production increased

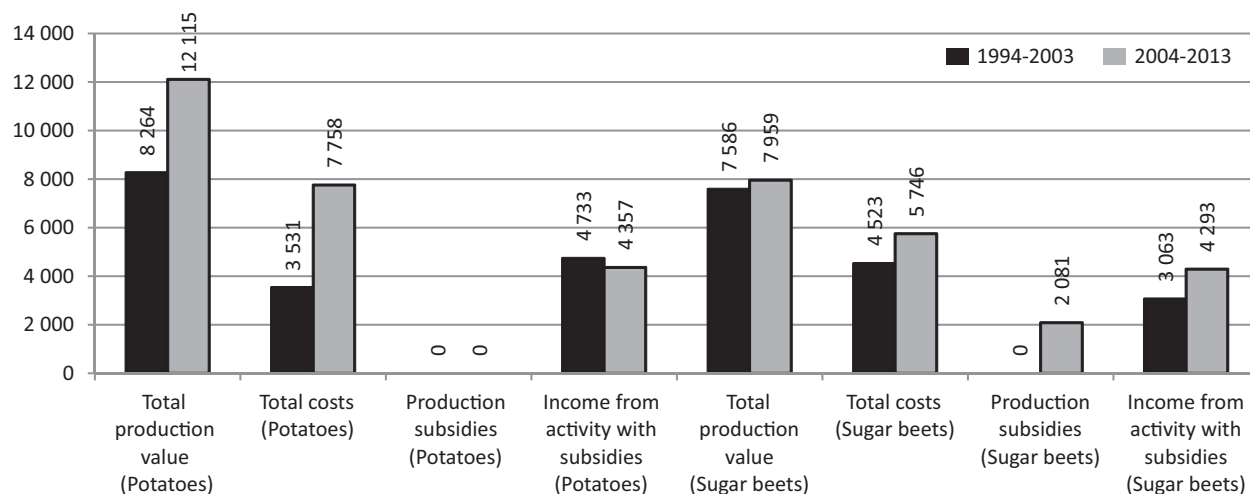


Figure 2. Financial results of farms growing potatoes and sugar beet in Poland in the years 1994–2003 and 2004–2016 (in PLN per 1 ha of crops, base year = 2016)

Source: own study based on FADN data.

at the same time, which at the same time worsened the relation of income to costs. In both markets under review during the post-accession period, the average annual values of cost-consumption coefficients and income efficiency (excluding production subsidies) were less favourable than before (Table 2). This is due to the so-called technological treadmill. This mechanism forces farmers to constantly increase la-

bour productivity leading to cost reduction, which in turn does not translate into an increase in income due to declining prices of agricultural raw materials (Czyżewski and Czyżewski, 2015).

Among many interesting compounds presented in Table 3, it is worth pointing out that both in the period before and after the accession, there were positive correlation relationships between the income

Table 2. Cost-absorption and income efficiency of potato and sugar beets cultivation in Poland in the years 1994–2003 and 2004–2016

Specification	Potatoes		Sugar beets		
	Cost-absorption*	Income efficiency**	Cost-absorption*	Income efficiency**	Income efficiency w/o subsidies for production***
Average for years 1994–2003 (1)	0.44	1.38	0.61	0.7	0.7
Average for years 2004–2016 (2)	0.65	0.57	0.77	0.73	0.37
Dynamics index (2) / (1) (1994–2003 = 100)	148	42	127	104	53

* Cost-absorption: Total cost / value of production; ** Income efficiency: total income / costs; *** Income efficiency without subsidies for production: income without subsidies for production / total costs

Source: own study based on FADN data.

Table 3. Values of Pearson's linear correlation coefficients related to selected variables related to the cultivation of potatoes and sugar beet in Poland in the years 1994–2003 and 2004–2016

Variable 1	Variable 2	1994–2003*	2004–2016*
Harvest (Potatoes)	Harvest (Sugar beets)	0.55	0.27
	Area of cultivation (Potatoes)	0.78	0.85
	Crops (Potatoes)	–0.45	–0.74
	Purchase price (Potatoes)	–0.53	–0.73
	Income efficiency (Potatoes)	0.63	0.23
Harvest (Sugar beets)	Area of cultivation (Sugar beets)	0.73	–0.02
	Crops (Sugar beets)	0.27	0.51
	Purchase price (Sugar beets)	–0.1	0.28
	Income efficiency (Sugar beets)	0.44	0.64
Area of cultivation (Potatoes)	Area of cultivation (Sugar beets)	0.79	0.80
Crops (Potatoes)	Crops (Sugar beets)	0.2	0.88
Purchase price (Potatoes)	Purchase price (Sugar beets)	0.35	–0.46
Income efficiency (Potatoes)	Income efficiency (Sugar beets)	0.93	0.11

* The correlation coefficient is statistically significant ($p = 0.05$, for $n = 10$ the critical value is 0.6319, for $n = 13$ the critical value is 0.5529).

Source: own study based on FADN and Central Statistical Office (GUS) data, the calculations were made using the Statistica 12.

efficiency of production and the size of the collections in both examined markets. However, these interdependencies were characterized by significant linear correlation coefficients, in the case of the potato market in the pre-accession period (there was a significant decrease in production, which was caused by decreasing profitability of crops), and in the case of sugar beet in the post-accession period (impact of subsidies on production volume). It is worth adding that the main determinant of the size of potato harvest in 2004–2016 was the area of cultivation, whereas the sugar beet harvest was not significantly interrelated, either with the crop area or with the level of yield (Czyżewski and Czakowski, 2018). This can be explained by extensive interventional mechanisms on this market, which were not so important in the case of potatoes. In turn, between the purchase prices and the size of harvests on the potato market in both analysed periods, there was a significant negative correlation relationship. Therefore, it can be concluded

that producers in this market were not able to react to price changes on an ongoing basis, and additionally shortages/overproduction contributed to their fluctuations.

Between the cultivated area and the yield (except for the pre-accession period), significant and positive correlation relationships occurred in both markets, which was related to similar cultivation technology and a nationwide tendency to reduce the area of cultivation (Czyżewski and Czakowski, 2017). On the other hand, the development of procurement prices and the efficiency ratio was characterized by the lack of significant correlation relationships between the markets surveyed markets in the post-accession period, with simultaneous significant correlation between the income-efficiency ratios in the pre-accession period. This can be explained first of all by the differences in the formation of world prices and more extensive mechanisms of support and regulation of the sugar and sugar beet market.

CONCLUSIONS

1. Poland's accession to the European Union accelerated the processes of concentration and specialization of production. This was done at the expense of a significant reduction in the area of crops and the number of small growers. In the case of sugar beet cultivation, this process accelerated due to the introduction of new regulations on the sugar market, which coincided with the first years of Poland's membership in the EU.
2. In the post-accession period, the formation of purchase prices on the potato and sugar beet market was more dependent on the level of world prices, due to the accession to the single European market. In addition, the level of domestic prices was also dependent on the mechanisms of the common agricultural policy, which was especially visible on the sugar beet market, where in the first two years of membership there were significant increases related to the adjustment of minimum purchase prices to those applicable in the EU. On the other hand, the reform of the sugar market from the 2006/2007 season resulted in a reduction in sugar beet prices.
3. One of the most important aspects related to the accession for agricultural producers were subsidies in various forms to their activities. They had a significant impact on the production profitability, especially on the sugar beet market, where they occurred in the form of subsidies for production. On the potato market producers could not count on similar discounts. Other subsidies, such as uniform area payments, payments for greening and additional payments. Nevertheless, in the post-accession period, the income from the activity of potato producers increased, with a simultaneous slight decrease in cost-efficiency and income efficiency. On the other hand, in the case of sugar beets, both the profitability of production (income) and cost-consumption and income-efficiency indicators decreased.
4. There is a significant difference between the examined markets in the impact of the Common Agricultural Policy mechanisms in the post-accession period. This could have an impact on the lack

of a significant correlation relationship between potato harvests and the income efficiency ratio in the post-accession period (while in the pre-accession period such a relationship occurred). On the other hand, the reverse situation took place on the sugar beet market, significant interdependence between these features occurred in the post-accession period, and before the accession it was not recorded.

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ARE POLAND AND TURKEY RIVALS IN THE EU AGRICULTURAL MARKET?

Funda Gencler, Assistant Professor¹; **Berna Turkekul**, Associate Professor²;
Altay Ugur Gul, Full Professor³

^{1, 3} School of Tobacco Expertise, Celal Bayar University

² Agriculture Faculty, Ege University

ABSTRACT

Poland and Turkey are one of the largest global producers and particularly exporters of fruits. The export is of great importance to domestic producers of these fruits. This paper attempts to assess Polish and Turkish fruit sectors' competitiveness. For competitive comparison of Poland and Turkey, balance of foreign trade, trade coverage index, share in export and import, specialisation index, relative revealed comparative export advantage index, relative import penetration index, relative trade advantage index were calculated. According to the results, Turkey has shown to have comparative advantage for all periods. In contrast, however, Poland seems to be losing its advantages. Although Poland's competitiveness is diminishing, Poland enjoys free access to EU market.

Keywords: Poland, Turkey, competitiveness

JEL codes: Q17, F12

INTRODUCTION

The accession to European Union (EU) in 2004 resulted many kinds of agro-trade possibilities and difficulties for Poland. The elimination of customs and other trade barriers led to an increased trade. The free flow of goods on the common international market was set and enhanced, and enabled trade expansions following the integration. The countries which integrated after the enlargement in 2004 had very different conditions concerning the role of agriculture in national economy: its level, volume of agricultural subsidies, production efficiency and competitiveness

of the sector. On the other hand Turkey's agricultural structure shows similarities with Poland in terms of population and some other agricultural indicators. Turkey's relations with the EU began in 1964. The Union consists of a large portion of agricultural legislation and due to the excess of the budget allocated to agriculture; Turkey is forced to comply with most of the CAP, like all other candidate countries. The agri-food sector is a major component of the Polish economy, agricultural products export is 12.7% in total export, accounting for 10.5% of employment and 2.41% GDP in 2014 (Eurostat, 2018). These figures for Turkey are 19.5% employment rate, 7.1% GDP

¹ Corresponding author: 45210 Akhisar, Manisa, Turkey, funda.gencler@cbu.edu.tr, +90 536 237 21 06

² Corresponding author: Bölümü 35100 Bornova Izmir, Turkey, bturkekul@gmail.com, +90 232 88 12 68

³ Corresponding author: 45210 Akhisar, Manisa, Turkey, altay.gul@cbu.edu.tr, +90 236 412 68 96

and agricultural products export is 13.9% in total export in 2015 (TUIK, 2018). Relative changes in competitiveness compared to international markets and EU members will have an effect on the development of agriculture in both countries. If the Polish and Turkish agricultural sectors want to develop and positively contribute to economic growth it must be competitive in the EU market. The sector's competitiveness derives from the mechanisms of comparative advantage.

The competitiveness of a product in the international market depends on the principle of comparative advantages associated with favourable natural factors and lower relative costs of production. It also depends on infrastructure, transport and marketing costs to the end destination. Moreover, its price competitiveness in foreign markets is also influenced by movements in the exchange rate. Finally, competitiveness is also affected by other factors such as product quality, the degree of product differentiation, the seasonality of production and market and government policies of both the exporting country and importing country. The increased competitiveness of a product in the international market is expressed in higher export growth and increased market share. There are many indices of competitiveness in literature. Therefore the purpose of this study is to determine the Poland's and Turkey's competitiveness in the EU market in fruits after Poland accession to the EU. Polish foreign trade in fruit recorded a dynamic growth in volume, and particularly, in the value. The export of fruits from Poland increased from USD 401,008,703 in 2004 to USD 775,995,764 2017. For Turkey the value of fruit export has increased from USD 1,304,747,366 to USD 1,918,095,483 for the same period. For both countries the EU is the major trade partner in fruits.

THEORETICAL BACKGROUND

Economic approaches to assess competitiveness differ greatly, and depend on analyses related to firms, sectors and overall economy (Frohberg and Hartmann, 1997). Approaches analysing the sector level consider competitiveness to be the ability of an industry to maintain market share, and to compete

with foreign counterparts in foreign and domestic markets under free trade conditions (Kim and Marion, 1997). As theoretical reference, competitiveness is mainly linked to comparative advantage, which is connected to the Heckscher-Ohlin theory. An analysis of competitiveness at the sector level is usually carried out by assessing trade indices (Carraresi and Banterle, 2008). Indices approach to competitiveness analysis has been used widely to determine and analyse the competitiveness and the factors influencing the competitiveness (Bender and Li, 2002; Sassi, 2003; Hambalková, 2006; Rusali and Gavrilesco, 2008).

Studies on Turkish economy are mostly sectoral studies. In these studies competitive sectors are determined according to factors of competitiveness in international markets (Akgüngör, Barboros and Kumral, 2002; Yılmaz, 2003; Ferman, Akgüngör and Yüksel, 2004). Although each study used different models, competitor countries and different products, they offered empirical evidence to show that Turkey gains comparative advantage via relative prices, but cannot sustain its existing competitiveness.

The literature on competitiveness of Polish agriculture, especially in the context of EU entry is very rich. Empirical studies on the competitiveness of Polish agriculture are most frequently based on the concept of comparative advantage. A large number of measures have been used to study revealed comparative advantage. The main ones were carried out by Gorton et al. (2001), Zawalińska (2004), Trajer, Smoliński and Mieczkowski (2014), Wigier (2014), Szczepaniak and Tereszczuk (2016). Overall, the studies on revealed comparative advantage confirmed that Poland has a low comparative advantage in processed products, high comparative advantage in agricultural products.

MATERIALS AND METHODS

The data set has the exports as well as corresponding imports for the years 2004 through 2017. Each year's data includes, in USD millions values for fruits and agri-food products in Poland, Turkey and the EU. These data is obtained from Comtrade data

set, compiled and maintained by the United Nations Statistical Office in New York. The data used regarding foreign trade in fruits HS code 08 and agri-food products BEC code 1.

In order to implement the study objective, the following indices of ex-post competitiveness in foreign trade in fruits have been calculated and analysed for Poland and Turkey.

1. Balance of foreign trade (TB)

$$TB_i = EX_{if} - IM_{if} \quad (TB < 0 \text{ or } TB \geq 0)$$

where:

EX_{if} – export of fruits from Poland/Turkey (USD million);

IM_{if} – import of fruits to Poland/Turkey (USD million).

In terms of the open economy, the positive balance of foreign trade in a given product, continuing for a longer time, may attest to international competitiveness of the country with regard to this product (Trajer, Smoliński and Mieczkowski, 2014).

2. Trade coverage index (TC)

$$TC_i = \frac{EX_{if}}{IM_{if}} \quad (TC \geq 0)$$

where:

EX_{if} – export of fruits from Poland/Turkey (USD million),

IM_{if} – import of fruits to Poland/Turkey (USD million).

The value of the TC index greater than 1 means that the country has a relative internal advantage over competitors (Trajer, Smoliński and Mieczkowski, 2014). But also reflects competitiveness revealed in the export dynamics (Trajer, Smoliński and Mieczkowski, 2014).

3. Share in global export (SGE)

$$SGE_i = \frac{EX_{if}}{EX_{EUf}} \cdot 100\% \quad (0\% \leq SGE \leq 100\%)$$

where:

EX_{if} – export of fruit from Poland/Turkey (USD million);

EX_{EUf} – the EU export of fruit (USD million).

It is believed that the increasing share in the EU export of a given product means improving of international competitiveness of the country with regard to this product (Trajer, Smoliński and Mieczkowski, 2014), as far as the increase in the value of this index does not result from the increasing re-export only.

4. Specialisation index (SI)

$$SI_i = \frac{EX_{if}}{EX_{ia}} \div \frac{EX_{EUf}}{EX_{EUa}} \quad (SI \geq 0)$$

where:

EX_{if} – export of fruits from Poland/Turkey (USD million);

EX_{ia} – export of agri-food products from Poland/Turkey (USD million);

EX_{EUf} – EU export of fruits (USD million);

EX_{EUa} – EU export of agri-food products (USD million).

The SI index compares the share of a given product in the agri-food export of the country with the share of this product in the EU agri-food export. The SI index values greater than 1 may be indicative of high competitiveness (Trajer, Smoliński and Mieczkowski, 2014), as long as they are not the result of the large re-export only.

5. Share in global import (SGI)

$$SGI_i = \frac{IM_{if}}{IM_{EUf}} \cdot 100\% \quad (0\% \leq SGI \leq 100\%)$$

where:

IM_{if} – import of fruits to Poland/Turkey (USD million);

IM_{EUf} – EU import of fruits (USD million).

The decreasing share in the EU import of a given product may mean improving of competitiveness

of the country with regard to this product (Trajer, Smoliński and Mieczkowski, 2014).

6. Relative revealed comparative export advantage index (XRCA)

$$XRCA_i = \frac{EX_{if}}{EX_{EUf}} \div \frac{EX_{i\neq f}}{EX_{EU\neq f}} \quad (XRCA \geq 0)$$

where:

EX_{if} – export of fruits from Poland/Turkey (USD million);

EX_{EUf} – EU export of fruits (USD million);

$EX_{i\neq f}$ – export of agri-food products from Poland/Turkey excluding fruits (USD million);

$EX_{EU\neq f}$ – EU export of agri-food products excluding fruits (USD million).

7. Relative import penetration index (MRCA)

$$MRCA_i = \frac{IM_{if}}{IM_{EUf}} \div \frac{IM_{i\neq f}}{IM_{EU\neq f}} \quad (MRCA \geq 0)$$

where:

IM_{if} – import of fruits to Poland/Turkey (USD million);

IM_{EUf} – EU import of fruits (USD million);

$IM_{i\neq f}$ – import of agri-food products to Poland/Turkey excluding fruits (USD million);

$IM_{EU\neq f}$ – EU import of agri-food products excluding fruits (USD million).

8. Relative trade advantage index (RTA)

$$RTA_i = XRCA_i - MRCA_i \quad (RTA < 0 \text{ or } RTA \geq 0)$$

If the RTA_i index is positive and the XRCA index is also greater than 1, it attests to high competitiveness of the country with regard to a given product when compared to other countries of the EU in total. On the other hand, the negative value of the RTA_i index and also the value of the $MRCA_i$ index greater than 1 means that the country shows the absence of competitiveness. In other cases, the results of the analysis are not unambiguous (Trajer, Smoliński and Mieczkowski, 2014).

RESULTS AND DISCUSSION

In the analysed period, i.e. in the years 2004–2017, the Polish foreign trade balance (TB) in fruits was negative (Table 1). The value balance decreased from USD 12,529,660 in 2004 to USD –169,104,046 in 2017. The trade balance, negative and worsening in the years 2004–2017, to a very large extent attests to the low and decreasing competitiveness of Poland in the EU trade in fruits.

In the years 2004–2017, the value of the trade coverage index (TC) was characterised by a downward trend. The TC index had the highest value in 2004 and the lowest in 2011. Throughout the analysed period, the TC index was significantly lower than 1, which shows that Poland has a relative internal disadvantage over foreign competitors. The low and decreasing value of the TC index reflects small and diminishing competitiveness of Poland in foreign trade in fruits.

In the years 2004–2017, the share of Poland in the global export of fruits (SGE) showed a downward trend. This index decreased most in 2010–2012 (Table 1). The decrease in the level of the SGE index also means declining of Poland's competitiveness in trade in fruits. In the analysed period, the share of Poland in the global import of fruits (SGI) was at the similar level and did not exceed 4.33% (Table 1). In the analysed period, the level of the specialisation index (SI) showed a downward trend and in 2017 was nearly 3 times lower than 2004. Such value of the SI index confirms low and diminishing competitiveness of Poland in EU trade in fruits.

In the entire analysed period, the relative revealed comparative export advantage index (XRCA) assumed values greater than 1 and also, the relative trade advantage index (RTA) was positive (Table 1). Both indices were characterised by a downward trend and decreased almost three times. Such values of the XRCA and RTA indices confirm low and diminishing competitiveness of Poland in the EU trade in fruits.

On the other hand Turkish trade balance (TB) in fruits was positive and showed an upward trend (Table 2). The value balance increased from USD 1,282,385,892 in 2004 to USD 1,879,089,768 in 2017.

Table 1. Indices of Poland's competitiveness in the EU trade in fruits

Years	TB	TC	SGE	SGI	SI	XRCA	MRCA	RTA
2004	12 529 660	1.03	23.31	3.09	3.07	3.27	0.76	2.52
2005	6 356 888	1.01	22.07	3.00	2.26	2.35	0.62	1.73
2006	33 286 634	1.07	20.77	3.20	1.94	2.00	0.61	1.39
2007	-49 752 176	0.93	20.70	4.03	1.72	1.77	0.64	1.13
2008	-12 117 153	0.99	22.07	4.18	1.77	1.82	0.55	1.28
2009	-112 911 531	0.82	15.73	3.66	1.23	1.24	0.46	0.78
2010	-160 469 974	0.76	13.30	3.89	1.09	1.09	0.48	0.62
2011	-213 525 020	0.73	13.10	4.19	1.12	1.13	0.50	0.62
2012	-117 281 364	0.84	12.31	4.07	1.07	1.07	0.48	0.59
2013	-119 016 904	0.86	14.57	4.33	1.08	1.09	0.45	0.64
2014	-110 192 801	0.87	14.21	3.90	1.06	1.06	0.41	0.65
2015	37 619 721	1.05	20.41	3.55	1.40	1.42	0.39	1.03
2016	-44 371 307	0.94	18.03	3.41	1.29	1.30	0.37	0.93
2017	-169 104 046	0.82	19.55	4.10	1.36	1.37	0.41	0.97

Source: own elaboration pursuant to the data from UN.

Table 2. Indices of Turkey's competitiveness in the EU trade in fruits

Years	TB	TC	SGE	SGI	SI	XRCA	MRCA	RTA
2004	1 282 385 892	58.35	75.83	0.18	14.90	25.83	0.17	25.66
2005	1 677 278 491	72.72	86.99	0.16	14.61	26.24	0.13	26.11
2006	1 488 767 193	58.80	62.10	0.17	11.67	19.01	0.16	18.85
2007	1 604 249 003	44.01	53.00	0.22	10.57	16.99	0.17	16.81
2008	1 582 145 746	47.51	44.66	0.18	9.70	14.64	0.11	14.53
2009	1 618 302 291	44.58	52.13	0.22	11.04	18.39	0.15	18.24
2010	1 811 520 734	46.91	49.04	0.23	10.96	18.57	0.12	18.45
2011	1 939 559 111	40.68	45.22	0.26	11.27	18.81	0.11	18.70
2012	1 860 455 828	54.81	38.40	0.19	10.30	17.05	0.10	16.95
2013	2 020 705 608	70.94	39.77	0.14	10.55	17.30	0.08	17.22
2014	2 110 753 902	45.77	42.24	0.22	10.78	17.45	0.11	17.34
2015	2 266 188 975	43.68	59.15	0.25	12.71	21.13	0.11	21.03
2016	2 078 509 893	63.38	54.60	0.15	12.96	21.18	0.07	21.11
2017	1 879 089 768	49.17	48.33	0.17	12.50	19.39	0.07	19.32

Source: own elaboration pursuant to the data from UN.

Briefly, the trade balance is positive indicating high and increasing competitiveness of Turkey in the EU market. Although TC index fluctuates over time, TC index shows that Turkey has a relative comparative advantage. The large and increasing value of the TC index reflects high and improving competitiveness of Turkey in the EU market in fruits. In the analysed period, the share of the EU in the Turkish import of fruits was 11.69% compared to Poland's. Therefore SGI index was low confirming the increase in competitiveness of Turkish fruit sector. Similarly the SI index confirms high and improving competitiveness of Turkey in the EU.

In the entire analysed period, the relative revealed comparative export advantage index (XRCA) values were greater than 1 and the relative trade advantage index (RTA) was positive (Table 2). Both values of XRCA and RTA indices show high and improving competitiveness of Turkish fruit sector.

CONCLUSIONS

An analysis of the competitiveness of Polish and Turkish fruit sector with respect to the EU market has been presented, based on eight indices of comparative advantage, and calculated for the period 2004 to 2017. Indices approach to competitiveness analysis indicated that Turkey has comparative advantage over Poland in the EU market. The Common Organization of Markets limits considerably the regulation and commercial accessibility of this market. The EU preserves a quite elevated competitiveness differential encouraging the intra-communal exchanges. Therefore, Poland enjoys free access to the EU market and the development of the global market, although its competitiveness is declining. The CAP instruments covering Poland resulted in doubling the actual income of farmers, which improved their economic situation and increased the opportunities to finance the current expenditure and to implement modernisation investments. After the accession, a considerable production and economic progress was made, but its competitiveness does not represent a strong foundation of international competitiveness. These difficulties related to physical accessibility limits the position of Turkey.

For Turkey competing in the EU market is possible due to the integration measures consisting in the establishment of producer groups and organisations. The producer organisations and groups make it possible for the Turkish farmers to consolidate the supply, prepare standardised product batches and with base storage provide the supply throughout the season.

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FOOD IMPORTS AND FOOD SECURITY OF MAIN GLOBAL MARKET PLAYERS

Magdalena Jaworska, PhD¹

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The main purpose of this paper was to assess the openness of trade in food products in the context of changes in food security levels. The period covered by this study is 1995–2015. The research was based on outcomes reported by main players of the global market. The basic source of data were online databases and reports. Once collected, the data was analysed with the use of quantitative and qualitative research methods. Selected statistical methods, indices of structure and dynamics, indicators of economic openness and indicators related to three dimensions of security (availability, access and stability) were used. The analysis resulted in numerous conclusions. In the study period, food imports followed a global growth trend with alternating periods of contrasting developments. In the countries covered by this study, the openness of trade in food was higher than that of global imports and followed a growth trend. The singularities of the development of the agri-food sector were reflected in decreasing values of the exports-to-imports ratio, and were decisive for the positive growth rate of per capita agri-food output. According to the analysis of relationships between changes in trade levels and selected food security indicators, imports proved to be positively correlated with physical and economic availability, and negatively correlated with stability. Based on the results, a general conclusion may be drawn that economic growth resulted in structural changes which contributed to improving access to food.

Keywords: food, food security, importers, international trade

JEL codes: F14, F41, Q17, F62

INTRODUCTION

Agriculture is subject to specific environmental, climate, production and socio-cultural conditions which complicate the situation in the agri-food market in a number of ways. On the one hand, the economic singularities of resources used in the production process result in a relatively low efficiency of agri-food manufacturing and processing. On the other hand, these products are considered to be a 'sensitive' commodity which is of key importance in the context of the need to ensure food security. Their critical

importance in both economic and political terms is compounded by the fact that all countries around the world participate in agri-food trade, and that international trade itself continues to be the overarching dimension of progressing economic globalization. The above is the starting point for the investigation and questions on global food trade: how did the trade activity and food security level of key global market players evolve? Do these categories follow a parallel evolution or are they independent from each other? This is why the main purpose of this paper was to assess the openness of trade in food products with refer-

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, jaworska@up.poznan.pl, +4861 848 71 34

ence to changes in food security levels. Contributing to that objective were the analyses related to: a comparative assessment of the importance of food trade; the intensity of involvement of selected countries in the world food trade; an evaluation of food security levels in three dimensions; and a test of relationships between imports and food security.

THEORETICAL BACKGROUND

This paper is a part of the discussion on interactions between trade and food security. This topic is addressed at both a national and international level, including multilateral WTO trade negotiations. The extent of the negotiations, and especially the difficulties in developing a global framework to ensure consistency between national objectives and the reduction of food insecurity at a global level, emphasize the specific context of relationships between trade and food security (Krivonos, Morrison and Canigiani, 2015). According to the definition, food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food meeting dietary needs and food preferences necessary for an active and healthy life (FAO, 2017). The multidimensional nature of food security accentuates four fundamental pillars: availability, access, utilization and stability (UNCTAD, 2017a). Note that availability refers to the physical supply of food from all possible sources, e.g. all forms of domestic production, commercial imports, food aid, etc. (Aurino, 2014).

The activity of different countries in the global market for agri-food products is a consequence of real conditions of farming which impose limitations on output growth. The prevailing conditions are decisive for the spatial distribution, level and commodity structure of the supply of agricultural products and, as a consequence, for the need to meet the demand through imports (Herrmann, 2009). Meanwhile, by increasing the transnational interconnectedness between markets, globalization enables balancing local production instabilities (UNCTAD, 2017b) which means addressing demand in a relatively stable and fast way. However, it can also make a country increasingly dependent on food imports. Zhu drew at-

tention to this fact when analysing the theoretical and empirical interactions between international trade and food security in China, and concluded that an increasing dependence on food imports will adversely affect food security. He also emphasized that while international trade is not necessarily the cause of food insecurity, it affects the demand for and supply of food production in the global market. Therefore, it also has an impact on prices, the increase of which aggravates a populations' income situation (Zhu, 2016).

Also, trade openness improves each dimension of food security. The flows from surplus to deficit areas improve the availability of food and increase the income of exporters (who charge higher prices in the market than would be possible without trade) and importers (who make purchases at lower prices) (Wacziarg and Welch, 2008). Trade may improve balanced nutrition patterns through product diversification while helping to make availability more stable as domestic production uncertainty is higher than the total production risk across international markets (Brooks and Matthews, 2015). International trade is also believed to have an important role in reducing the adverse effects of climate change on food security (Nelson, McCarl and Thayer, 2010; Chen et al., 2017). The observations conducted by FAO (2005) also confirm the existence of a positive relationship between market openness and food security. Therefore, the hypothesis may be formulated that efforts made to improve the food situation increase engagement in international trade, and therefore make up shortfalls in food production.

In this context, Yu and You (2013) paid attention to the developments which have taken place in the last two decades. A rapid growth of food prices in 2005–2008 and the recent economic downturns were factors that undermined global efforts for security. Also, increasing food availability through imports is a short-term solution. Many food importers either continue to struggle to fully address the domestic demand (Braun et al., 2008) or experience a clear deterioration of food availability. This can be caused by natural conditions (e.g. frequent floods or droughts) or human activity. Adverse developments are believed to be caused primarily by: high energy prices which entail a dramatic growth in the consumption of

agricultural products used for the production of bio-fuels; a decline in agricultural productivity and international supply; climatic change which exposes food production to uncertainty; increased demand in international markets; and inefficient regulation of the futures market (Chatterjee and Murphy, 2013). The above shows that food security is highly vulnerable to threats involved in the global context of market processes.

DATA AND METHODS

This study covered food products identified as a product group in accordance with SITC (Standard International Trade Classification). The timeframe for this study is 1995–2015. Research was based on the outcomes of seven main players of the global market selected by average figures of trade flow. This group included the European Union, the United States, China, Japan, Canada, Korea, and Hong Kong (China). The basic source of data were online databases and reports, including those delivered by UNCTAD (the United Nations Conference on Trade and Development), FAO (the Food and Agriculture Organization), WTO (the World Trade Organization), OECD (the Organization for Economic Co-operation and Development) and WB (the World Bank). Once collected, the data was analysed with the use of both quantitative and qualitative research methods. To describe the structure of phenomena under consideration, selected statistical methods were used, including: measures of dependence (the Pearson correlation coefficient), measures of position, measures of volatility and structural and dynamic indicators. The analysis of the dynamics of the economic phenomena used the mid-term rate of changes, which enables evaluating the changes in the whole period covered by the study. It was calculated using the geometric mean. The comparative assessment of the importance of trade in food products, and of the intensity of involvement of selected countries in the world food trade was enabled by purposefully selected measures, such as: the trade openness rate [$\text{import food}/\text{GDP} \times 100$], the import rate [$\text{import food}/\text{GNI} \times 100$], the import penetration index [$\text{import food} / (\text{GDP} - \text{import food} + \text{export food}) \times 100$], the import intensity index [$\text{import food}/$

$\text{production food} \times 100$], the share in total imports, and the internal comparative advantage measurement index (Trade Coverage).

Food security results may be analysed at multiple levels, from a global and national level of food availability, through the assessment of household access to food, to individual nutrition performance. For various reasons, it is difficult to reach a consensus on a common framework for food security monitoring on a national and global basis. This ultimately boils down to selecting the most adequate database for the assessment of the global level of food security (Aurino, 2014). Therefore, in this paper, progress in improving importer food security was assessed based on five indicators: value of agri-food production per capita; GDP per capita and the share of agri-food imports in total exports. The selection of indices was determined by the multidimensionality of food security and the macroeconomic nature of this analysis. The indices refer to three dimensions of security: availability, access and stability.

RESULTS AND DISCUSSION

Trade globalization has progressed despite crises, natural disasters or geopolitical tensions, which are also responsible for price instability and changes in the group of leading trading partners (WTO, 2015). Major events that affected the levels of international trade include: the Mexican peso crisis (1995–2001), the Asian financial crisis (1997), the adoption of the euro (2000), the bursting of the dot-com bubble (2001), the accession of China to the WTO (2001), the increase in oil prices resulting from a strong demand for natural resources in China, and the political instability in oil-producing countries. The last decade was determined by the consequences of the 2008 financial crisis caused by the collapse of the US sub-prime mortgage market, leading to a global recession in 2008–2011 (WTO, 2015). These external shocks have also left their imprint in the general trends of world trade flows in the agri-food sector. During the 21-year study period, agri-food trade volumes nearly tripled despite the declining importance of agriculture in the global economy considered in quantitative terms. In 1995, food imports accounted for

USD 468,624 million (9.04% of total imports) while in 2015, they reached as much as USD 1,357,754 (8.23%). There were some contrasting fluctuations around the global growth trend. In these sub-periods, compared to global commodity trade trends, changes in agricultural trade volumes were less dynamic and relatively highly convergent (Jaworska, 2012).

The growth in global trade is accompanied by relatively insignificant changes in commodity structure (Aksoy, 2005); this affects imports more than exports and agricultural raw materials more than food. Nearly 40% of global demand originated from European Union countries, of which 2/3 was addressed by internal trade. Other countries surveyed accounted for over 1/4 of global food imports, and food trade did not represent a dominant share of their international trade. Moreover, the decreasing share of food imports in total imports was inductively confirmed to be a general pattern, except for Canada, the US and Korea. Of all the countries surveyed, only Canada and the US were not net food importers in 1995–2015 (Table 1). As regards other economies, the average import-to-export ratio ranged from 1.02 in China to 3.62 in Korea. The highest (though decreasing) ratio was recorded in Japan (18.34).

According to a comparative analysis of food trade transformation and intensity of involvement of global leaders, based on selected indicators of economic openness, a growth trend was observed in almost

every country covered by this study (some exceptions were found mainly in China). In nominal terms, the annual average growth of global food imports was 5.46%, and followed an upward trend in all countries considered. The highest growth rate was recorded in China (12.8%) where the value of food purchased increased nearly twelve-fold from 1995 to 2015. In turn, the lowest level was observed in Japan which spent only 16% more on food in 2015 than 21 years prior.

High economic openness (measured as the import-to-GDP ratio) makes import-dependent countries exposed to external economic shocks, including threats posed by a sharp upward movement in prices in global markets. The openness of food trade was barely 1.63%. In turn, the contribution of food to agricultural GDP was definitely higher, growing each year to reach nearly 44% in 2015. However, it differed across importers covered by this study: the highest levels were reported in Hong Kong, the EU, Canada and Japan while China recorded the lowest rate, primarily because of internal conditions.

The penetration index, which informs of the proportion of domestic demand satisfied with imported products, is particularly important when assessing a country's involvement in international trade (Table 1). The rate of food demand covered by global food imports was 1.63% and grew steadily, especially in pre-recession years. Hong Kong and the EU saw

Table 1. Average annual growth rate of selected indices for main players of the global market in 1995–2015 (%)

Specification	World	EU28	Canada	China	Hong Kong	Japan	Korea	USA
Food imports	5.46	4.30	6.69	12.80	4.45	0.76	6.52	6.70
Share of food imports	-0.47	-0.35	1.80	-0.67	-0.88	-2.33	0.45	1.00
Economy openness degree	0.97	1.58	1.77	-1.53	0.56	1.86	1.79	2.23
Imports ratio	0.92	1.56	1.65	-1.62	0.52	1.71	1.74	2.07
Import penetration	0.97	1.58	1.76	-1.57	0.49	1.84	1.76	2.22
Import intensity	0.91	2.99	2.24	4.99	1.69	4.00	6.25	2.36
Food imports per capita	4.15	4.05	5.61	12.13	3.59	0.69	5.93	5.72

Source: calculations and author's own study based on: UNCTADstat (2018). International trade in goods and services, Economic trends (1995–2015) and FAOSTAT (2018). Food and agriculture data: Production. Population, Macro-Statistics, Food Security (1995–2015).

a relatively high degree of dependence of their domestic demand on imports. The highest growth rate (56%) was recorded in the US.

The assessment of activity of main global market players is supplemented with the analysis of import intensity of agricultural production. Globally, average contribution of food imports to final domestic food output in 1995–2014 was 47%. Average absorption of imported agricultural commodities by production of economies under consideration was much higher, and followed an upward trend, particularly marked in Asian countries. Meanwhile, in China, the extent of food trade globalization was disproportionately low (6.6%).

Analysis of per capita imports sheds some objective light on the assessment of importance and intensity of food trade at a level of global market leaders. In 1995–2015, the highest rates were recorded in Hong Kong, the EU, Canada and Japan, while the lowest were observed in the Chinese economy. Due

to a relatively small population growth compared to commodity flow growth, imports per capita followed an upward trend, especially in China where annual growth rate was three times higher than in the world.

When considering availability and stabilization dimensions of food security at a national and global level, particular attention should be paid to two issues considered collectively: the ability to generate enough funds to finance required food imports; and domestic output per capita. Both for food and agricultural commodities, the average export-to-import ratio did not exceed 10% because of the relatively small importance of these products for total trading volume. The highest and the lowest exports-to-agricultural-imports ratios were recorded in Japan and China, respectively, while a general downward trend was evident (Fig. 1). Interestingly, the index doubled between 1995 and 2015 in countries other than net importers, i.e. Canada and the US. Similar changes were observed for the exports-to-food-imports ratio.

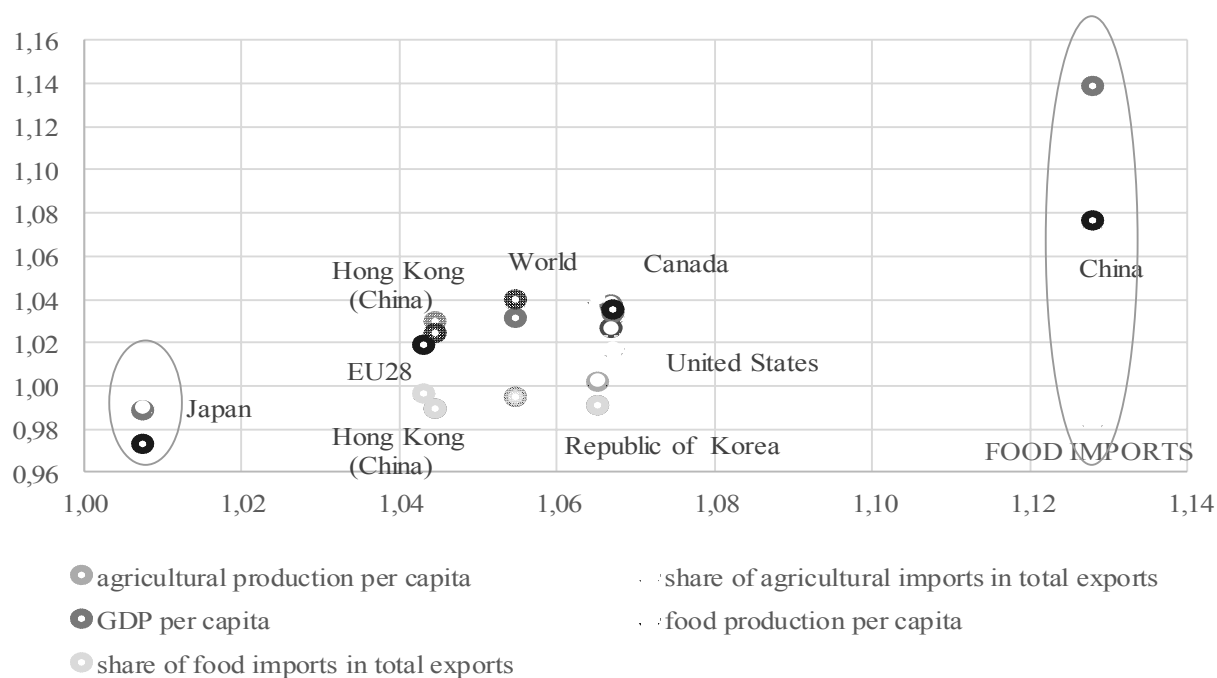


Figure 1. Correlation between changes in the value of food imports and food security levels over the 1995–2015 period

Source: calculations and the author's own study based on: UNCTADstat (2018). International trade in goods and services, Economic trends (1995–2015) and FAOSTAT (2018). Food and agriculture data: Production. Population, Macro-Statistics, Food Security (1995–2015).

A more complete picture is provided by the analysis of agricultural output per capita. Globally, in 2014, this index reached nearly USD 425, with an annual growth rate of 3.9%. As foodstuff represents a fundamental part of agricultural production, the changes to and the level of food production per capita were only several percent lower. Undeniably, import activities of selected economies depend on their production potential. The higher the intensity of agricultural production and the higher the concentration of agricultural production on a relatively large privately held agricultural area, the weaker the willingness to develop agricultural imports irrespective of global changes. This is especially true for the US, the EU and Canada.

Analysis revealed the evolution of trade activity and food security level of key global market players. To determine the direction of that process and identify the interrelationships, the correlation between changes in the value of agricultural imports and selected food security indices was analysed over the 1995–2015 period. As shown by the results, at a global level, a strong positive correlation exists between agricultural imports and the physical and economic availability of food (except for Japan and Korea where the correlation was moderate), and a weak negative correlation exists between agricultural imports and stability of food security. The increase in agricultural imports was accompanied by a decline in food security levels measured with the total-exports-to-agricultural-imports ratio and the total-exports-to-food-imports ratio. The correlation between these characteristics varied extremely from one country to another.

CONCLUSIONS

The theoretical and empirical analysis performed in this paper answered the research question asked in the introduction and enabled the implementation of the main research plan which was to assess the openness of food trade in relation to the changing level of food security experienced by main players of the global market. The discussion resulted in the following conclusions and generalizations. In 1995–2015, food imports followed a global growth trend marked

by the occurrence of external shocks which slowed down the development of trade flows. Ultimately, food trade volumes nearly tripled while the share of food in total imports decreased, except for Canada, the US and Korea. Note that only the first two of them were not net importers of food.

According to a comparative analysis of food trade and the intensity of the main players' involvement in global food trade, a growth trend was observed, with China and Japan being the main exceptions. The contribution of food products to agricultural GDP varied across countries but was more than ten times higher than trade openness measured by taking into account the profitability of the global economy. The singularities of development of the agri-food sector were also reflected in decreasing values of the exports-to-imports ratio both for agricultural commodities and foodstuff. That ratio doubled in countries other than net importers. Agri-food output per capita followed an upward trend and was driven by local conditions.

According to the analysis of relationships between changes to food imports and selected food security indicators, agricultural imports demonstrate a strong positive correlation with physical and economic availability, and a weak negative correlation with stability. This was true both on a global basis and for different economies covered by this study. Based on the above, a general conclusion may be drawn that economic growth resulted in structural changes which contributed to improving access to food.

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DUTCH DISEASE IN OIL-EXPORTING COUNTRIES: A SURVEY OF THEORY AND EVIDENCE

Katarzyna Czech, PhD¹

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

Dutch disease phenomenon can be observed in a country that discovers an important and substantial natural resource deposit and starts exporting it on a large scale. In consequence, the country's currency appreciates reducing competitiveness of its traditional export sector, including agricultural sector. The Dutch disease is considered to be one of the most significant reasons for the natural resource curse. The aim of the paper is to consolidate a growing literature on the Dutch disease and to provide theoretical framework for analysing this phenomenon. It refers to both developed and developing oil-exporting countries. The paper stresses the fact that the vulnerability to the Dutch disease depends strongly on economic policy, political regime and quality of institutions.

Keywords: Natural resource curse, Dutch disease, oil market

JEL codes: F43, O13, Q32, Q33

INTRODUCTION

Oil is one of the most important commodities in the world. There are countries that highly depend on oil income. Surprisingly, market evidence suggests that natural resources, including oil, may be a curse rather than blessing, since many resource-rich countries tend to develop slower than resource-poor ones. The phenomenon gives a rise to a concept known as the natural resource curse (Gelb, 1988; Auty, 1993). Sachs and Warner are among the first researchers who empirically test the relationship between natural resource abundance and country's economic growth. They find evidence that resource-poor countries perform generally better than resource-rich countries (Sachs and Warner, 1999, 2001). However, it concerns mainly the countries that overwhelmingly rely

on income derived from natural resources. Gylfason includes in his research another economic indicators that are likely to be negatively affected by a discovery of an important and substantial natural resource deposit. He shows that natural resources may bring adverse effects on country's human capital, economic policies, level of savings and investments, and institutions (Gylfason, 2001, 2006; Gylfason and Zoega, 2006).

There are two main streams in literature that explain the natural resource curse (Badeeb, Lean and Clark, 2017). The first one is focused on economic and the second one on political explanations. The Dutch disease, long-term trends in world prices, commodity prices' volatility, permanent crowding out of manufacturing, the neglect of education and failures of economic policy are among the most important

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, katarzyna_czech@sggw.pl, +4822 593 41 12

economic reasons of resource curse (Van der Ploeg and Poelhekke, 2009; Frankel, 2010). Political explanations, on the other hand, embrace rent seeking, weak institutions and corruption (Iimi, 2007; Eregha and Mesagan, 2016).

The Dutch disease is considered to be one of the most significant triggers for the natural resource curse. The paper is focused on the Dutch disease phenomenon among oil-exporting countries. It should be emphasized that there are different approaches to the problem of Dutch disease among oil-exporting countries. There exists a striking contrast especially in their fiscal and monetary policy adjustments to the oil boom. The aim of the paper is to consolidate a growing literature on the Dutch Disease and to provide theoretical framework for analysing this phenomenon. It refers to both developed and developing oil-exporting countries. The paper is organised as follows. Section 2 contains literature review concerning the Dutch disease concept. Section 3 surveys empirical studies testing for Dutch disease effect in both developed and developing oil-exporting countries. Section 4 summarizes and concludes.

DUTCH DISEASE. A SURVEY OF THEORY

Adam Smith and David Ricardo, two main classical economists, claim that countries with abundant natural resources perform economically better than those without. This belief was supported by many post-war economists, especially in the early 1970s. The situation has changed in the late 1970s, when the so called Dutch disease occurred. The term was introduced by 'The Economist' in 1977 and reflected the crisis in the Netherlands driven by discoveries of vast gas deposits in the North Sea, in 1959 (Badeeb, Lean and Clark, 2017). The appreciation of the Dutch guilder, followed by the gas export boom, led to deindustrialization, decline in traditional export of tradable sectors and price increase in non-traded goods and services².

In economic literature, the Dutch disease model was introduced by Corden and Neary (1982). The Dutch disease is a phenomenon related to adverse effects that result from discovering new natural resources. The production and export of natural resources lead to country's currency overvaluation, and in consequence, generate adverse externalities in other sectors of tradable goods and services. It altogether hampers those sectors from developing, regardless of the level of applied technology, their innovation regime, quality of labour force etc.

The Dutch disease model assumes that the economy comprises three sectors: a tradable sector of natural resources, a tradable manufacturing sector and a non-traded sector. Moreover, a tradable sector of natural resources and a tradable manufacturing sector are presumed to be booming and lagging sub-sectors, respectively. The Dutch disease occurs when the boom in natural resource market (e.g. oil) leads to a rise of domestic income, money supply and demand for goods. This, in turn, brings about high inflation and appreciation of real currency. In a process, higher domestic prices and stronger home currency make the country's export of other goods in a tradable manufacturing and agricultural sector less competitive. This adverse effect is called 'the spending effect' (Corden and Neary, 1982). There is also another negative consequence (so-called 'pull effect') that squeezes the non-resource manufacturing and agricultural sector (Badeeb, Lean and Clark, 2017). The 'pull effect' is associated with the situation when, in a result of boom in natural resources, domestic input prices increase and generate a rise in the production cost of other tradable sectors such as manufacturing and agriculture. It altogether hampers the overall growth of non-resource tradable sector.

However, it should be added that the Dutch disease is likely to lead to the expand of non-traded sector. Higher domestic income and higher personal revenues conduce to the increase of demand for non-

² Domestic production structure embraces the traded and non-traded goods sectors. Tradable goods include those production activities that are traded internationally (e.g. shoes, cars, food, copper, etc.) and their price is determined in the world market. Non-tradable sector involve items which consumers and producers are in the same location and a price is determined by supply and demand in the local market. Non-tradable goods and services include electricity, water supply, public services, real estate, construction, local transportation etc.

traded goods and the rise in their prices. It is favourable to the growth of that sector mostly during the time of boom in the natural resource market, when the money supply increases.

OIL-DEPENDENT ECONOMIES

Natural resource dependence is defined as a degree to which a country economic performance is determined by resource revenues. Natural resource dependence is very often measured by the ratio of natural resource rents relative to gross domestic product (GDP) or as a percentage of natural resource export to total country's export (Auty 2007; Dietz, Neumayer and De Soysa 2007).

Figure 1 presents the countries that are most dependent on oil revenues. Data reflects oil rents as a share of GDP in 2016. Oil rents are estimated as a difference between the value of crude oil production at world prices and total cost of production.

Among the 21 countries that highly rely on oil rents, oil dependence ranges from 3.8% in Norway, to 44% and 42.4% in Kuwait and Iraq, respectively. Apart from Kuwait and Iraq, Saudi Arabia, Oman, Congo Republic, Azerbaijan and Qatar represent

those countries where oil rents are more than 15% share of GDP.

Sachs and Warner (1995), Gylfason et al. (1999), Leite and Weidmann (1999), Auty (2001), Manzano and Rigobon (2001), among others, demonstrate that the share of resource rents in GDP is negatively correlated with the GDP per capita growth rate and confirm that a high resource dependence can lead to negative development of resource-rich country. Auty (2001) shows that GDP per capita of resource-poor countries has a tendency to grow much faster, even two to three times, than per capita incomes of resource abundant countries. Nili and Rastad (2007) find that oil-dependent countries' average per capita income has fallen 29% over the period 1975–2000. It is worth emphasizing that this indicator has increased by 34% for all countries of the world over the same period of time.

Mehrara (2008) finds that positive oil revenues shocks have a short-term positive and significant impact on economic growth. Negative oil shocks effects, on the other hand, have negative and significant impact. However, Mehrara (2008) shows that the effects of negative oil revenues shocks are over twice as large as effects from positive shocks. He points

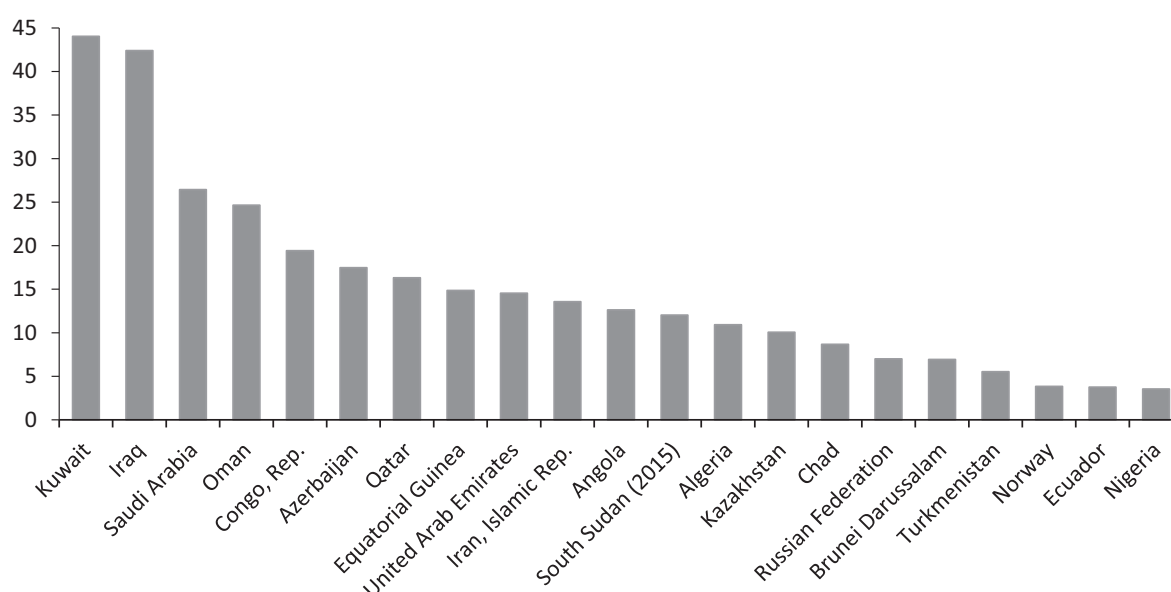


Figure 1. Oil rents as a share of GDP in 2016 (%)

Source: own elaboration based on World Bank database.

out that bust in the oil market seriously hampers economic growth, while oil boom has positive, but often contemporaneous and inconsiderable impact on economic growth. Therefore, the overall influence of oil revenues shocks on country's economic growth is very often negative and is taken as a symptom of the Dutch disease.

Nigeria is the example of developing country that has been suffering the Dutch disease from the late 1950s, when its first oil deposits were discovered. Between 1965 and 2000 oil revenues per capita increased there from USD 33 to USD 325, while per capita income almost did not change. The part of population that has to survive on less than 1 USD per day climbed from 26% in 1970 to almost 70% in 2000 (Van der Ploeg, 2011). Apart from Nigeria, there are many other developing countries that are highly vulnerable to the Dutch disease like for example Algeria, Congo, Mexico, Saudi Arabia, Venezuela, Zambia (Tornel and Lane, 1999; Torvik, 2002). Botswana, Chile, Malaysia, Oman, Thailand are, on the other hand, among developing countries that have been able to avoid the Dutch disease. Most of the developed oil-dependent countries seem to be more resistant to the Dutch disease. Mehlum, Moene and Torvik(2006) confirm it for Australia, Canada, Norway, United States, the countries which are both rich in natural resources and have high per capita income. They claim that quality of institution determines the country's vulnerability to the Dutch disease phenomenon.

It should be stressed that there is a substantial difference in a policy adjustment to the oil boom between resource-rich countries. They have distinct views on both fiscal and monetary policy, and different type of political regime. There is a huge body of literature that shows that country's economic policy, political regime and quality of institutions determine whether countries are able to avoid the Dutch disease and the natural resource curse (Van der Ploeg, 2011).

CONCLUSIONS

Natural resource boom has positive impact on resource-rich country, however, an increase in foreign exchange inflows may have also a negative long-term effects known as the natural resource curse. One of

the most significant triggers for the natural resource curse is called the Dutch disease. Dutch disease phenomenon may touch a country that discovers an important and substantial natural resource deposit and starts exporting it on a large scale. In consequence, the country's currency appreciates reducing export's competitiveness of other goods, including agricultural items, and conducting to a decrease in their production. Furthermore, the Dutch disease is likely to lead to the expand of a non-traded sector and increase in price of non-traded goods. It altogether may be harmful for oil-rich countries' economy, especially during a time of negative oil price shocks. Many researchers study the relationship between oil dependence and economic growth of rich-oil countries. The vast majority of them confirm the negative link between these variables. However, it needs to be emphasized, that their results are highly influenced by the choice of analysed country. The vulnerability to the Dutch disease depends strongly on economic policy, political regime and quality of institutions.

Economists struggle to find the solution to negative externalities associated with the Dutch disease phenomenon. It is worth emphasizing that during the boom in the natural resources market high profits are incorporated in the country's government budget. Real appreciation of the currency may be avoided by accumulating budget surpluses. However, revenue sterilization and accumulation requires a mature, long-distance results-oriented government, which is able to resist the pressure of enjoying high oil profits in short-run period. It should be stressed that a short-horizon of the government's power gives an edge to that problem. There is a huge temptation for governments to achieve short-term political goals by using windfall oil revenues (Roemer, 1983). Atkinson and Hamilton (2003) find that resource-rich countries with effective, high-quality institutions are more likely to mitigate the negative consequences of natural resource curse phenomenon. Van der Ploeg (2011) stresses that the resource curse is not etched in stone. This belief may be pictures by the phrase below (Van der Ploeg, 2011): 'Resource rich countries with good institutions, trade openness, and high investments in exploration technology seem to enjoy the fruits of their natural resource wealth.'

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QUALITY OF LIFE IN POLISH FARMERS' HOUSEHOLDS ASSESSMENT WITH TOPSIS METHOD

Romana Głowicka-Wołoszyn, PhD¹; **Andrzej Wołoszyn**, MSc²;
Feliks Wysocki, Full Professor³

Faculty of Economics and Social Sciences, Poznań University of Life Sciences

ABSTRACT

The aim of the research was a multidimensional assessment of the quality of life in farmers' households along with its synthetic measure and a typology of household classes, rendered by the measure. The 2015 data on 730 farmers' households were used to analyse their quality of life in nine dimensions: material living conditions, employment, health, education, leisure and social relations, economic and physical security, civic participation, environmental quality, and the subjective assessment of well-being. Due to concomitance of features measured on metric and non-metric scales, generalized distance measure (GDM) was applied as part of the TOPSIS method to determine the distance of objects from the model values. The study drew on microdata from the Social Diagnosis survey conducted in 2015 by the Council for Social Monitoring, and employed *clusterSim* R-package for calculations.

Keywords: quality of life, class typology, TOPSIS, farmers' households

JEL codes: C38, I31

INTRODUCTION

The concept of the quality of life made its entrance into the economic sciences during the 1960s to broaden and provide a more social perspective to the notion of economic well-being (Panek, 2016). Since then, there have been many studies on the subject, yet not a single universal definition took shape (Borys and Rogala, 2008; Borys, 2015; Panek 2016; Dudek and Szczęsny, 2017). The complex and multifaceted idea has alternatively been identified with prosperity or well-being, defined as a state of contentment, complacency, happiness, or even equated with existential

fulfilment, flowing from Maslowian-like self-actualization (Campbell and Converse 1972; Rutkowski 1987; Bywalec and Rudnicki, 1999). However phrased, the study of such a many-sided concept must require an integrated approach that reflect all its objective and subjective aspects (Kasprzyk, 2012; Panek, 2016) – an approach whose application is by no means straightforward. The current scientific discussion on the quality of life, the ongoing process of redefining its meaning, the development of new analysis methods and measuring techniques (Ostasiewicz, 2004; Panek, 2016), all testify to the vitality of the concept, both as a research subject and as a social

¹ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, roma@up.poznan.pl, +4861 846 61 85

² Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, andrzej.woloszyn@up.poznan.pl, +4861 846 61 85

³ Corresponding author: Wojska Polskiego 28, 60-637 Poznań, Poland, wysocki@up.poznan.pl, +4861 848 71 18

idea. Yet, the abundance of definitions and quantification proposals has made the task of standardization all the more urgent, as only a common ground operational framework permits reliable monitoring and consistent comparisons between individuals, social groups, regions or countries.

The framework adopted by the Polish Central Statistical Office (GUS) covers 9 dimensions recommended by the European Statistical System. These are: material living conditions (D1), employment (D2), health (D3), education (D4), leisure and social relations (D5), economic and physical security (D6), civic participation (D7), quality of the environment (D8), and subjective assessment of well-being (D9). Correspondent set of measurable indicators developed by GUS forms a tentative, modifiable core that enables in-depth analysis of the individual dimensions. Szukielojć-Bieńkuńska (2015) draws attention to the particular role of GUS funded cyclical Social Cohesion Survey (BSS) in promoting research on the quality of life in Poland. Editions of the survey were carried in 2011 and 2015 (its last edition just completed) reaching about 15 thousand households. Yet another study on the quality of life in Poland is overseen by the Council for Social Monitoring, as part of bi-annual 'Social Diagnosis' project and includes 8 dimensions: social capital, psychological well-being, physical well-being, social well-being, civilization level, material well-being, stress in life and pathology. In 2015 the survey covered about 12,000 households.

Monitoring the quality of life of various demographic, social and economic groups of households is essential for the implementation and adaptation of public policies oriented towards social inclusion. Farmers' households are one such group, whose material well-being has been progressing steadily in recent years. Their main source of income comes from agricultural activity, still characterized in Poland by a strong link between production and consumption, at least compared to other socio-economic groups. Following Poland's accession to the EU and with subsequent increases in agricultural prices, subsidies, and

production volume, the income situation of farmers improved notably (Kozera and Wysocki, 2014). The pace of the growth was higher than in other groups, which translated into narrowing of the income gap that separated the farmers' from the better-off households (Wołoszyn, 2013). Still, despite the recent improvements or more than a decade long operation of cohesion policies, farmers' households continue to exhibit much lower consumption levels, especially as regards durable goods, a fact indicative of lower standards of living (Kozera, Głowicka-Wołoszyn and Stanisławska, 2014).

The aim of the research was a multidimensional assessment of the quality of life in farmers' households in 2015, along with its synthetic measure and a typology of household classes, rendered by the measure.

MATERIALS AND METHODS

The study drew on microdata from the survey 'Social Diagnosis – the objective and subjective quality of life in Poland', 2015 edition (www.diagnoza.com) conducted by the Council for Social Monitoring (Czapiński and Panek, 2015), that covered 730 Polish farmers' households. The research proceeded in two stages.

- **Stage I** – Construction of the synthetic index of the quality of life in farmers' households using the TOPSIS method (Hwang and Yoon, 1981; Wysocki, 2010). This stage itself consisted of several steps. First, from among all pure survey questions and tailored indicators (simple features in the parlance of the TOPSIS method) nine sets of features were selected that could be viewed as joint diagnostic measures of the nine quality of life dimensions (in line with the definition adopted by GUS): material living conditions (D1), employment (D2), health (D3), education (D4), leisure and social relations (D5), economic and physical security (D6), civic participation (D7), quality of the environment (D8), and subjective well-being (D9)¹.

In the second step all simple features that had been

¹ These were (D1): previous month net income, meeting household needs with present income, material situation over previous 2 years, share of food and beverages in total expenses, dwelling sharing, sanitary conditions, meeting nutritional needs; (D2): professional skill acquisition over previous 2 years, job satisfaction; (D3): disability, health problems affecting

considered destimulants of the quality of life were transformed into stimulants. Feature normalization followed in the third step. Next, the coordinates of the positive (A+) and negative (A-) ideals were taken to be the maximum and minimum values of the features over the set of all $N = 730$ objects (households). These coordinates were needed for the fifth step: the calculation of the distance between objects and the ideals.

With a set of features measured on an ordinal scale the Euclidean distance cannot be used as object similarity measure. One solution is to choose the Generalized Distance Measure (GDM) as most universal when dealing with qualitative or mixed-type data. GDM is based on the notion of generalized correlation coefficient that combines Pearson linear and Kendall tau correlation coefficients (Walesiak, 2016). GDM distance of the i -th object ($I = 1, \dots, N$) to the positive ideal ($j = N + 1$) or to the negative ideal ($j = N + 2$) is given by the following formula (Walesiak, 2016):

$$d_{ij}^{(*)} = \frac{1}{2} - \frac{\sum_{k=1}^K a_{ijk} b_{ijk} + \sum_{k=1}^K \sum_{l=1}^{N+2} a_{ilk} b_{ilk}}{2 \left[\left(\sum_{k=1}^K a_{ijk}^2 + \sum_{k=1}^K \sum_{l=1, l \neq i, j}^{N+2} a_{ilk}^2 \right) \cdot \left(\sum_{k=1}^K a_{ijk}^2 + \sum_{k=1}^K \sum_{l=1, l \neq i, j}^{N+2} a_{ilk}^2 \right) \right]^{\frac{1}{2}}}$$

where: $I = 1, \dots, N$, $j = N + 1, N + 2$, and (*) denotes either positive or negative ideal.

For ordinal scale, the distance indicator $a(b)$ is calculated in the following way:

$$a_{iuk}(b_{jtk}) = \begin{cases} 1 & x_{ik} > x_{uk} \left(x_{jk} > x_{tk} \right) \\ 0 & x_{ik} = x_{uk} \left(x_{jk} = x_{tk} \right) \\ -1 & x_{ik} < x_{uk} \left(x_{jk} < x_{tk} \right) \end{cases}$$

where: x_{ik} (x_{jk} , x_{lk} , x_{uk} , x_{tk}) is the i -th (j -th, l -th, u -th, t -th) observation on k -th feature. For the distance calculations the study employed *clusterSim* R package.

In step 6 values of the synthetic sub-indices were calculated separately for each of the nine quality of life dimensions ($D = 1, \dots, 9$) in the usual way of the TOPSIS method:

$$q_i^D = \frac{d_i^-}{d_i^+ + d_i^-}$$

where: $0 \leq q_i^D \leq 1$, $i = 1, 2, \dots, N$

everyday activities, smoking, hospitalization, medical expense decisions due to financial hardship; (D4): household head's educational attainment, foreign language competence, internet access, type of internet connection, computer use; (D5): culture related decisions due to financial hardship, book collection at home, meeting culture related needs, leisure related decisions due to financial hardship, satisfaction of leisure needs over previous 2 years, leisure satisfaction; (D6): home insurance, outstanding housing, gas and energy bills, mortgage debt, other debts, emergency fund to cover unexpected expenses, crime and safety concerns, security satisfaction in the place of residence; (D7): support for local government, commitment to the local community, voting in elections, membership in organizations, participation in public meetings; (D8): overcrowding, problems with annoying neighbours, satisfaction with recreational areas; (D9): general life assessment, recent stocktaking, last year evaluation.

Finally, the joint synthetic index of the quality of life (Q_i) was calculated as the average of the synthetic sub-indices from the nine dimensions ($Q_i = \sum_{D=1}^9 q_i^D$). Then, four distinct typological classes of the quality of life were established, based on the mean (Q_{av}) and standard deviation (S_Q) of the synthetic index Q_i :

- class I (high): $Q_i \geq Q_{av} + S_Q$,
- class II (medium high): $Q_{av} \leq Q_i < Q_{av} + S_Q$,
- class III (medium low): $Q_{av} - S_Q \leq Q_i < Q_{av}$,
- class IV (low): $Q_i < Q_{av} - S_Q$.

- **Stage II** – Characterization of the quality-of-life typological classes. At this stage the classes were characterized by dimension-specific synthetic sub-indices of the quality of life. Also, some additional household factors were identified that might possibly influence the level of the quality of life among the farmers' households.

RESULTS

The TOPSIS method employed in the study divided the group of farmers' households into four classes of high (I), medium-high (II), medium-low (III) and low (IV) quality of life, that constituted respectively 15.2, 36, 33.9, and 14.9% of the total (Table 1). The average sub-index values for each individual dimension were without exception smaller in lower quality of life classes. In class I of high quality of life the values were largest, and very similar to each other, their coefficient of variation was just 7.7%. Descending down to lower quality of life classes all sub-indices were falling but their variability rising, and in class IV the coefficient of variation among sub-indices for the nine dimensions registered 31%.

High ratings of quality of life dimensions in class I were even but not identical: health (D3) scored the highest 0.793 followed by employment (D2) 0.782 and environment (D8) 0.776. The lowest rating of 0.619 in this class was given to civic participation (D7), with education (D4) and leisure/social relations (D5) slightly higher (0.686 and 0.691, respectively). The most numerous class II of medium-high quality of life showed high scores for all dimensions except D4 and D7, that can be described as average. The

ranking of dimensions in this class gave preference to health (D3 – 0.698), followed by D8 (0.631) and D2 (0.625). Class III of medium low quality of life also scored high on health (D3 – 0.682) and roughly mirrored the ranking of class II, albeit with middling 0.531 and 0.509 values for D8 and D6 (environment and economic/physical security), respectively. The only notable exception was employment (D2) that plunged to the last position with a low rating of 0.398. The low quality of life class IV was characterized by middling levels of D8 (0.498), D3 (0.494) and D6 (0.452), a very low rating of D7 (0.157) and rather low remaining ratings.

Analysing the quality of life by dimensions rather than classes, one can notice that health (D3) ranked first in classes I-III and second in class IV. Environment (D8) followed second and third in the higher three classes and came first in class IV. In all the classes a consistently low, penultimate place was accorded to education (D4), due perhaps to its purely objective character. Interestingly, employment (D2), that remained high in the ranking of classes I and II, came last in III and IV. The position of this dimension most strikingly set apart the high from the low quality of life classes.

Continuing beyond the quality of life dimensions, the study examined compositions of the four classes by demographic and social characteristics such as household size or head's age and education to find possible determinants of the quality of life in farmers' households. Its higher levels were found to correspond to higher fractions of households run by persons with at least secondary education (class IV: 4.7%, III: 15.4%, II: 39.4%, I: 60.8%). Furthermore, households with high quality of life (I) were headed by persons of average age 45.8 years, ten years younger than those with low quality (IV). The two classes also differed in fractions of small and medium-size households: in class I the 1- and 2-person households (of typically older members) accounted for less than 10%, while in class IV for as much as 34.2% of their respective compositions. At the same time the fraction of 3- and 4-person households in class I was 53%, while in class IV – about 29%. All in all, farmers' households with higher quality of life were better educated, younger and more likely had children (but not too many).

Table 1. Quality of life classification results for farmers' households in Poland in 2015

Specification		Typological class								Overall
		I		II		III		IV		
Quality of life level		high		medium high		medium low		low		
Synthetic (sub)-index		⟨0.669; 0.826⟩		⟨0.550; 0.669⟩		⟨0.432; 0.550⟩		⟨0.194; 0.432⟩		⟨0.194; 0.826⟩
Farmers' households	number	111		263		247		109		730
	share (%)	15.2		36.0		33.9		14.9		100
Dimension ranking with average levels of synthetic sub-indices		D3	0.793	D3	0.698	D3	0.682	D8	0.498	D1 0.037; 0.985
		D2	0.782	D8	0.631	D8	0.531	D3	0.494	D2 0.000; 1.000
		D8	0.776	D2	0.625	D6	0.509	D6	0.452	D3 0.013; 1.000
		D6	0.747	D9	0.613	D1	0.495	D7	0.395	D4 0.000; 1.000
		D9	0.745	D1	0.612	D9	0.462	D1	0.341	D5 0.028; 0.963
		D1	0.711	D5	0.611	D5	0.459	D5	0.334	D6 0.136; 1.000
		D5	0.691	D6	0.609	D7	0.456	D9	0.297	D7 0.000; 1.000
		D4	0.686	D4	0.573	D4	0.445	D4	0.274	D8 0.000; 1.000
D7	0.619	D7	0.508	D2	0.398	D2	0.157	D9 0.000; 1.000		
Demographic and social determinants										
Quality of life level		high		medium high		medium low		low		Overall
Household head's educational attainment (% of farmers' households)										
Elementary or none		3.9		8.1		15.7		45.9		15.7
Basic vocational or Junior high		35.3		52.5		68.9		49.4		55.0
Secondary		50.3		33.3		12.6		4.7		24.6
Higher		10.5		6.1		2.8		0.0		4.8
Total		100.0		100.0		100.0		100.0		100.0
Household size (% of farmers' households)										
1		0.0		2.2		9.8		14.7		6.32
2		9.9		10.1		14.4		19.5		12.94
3		22.6		21.3		11.5		9.2		16.37
4		30.5		23.2		16.6		20.0		21.59
5		8.9		15.5		20.3		12.9		15.72
6+		28.1		27.7		27.4		23.7		27.06
Total		100.0		100.0		100.0		100.0		100.0
Sex of household head (% of farmers' households)										
Female		6.7		12.2		7.6		17.4		10.6
Male		93.3		87.8		92.4		82.6		89.4
Total		100.0		100.0		100.0		100.0		100.0
Age of household head (years)										
Age		45.8		49.0		50.6		55.0		49.9

Source: own elaboration based on microdata from Social Diagnosis 2015 survey (Retrieved from: <http://diagnoza.com>, accessed 15.03.2017).

CONCLUSIONS

Employment of the TOPSIS method with general distance measure GDM permitted multidimensional assessment of the quality of life in farmers' households in 2015. The presented research method can be used in public policy implementations to diagnose the quality of life of specific social groups and the typologies of those groups. This would help to identify factors contributing to the improvement of the quality of life, better target social policy and strengthen support for groups of households with low quality of life.

Analysis of nine quality of life dimensions, overall and for the four classes, helped create profiles of farmers' households with different quality of life levels. The values of dimension specific synthetic sub-indices were high in the first class, high and medium in the second, medium in the third and low in the fourth class. Their ranking however was not the same in every class. Health and environment were ranked everywhere high, education everywhere low, but employment was high in the higher classes and low in the lower ones. A rather heterogeneous dimension of economic and physical security occupied further places in the rankings of higher classes, but were relatively high up in the lower ones.

Demographic and social composition of the households was also found to differ markedly, especially between classes I and IV. In the former, most (61%) households had heads with at least secondary education, their average age was 46 years, and were mostly (53%) comprised of 3 or 4 persons. The households in class IV were mostly (95%) headed by persons with at best basic vocational education, with average age of 55 years, and had mostly (58%) either very few (1 or 2) or very many (6 or more) members.

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PART 3

IMPORTANCE OF SOCIAL CAPITAL IN LOCAL AND REGIONAL DEVELOPMENT

THE ROLE OF SOCIAL CAPITAL AND TRUST IN CONTRACTING

Katarzyna Bentkowska, PhD¹

Collegium of Business Administration, Warsaw School of Economics

ABSTRACT

The aim of the study is to analyse how the social capital in Poland affects contracting. It's role is significant as the contracts concluded on the market are incomplete, i.e. they do not regulate all the issues explicitly. The effects of contractual incompleteness can be mitigated by the high level of trust and well-developed social capital. However, the research results show that the level of trust in Poland has been low for years and that social capital remains underdeveloped. It prevents the social capital to fulfil its role as a factor supporting the conclusion of contracts properly. This results in a real loss for enterprises, as part of the transactions is not conducted.

Keywords: informal institutions, social capital, incomplete contracts

JEL codes: A13, L14, O17

INTRODUCTION

The activities of enterprises can be perceived in accordance with the institutional economics approach as continuous contracting. Of course, the enterprise itself is a bundle of contracts (Alchian and Demsetz, 1972). However, in order to exist and develop, it has to conclude contracts with partners on the market. The more contracts there are, the greater the scale of its operation, the greater the potential for profits and the more dynamic the enterprise's development becomes. In practice, contracts are characterized by a feature important for the enterprises i.e. they are incomplete. This means that it is impossible to specify explicitly all the rights and obligations of the parties or to take into account all circumstances. As a result, entities may be afraid of signing contracts with unverified partners because they fear their unreliability and difficulties in enforcing the contract.

Informal institutions, including social capital, play a significant role in signing contracts and the way they are performed. Well-developed social capital can mitigate the effects of contractual incompleteness and the lack of trust between the partners. It is worth considering how the social capital in Poland affects contracting.

THEORETICAL BACKGROUND

Institutional economy focuses on the key role of institutions in analysing the entities' operations. According to North's approach, institutions that are a set of fundamental political, social and legal principles forming the structure of production, distribution and exchange, can be divided into formal institutions, informal institutions and enforcement mechanisms (North, 1994). Formal institutions consist of the constitution, all legal regulations, administrative and

¹ Corresponding author: Szkoła Główna Handlowa, Instytut Rynków i Konkurencji, al. Niepodległości 162, 02-554 Warsaw, Poland, kbent@sgh.waw.pl, +4822 564 92 37

technical rules. Informal institutions are customs, traditions, culture, religion, certain codes of conduct, norms of behaviour and adopted conventions. Enforcement mechanisms include norms of behaviour, penalties, sanctions and taxes which are voluntary or imposed by governments. They are designed to detect deviations from the adopted rules and to correct them.

Institutions form a structure for all the activities of everyday life and thereby reduce uncertainty, which is their main goal (North, 1994). Formal and informal institutions are interrelated. Formal institutions are supplemented with informal institutions. They may also be modified or even arise due to the existence of certain informal institutions. The effectiveness of formal institutions is therefore dependent on their compatibility with informal institutions.

According to the institutional economics approach, the existence of an enterprise is the result of transaction cost (Coase, 1937). It depends on transaction cost which transactions will be included in the company and which will be conducted on the market. If the cost of arranging transactions inside the enterprise is lower than on the market, one should decide to set up a company. Otherwise, the transaction should be organized on the market. Moreover the company should be increased until the cost of organizing transactions inside the company is lower than organizing them on the market. So this relates to the internal development of the enterprise.

However, here we will focus on the transactions conducted on the market. The company is looking for suppliers there, from whom it purchases the necessary goods and services. It looks also for partners, to whom it sells the goods and services it produces. If an enterprise wants to grow quickly and increase its potential for profits, it has to conduct more and more transactions. When we deal with the exchange process, we always face the problem of the agreement between the parties, of establishing their rights and obligations. So we enter the world of contracts. Contracts are understood here as agreements specifying the terms of the transaction and the obligations of the parties.

Contracts play a significant role in coordinating economic activities and ensuring trade's safety. The

growing interest in contracts is often justified by the fact that the personal relationship between the entities are becoming weaker. Moreover social norms guaranteeing satisfactory contracts' fulfilling are too weak. The exchange of goods and services in the global economy is far from traditional patterns. Besides today we are dealing with growing transaction cost and increasing complexity of contracts. As a result the solutions used in the contracts that have been appropriate even recently, now begin to fail.

Institutional economy draws attention to an important issue related to contracting i.e. contracts' incompleteness. In theory, there are complete (or full) contracts including all the variables that may affect the partners' relationship (Stankiewicz, 2012). In complete contracts the parties specify precisely their rights and obligations for all possible states of the contract's implementation in the future. It is therefore fully enforceable. A complete contract presupposes the legal consequences of every possible solution, foresees all eventual circumstances. However certain conditions must be met if the contract is to be full. The contracting parties must be rational, strive for maximization, have access to full information and have stable preferences.

In the real world there is no full information of course. Besides entities have to deal with information asymmetry, they are bounded rational, their behaviour is opportunistic, there is uncertainty and there are transaction costs. We can therefore treat the complete contract as a certain pattern. A pattern to which the parties may be heading. However, this is not necessarily desirable to make the contracts complete because it would entail high transaction cost and become too time-consuming.

So in practice we deal with incomplete contracts (Hart, 1988; Royal Swedish Academy of Sciences, 2016). They contain some gaps, ambiguities, missing clauses. The contracts neglect many variants of future situations, because they are considered unlikely or they are not expected at all. The parties may sign an incomplete contract and then complete it and renegotiate if necessary during the implementation. They can use judicial or non-judicial proceedings. Besides, not all the gaps in the contracts are dangerous. Sometimes the law contains rules that fill such gaps. More-

over the parties may also try to reduce unpredictability by making the duration of contracts shorter.

Undoubtedly, the legal order plays an important role in contracts' implementation. However, even the best formal institutions are not enough to regulate relations between entities (Lissowska, 2008). In some cases it is difficult to enforce contracts even in the court. The costs associated with such solution are often very high. In addition, we face the increasing complexity of economic relations and the attempts to specify all the complexities and nuances are connected with more and more problems. Furthermore the law is sometimes obsolete and also contains some gaps. Therefore, it is stressed that as the contracts are embedded in the institutional system of social contractual relations, their implementation is supported by the so-called private order. So we can say that there are some social norms, such as honesty, reliability, trust, will to keep promises, which constitute the informal institutions (Staniek, 2017).

Thus, we come to the key role of informal norms for contracting. Such informal norms provide better performance of incomplete contracts. Let's pay special attention to social capital being part of informal institutions. Social capital can be understood as a set of informal values and ethical standards common to the members of a specific group and enabling them to cooperate effectively (Fukuyama, 2003; Sierocińska, 2011; Sztompka, 2016).

Beyond doubt, the general incompleteness of contracts leads to entities' opportunistic behaviour. At the same time the lack of social acceptance of such behaviour, associated with a high level of trust and social capital may reduce such opportunistic behaviour. Well-developed social capital can mitigate the effects of contractual incompleteness and distrust between partners. If the society lacks the confidence that business is conducted honestly, that the partners can be trusted, that they care about their reputation, fulfil their obligations and act in good faith, it has little chance for dynamic development.

The research show there is a strong relationship between the level of social capital and the dynamics of economic growth. Nations with a high level of social capital are wealthier (Krajowy Rejestr Długów, 2015). Social capital decreases transaction cost and

reduces the risk of running a business. With highly developed social capital entrepreneurs proceed reliably not only because of a threat someone may impose legal sanctions. They do it because they fear losing good reputation and being excluded from a group of trustworthy enterprises.

The article is to analyse how the social capital in Poland may affect concluding contracts by the enterprises.

RESULTS AND DISCUSSION

In the analysis there will be used data concerning the level of trust and assessment of social capital in Poland. The emerging evaluation of social capital in Poland is however unfavourable.

The results of the Social Cohesion Survey conducted by the GUS (Statistics Poland) show that the Poles trust primarily people in their immediate environment, i.e. the closest family (98%) and friends (93%). Unfortunately, strangers face much lower level of trust – only about 39% people trust them.

The image of the Poles as distrustful is also presented by the reports of the Center for Public Opinion Research (CBOS). Only 23% of respondents believe that most people can be trusted and 74% think that caution is needed while dealing with other people (Centrum Badania Opinii Społecznej, 2016). In business relations the Poles also follow the principle of limited trust. 35% of respondents believe that business trust generally pays off. However, up to 40% have of the opposite opinion.

The level of social trust in Poland has for years reached one of the lowest values in Europe. According to the European Social Survey 2014, Poland is at the end of the ranking in terms of general trust (ESS-ERIC, 2014). From the answers to three questions about trust in human contacts, assessing the readiness of the others to cheat and caring for their own interests only, one could get 30 points. Poland gained less than 13 points.

According to Skarżyńska, who studies the problem of low level of trust, it may result from several factors. One can mention the shock of transformation, turbulent history, social structure composed of isolated groups or authoritarian upbringing, which

‘carries the message that the world is ruled by force, people are divided into strong and weak, and you can only trust your relatives’ (Podgórska, 2010).

Making comments on the low level of social capital in Poland and the associated low level of trust, Czapiński also points out that the Poles identify themselves with a small group of people, mainly the family, and trust only them. This results in the increase of transaction cost because ‘in the relationships with strangers, one needs to apply a multitude of safeguards’. The effect is the diminishing creativity because people are less open and less inspired by each other. The stronger the bonds in such closed group, the worse become the relations of its members with potential clients or co-operators (Żakowski, 2010).

The lack of trust can also be seen in research directly related to business relationship. The report ‘Social Capital and Trust in Polish Business 2015’ shows that more than half of the entrepreneurs surveyed doubt the integrity of their contractors. They believe that ‘most Polish entrepreneurs use a legal loophole in the contract to obtain additional benefits from the contract at the expense of the other party’. Only less than 9% definitely disagree with such opinion. At the same time, almost 60% admit that most entrepreneurs play fairly only if it’s favourable for both sides, not only for the contractor. Of course, such approach affects the way of doing business. Entrepreneurs who do not trust their partners deal with them carefully and recognize that they should be constantly careful so as not to be deceived. Almost half of the entrepreneurs estimate that the lack of trust does not affect the resignation from conducting transactions. But a similar percentage – 47% – say that a part of the transaction is not conducted due to the lack of trust. As a result, their profits may be lower and their development becomes slower. Moreover as many as 27% of respondents declare that due to the lack of trust, they cooperate only with verified contractors and give up signing contracts with new partners. At the same time, entrepreneurs feel that their partners do not trust them. They admit that many transactions are not conducted because they are treated by the other entrepreneurs as strangers. 35% of respondents feel this way, while 58%

do not perceive such problems. More than a half of entrepreneurs admit that one has to constantly gather evidence of his integrity – otherwise the partner may want to prove his negligence (Krajowy Rejestr Długów, Rzetelna Firma, 2015).

Koźmiński, describing the character of Polish entrepreneurs, draws attention to the cultural inability to establish alliances and loyal cooperation. This is referred to as the ‘lonely wolf syndrome’ (Koźmiński, 2004). Lack of trust itself may be caused by the acceptance for opportunistic behaviour in the society. Growing competition on the market has increased the tendency among entrepreneurs to fight aggressively and pressure on using unfair practices in order to defeat the opponent (Strzyżewska, 2008). These are undoubtedly not the norms facilitating the conclusion of contracts. Trust in relatives does not help here, because the enterprise in order to develop has to build new relationship constantly and expand the group of its partners. But it is difficult to achieve it in the world of incomplete contracts with a low level of trust.

The report ‘Social Diagnosis’ draws attention to the fact that if high level of social capital is the essence of a society able to develop in an increasingly competitive market environment, then Poland with very low indicators of factors contributing to social capital doesn’t have the best prospects. Meanwhile, the results of the analysis confirm a significant relationship between social capital and the wealth of Polish sub-regions. In 2014, the average level of social capital of the 66 sub-regions explained 37% of GDP differentiation (Czapiński and Panek, 2015).

The report ‘Social Capital and Trust in Polish Business 2015’ shows that the value of transactions that have not been conducted for fear of contractors’ dishonesty can be estimated at PLN 145 billion to 215 billion, or at about 10% of GDP. The lack of actions increasing the trust in the companies resulted in the loss of the possibility to conclude contracts worth PLN 66.3 billion, or about 3% of GDP. In total, one can assume losing even 13% of GDP in 2014 only (Krajowy Rejestr Długów, Rzetelna Firma, 2015). This shows that all the attempts to raise social capital and the level of trust can be turned into real profits for enterprises.

International research show that for poorer countries the human capital is a more important premise of development than the social capital. Poland still belongs to this group of countries. However, after exceeding a certain threshold of GDP, social capital becomes crucial for further development. This explains why Poland's economic growth has been relatively high so far despite the very low level of social capital. The moment Poland exceeds the threshold of GDP, above which further investment in human capital will cease to be enough to sustain economic development, supporting the social capital will become even more crucial (Czapiński and Panek, 2015).

CONCLUSIONS

The article analyses the role of social capital from a perspective that is not commonly used in the literature, i.e. it refers to institutional analysis and contract incompleteness. It is only a preliminary attempt to show the important role social capital plays in concluding incomplete contracts and should be addressed in more details in future research. But even this limited analysis indicates that the problem is vital for the enterprises in Poland and it is recommended to devote more attention to investigate it further.

The presented research results show that the level of trust in Poland has been low for years. Social capital has not developed sufficiently in order to fulfil its role as a factor supporting the conclusion of contracts. Entrepreneurs do not trust their partners, they are afraid of being deceived, they have a feeling that one needs to be protected as much as possible. It is difficult to be combined with the incompleteness of contracts that does not allow to specify all the conditions explicitly and to ensure full protection against the partners' opportunist behaviour. This results in a real loss for enterprises and the economy as a whole, as part of the transactions is not conducted. Undoubtedly, with a higher level of trust and better developed social capital, the consequences of contractual incompleteness would be less noticeable.

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THE ROLE OF HUMAN, SOCIAL AND CREATIVE CAPITALS IN SOCIO-ECONOMIC DEVELOPMENT

Katarzyna Szara, PhD¹; Anna Mazurkiewicz, PhD²

Faculty of Economics, University of Rzeszów

ABSTRACT

Socio-economic development is a process of quantitative and qualitative changes that increase phenomena in the economic, social and cultural areas. Various types of capital, including human and social capitals, support this development. These capitals are often described in literature. Less information on the subject of creative capital derived from the Florida's theory is available in the subject matter literature.

The aim of the paper is to identify the role of human, social and creative capitals in socio-economic development. Against the background of the capitals characteristics, their similarities and differences were pointed out. Human capital is substitutive against social and creative ones. However, these two capitals have a complementary character in relation to human nature. The identified roles of the three capitals described in the comparative dimension in the aspect of a commune, a region and a country development are an original contribution to the paper.

Keywords: human capital, social capital, creative capital, development

JEL codes: O1, O15, R10

INTRODUCTION

Socio-economic development is a process of quantitative and qualitative changes that increase phenomena in the economic, social and cultural areas. These changes take place in terms of time and space and are determined by various factors. This development is characterized at the level of a country, a region and a municipality.

A man occupies an important place in social and economic development. It is described in numerous items of literature. An analysis of human capital can be considered from the perspective of business entities that run their business in a given region and as a resource located in this area. A place – a location is

the distinction of this capital. The place is also associated with the social capital distinguished due to the specificity of a group, a community. This factor also determines the 'occurrence, attraction' of the creative capital. So-called creative class is said to be a representatives of this capital in literature. This group is distinguished according to the criterion of a profession. It uses creativity, which according to the author of the creative class theory, is the driving force of economic growth and dominates in society (Florida, 2010).

The aim of this paper is to identify the role of human, social and creative capitals in socio-economic development. The specific objective is to promote the creative capital as the least recognized capital in the subject matter literature. It was taken due to an

¹ Corresponding author: al. Rejtana 16c, 35-001 Rzeszów, Poland, 33ksz@wp.pl, +4860 998 77 70

² Corresponding author: al. Rejtana 16c, 35-001 Rzeszów, Poland, annam@ur.edu.pl, +4817 872 16 77

interest of organizations and institutions in the creativity that formed its foundation. Another necessary condition was the promotion of development in the literature based on this capital mainly in urban areas (Landry, 1995). Few publications, however, indicate its importance in rural areas.

THEORETICAL BACKGROUND, MATERIALS AND METHODS

The article is of theoretical character. In pursuing the adopted purpose of the paper, the subject matter literature in the field of economics and management sciences was subject to a critical analysis. The deductive and reduction methods were applied.

Due to a wide range of research issues related to an identification of differences between concepts of capital, the considerations were limited to theoretical comparisons covering the indicated capitals in selected aspects. The analysis was carried out in the context of the region development. The subject matter is extremely complex due to its interdisciplinary character. However, it allows making a comparison of knowledge from different disciplines of science that discover new research fields, and which are the subject of interest for further, more detailed research.

The selected, subjectively presented roles of the three capitals are the results of the literature analysis. The most common in the literature is a comparison of the capitals: human and social ones. The comparison of the creative capital with them is an original contribution to the theory.

SUBJECT FEATURES OF THE CHARACTERIZED CAPITALS

Capital is a term that refers to goods that serve to start or continue a business activity. It is one of the means of production in addition to labour, entrepreneurship and land which are needed to start production (Marchewka, 2000).

Human capital is interpreted at the level of an organization, a team, and at the level of an individual. However, an analysis at a more general level is not only a sum of features that characterize the lower level. It is necessary to take into account some fac-

tors that merge individuals (both human and organizational ones) (Mazurkiewicz, 2010). Human capital in a country is treated as a 'source of knowledge, skills, health and vital energy contained in a given society/nation' (Schultz, 1961). It favours: innovations of economies, their ability to absorb new scientific, technical, organizational and other solutions, promotion of modern consumption and quality of life practices, shaping of modern technical and organizational, IT and social infrastructure, etc.

On the other hand, social capital means some characteristics of groups, collectivity, structures, organizations, so-called 'interpersonal space' or 'social field'. It is created and transmitted by social mechanisms (Herbst, 2007). Individual social capital results from social, ethnic origin, or a tied-up network of connections. In a collective context it means that a specific social group is its 'carrier'. Its elements are acquired and inculcated during socialization and adaptation of an individual to live in a group (Herbst, 2007).

Social capital contains several separate elements. Its two basic components are its own influences, connections and knowledge of individuals who, under some circumstances, may be treated as a kind of contribution to already existing or just forming social networks, or even as a simple 'trade offer' with its fixed price and clearly defined sales conditions, intra-group loyalty and solidarity and intra-group trust (Ziółkowski, 2012).

The concept of creative capital is related to Florida's theory. He defines it by presenting the assumptions of the creative class. The author claims that this class draws its identity from the role of creativity suppliers. Assuming that creativity is the driving force of economic growth, this class has become dominant in society (Florida, 2010). It is proposed to accept that the creative class is a narrowly defined creative capital, while the broader definition recognizes creative capital as a source appropriate for people who cooperate and function in new conditions using their creativity (Szara, 2017). Innovations, patents and improvements are the effects of people's creative work. These creative actions result from the self-consciousness of a person. It may happen that they are activated under the influence of relationships with other people. Then they will appear at the level of social capital

and interpersonal relationships. Although Florida's considerations suggest that social capital should be replaced by the concept of creative capital, this is a debatable statement. It should be agreed that strong social ties 'weaken' or even 'kill' creativity. Hence, one should not deny the individuality and diversity resulting from the essence of creativity. It is a man who individually starts their creative abilities, searches for new solutions guided by their knowledge.

Both human and social capitals are important factors for socio-economic development. All three analysed types of capitals are difficult to define. This results from their ambiguity. They differ in their characteristics due to the number of units they are referred to. However, all three capitals are closely related.

Human capital determines the existence of social and creative capital, while the social one can contribute to the enrichment or weakening of creative capital. Creative capital is inseparable from human capital, but not always with the social one.

When comparing human and creative capital, one can point to the following similarities: definition multidimensionality, an ability to 'multiply', fathering a human being to a person, a possibility to generate benefits, freedom of location, common effects, problem solving, a measurement difficulty, depreciation, an ability to make choices. However, they differ in: the perception of values, the mechanisms of action, the degree of an impact on economy, a lack of accumulation (Table 1).

Table 1. Similarities and differences between the human, social and creative capitals

Specification	Similarities	Differences
Human capital / /Creative capital	Multidimensionality (heterogeneity) definition	Differences in the perception of value
	An ability to 'multiply'	Different mechanisms of action
	An ability to 'achieve' for every human being	The advantage of the creativity features
	Opportunities to generate benefits	Different degree of impact
	Freedom of placement	Different degree of use
	Common effects	You cannot accumulate
	An ability to solve problems Indissolubility	Differences in the area of education
	Difficulty of measurement	–
	Depreciation	–
	Uncertainty of effects	–
Social capital / /Creative capital	An ability of selection	–
	Multidimensionality (heterogeneity) definition	High mobility of creative capital
	An ability to 'multiply'	Different degree of use
	Reliance on cooperation	Individualism
	An improvement of the quality of relationships	Autotelic values
	Creating values depending on one's needs	Social capital can quickly 'destroy'
	Independence of people's creativity	Differences in the assessment of effects
	The level of intimacy – creative	Intensity level (spatial, organizational, emotional)
Transformation	Creating structures	

Source: Szara (2015).

In the case of a comparison of the creative and social capital some common features are identified, such as: definition multidimensionality, an ability to 'multiply', relying on cooperation, independence of people 'creating' these capitals, transformability. In turn, the differences include: high mobility of the creative capital, different degree of exploitation, individualism, autotelic values, differences in an assessment of effects, a level of closeness, creation of structures (Szara, 2015).

HUMAN, SOCIAL AND CREATIVE CAPITAL IN THE PROCESS OF REGIONAL DEVELOPMENT

Pointing at different socio-economic potential of a specific space, the need to include not only human capital, but also social one in a development assessment is emphasized. This is a prerequisite for synergistic effects that can help overcome the barriers to build creative Europe (Wosiek, 2016). The proposal to include creative capital into the assessment results from the promotion of the importance of creativity in economy (Boschma and Fritsch, 2009).

All three types of capitals are considered to be important determinants of economic development (Czapliński, 2009; Florida, 2010; Mazurkiewicz, 2010; Marszałek-Kawa and Pająk eds., 2015). They

are economic in nature and are connected with a human, but they require investments. Multidimensionality is also their common feature, but they are related to people's behaviour. In the case of social and creative capital, behaviours based on honesty, trust and creativity are identified in detail.

The identified roles signify the participation and significance of capital in socio-economic development. They are based on the tasks set to be fulfilled on the basis of the literature. The selection of 'roles' and an assessment of their impact strength is subjective, which served to compare the importance of creative capital in development to other capitals (Table 1). The subjective nature of the analysis resulted from the difficulty of comparing the research of other authors mainly in relation to creative capital, which was an element of criticism of this capital in the literature. The results of the works of other authors are often not comparable due to the lack of analogical data adopted from an assessment of creative capital (Peck, 2005; Boschma and Fritsch, 2009) – Table 2.

RESULTS AND DISCUSSION

The reference to the role of the presented capital is connected with an indication of selected areas of influence. They allow determining the relationships

Table 2. The role of individual capitals in the context of socio-economic development

Role	Human capital	Social capital	Creative capital	Changes direction
Development determinants	+++	++	+	It sets the direction for development
Innovative	+++	+	++	New solutions
Knowledge-creative	+++	+	++	New knowledge
Relational	++	+++	+	The created relationships strengthen cooperation or suppress it
An ability to replace	+++	++	++	Substitutability or complementarity
Culture-creative	++	+	++	Creation of cultural works
Standards-setting	+++	+++	+	Creation of new rules, standards
Economic	+++	+	+	Income generation

(+) activity of capital influence on socio-economic development.

Source: author's own research.

between them as complementary ones. Each of the capital is in its essence important for economic development and should be taken into account during an implementation of regional policy tasks, which is emphasized, for instance by Kotarski (2013). The role of the distinguished capitals in socio-economic development is also based on the relationship of the use of common practices presented in the research, e.g. by Lee, Wong and Chong (2005). Each of the capitals analysed separately affects the quantitative and qualitative changes in the economic (World Economic Forum, 2013), cultural (European Commission, 2018) and social areas³. Human and creative capitals generate an increase in production revenues. They influence on the development of new phenomena mainly in the creation of innovations (Miguélez et al., 2008), building new enterprises or knowledge (Alexopoulos and Monks, 2004). Social capital affects changes in the above-mentioned areas, but mainly in the one related to building interpersonal relationships that can contribute to benefits both in time and in space (Zak and Knack, 2001; Parts, 2013). The role of human and social capitals in the process of economic growth and region development is indicated by the results of numerous empirical studies (Czapliński, 2009; Kancelaria Prezesa Rady Ministrów, 2009). Kaasa and Parte (2008). By contrast, the role of creative capital in development was identified at the lowest impact level in comparison to the other two capitals. Florida (2010) research showed only the correlation dependence between development and the criteria of talent, technology and tolerance that describe this capital. The comparison made in this paper is one of the few attempts to eliminate the critique of creative capital in world literature concerning, among others, similarities to human capital (Montgomery, 2005) and relationships which are the characteristic features of social capital (Peck, 2005; Boschma and Fritsch, 2009). An attempt to indicate the strength of the influence of individual capitals on the development in the role model is a proposal to diversify an impact of these capitals.

The literature also comments on the lack of interest in the subject of creative capital in rural areas (Thulemark and Hauge, 2014). Its role is emphasized for urban development (Markusen, 2006; Strykiewicz and Stachowiak, 2010).

With reference to the above commentary the distinguished roles of creative capital, in addition to an implementation of the specific objective, include also information on the potential to use it in rural areas (Szara, 2017). Also, the European Commission points at the usefulness of activities based on creative capital in the creative sector in rural areas (European Network for Rural Development, 2009; European Commission, 2018).

The roles performed by individual capitals are different, and the differences between them are poorly identifiable. An attempt to determine these roles is the first stage to a more detailed and insightful comparative characteristics.

In the future it may include a quantitative and qualitative assessment evaluating the strength of an impact of a given capital within the designated roles; determining the benefits of the presence of creative capital on various economic and social levels and empirical and statistical verification of the relationship between capitals.

CONCLUSIONS

In this paper the role of capitals: human, social and creative ones were discussed. Creative capital evolved as a result of human activities that had economic consequences. It is a derivative of human capital and can be identified as a manifestation of an interaction of human and social capital.

All three capitals are perceived as a factor of socio-economic development. Regardless of the classification and characteristics criterion, they allow using human abilities in a better way. The benefits are obtained both in the social and economic areas. In the case of creative capital this is connected with the economic function and connected with it social and cultural preferences of people, consumer habits and

³ European Social Studies Data website <http://nesstar.ess.nsd.uib.no>.

social identity, which results from the nature of creativity – its individuality and diversity. In the paper the role of the capitals in the comparative system were identified. The attention was paid to the comparison in the area of innovations, relations, culture-creating and economic.

In the comparison the strongest impact was attributed to human capital. This is mainly due to the fact that the other two capitals are its derivative. Creative capital is of lesser importance for the development, probably due to the low degree of recognition of its importance in the literature. The authors proposed the conclusions that the roles these capitals play should have a complementary character, which is a new element of knowledge in the case of creative capital. The distinction of creative capital does not mean replacing human or social capitals. It allows a coherent symbiosis of capitals, the search for common paths of development through creativity. These capitals indicate intangible assets which are the basis to identify and improve key human competences.

In the summary of the analysis, one should point to the limitations related to the research tasks. They are related to: an ambiguity of the analysed concepts which results in the penetration of economic content connected with human capital, sociological one that refers to social capital, and creative capital analysed in the course of economic research. Therefore, there is a need to develop a tool for further research and to adopt additional, detailed methodological assumptions so that in the future the obtained results were objective in nature. The lack of comparability of the research results of other authors resulting precisely from differences in the accepted research methodology is often a difficulty in the analysis of creative capital. In comparison of the role of capital the charge of 'copying' solutions regarding human capital in relation to creative capital may be a limitation. However, despite the research limitations, the comparison and differentiation of the roles of the presented capital is important as it allowed identifying many new research questions that need to be answered.

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INFLUENCE OF EDUCATION ON THE INVOLVEMENT OF INHABITANTS IN THE COMMUNITY AFFAIRS – IMPLICATION FOR THE SOCIAL CAPITAL

Beata Będzik, PhD¹; **Sylwia Gołąb**, PhD²

Faculty of Economics, West Pomeranian University of Technology Szczecin

ABSTRACT

The aim of paper is to present the level of respondents involvement in the commune affairs. The results of the analyses presented in this paper come from surveys conducted using a questionnaire survey among residents of rural communes in the West Pomeranian Voivodeship. After rejecting incomplete and/or illogical questionnaires, 2,409 respondents were qualified for the analysis. The results confirmed the relationship between social capital and involvement of inhabitants in the community affairs. Verification of the existence of a relationship between the involvement in the commune affairs (social capital component) and the education of the respondents was verified. The research results indicate the diversity of involvement in level of education groups. The respondents with a minimum level of secondary education noted a positive average level of involvement, which means that they showed more interest in commune matters and willingness to get involved in them. The highest level of involvement was noted in the group of people with post-secondary education. Respondents with basic vocational and elementary and gymnasial education more often showed lack of involvement in the commune's affairs, and thus they recorded negative average results of engagement.

Keywords: education, involvement, social capital

JEL code: R200

INTRODUCTION

The most discussed category in the last two decades is social capital and its role in stimulating social and economic development. It results from the pressure on continuous economic growth, improvement of welfare, change in the *status quo*, according to the rule more is better. And the existing funds generating socio-economic development have ceased to be enough, but also justify diversification in the pace of development of economies. The efforts

undertaken by researchers to identify sources in development disparities have led to the 'discovery' of soft factors as generators of progress in highly developed countries. Among them, the most important role was assigned to social capital, and its integral component is involvement in the affairs of the municipality. Research on the level of involvement of a given community in the municipality's matters is important, because this involvement reveals the community's equipment in social capital and its potential.

¹ Corresponding author: Żołnierska 47, 71-210 Szczecin, Poland, beata.bedzik@zut.pl, +4891 449 69 94

² Corresponding author: Żołnierska 47, 71-210 Szczecin, Poland, sylwia.golab@zut.pl, +4891 449 69 19

THEORETICAL BACKGROUND

Although the importance of ties, cooperation and trust has been noticed for a long time, the concept of social capital did not find its place in science until the 20th century. The first mention of social capital in today's understanding is attributed to Hanifan (1916) in the subject literature. In his work from 1916, he defined the term social capital describing it through the prism of 'kindness, community, mutual compassion and social coexistence between a group of people and families forming a social unit.' At that time, however, this concept was not noticed and appreciated. In the 1960s, this term was referred to in the work of sociologists and political scientists, but the definitions formulated by Bourdieu (1980, 1986) and Putnam (1995) and Coleman (1990) are among the most commonly cited in the literature on the subject. Bourdieu (1980, 1986) defined social capital as the sum of real or potential resources that belong to an individual or group due to having a permanent, more or less institutionalized network of relationships, knowledge, mutual recognition or belonging to a group characterized by diverse properties, but also integrated by long-lasting and useful networks. According to Coleman (1990), social capital is 'a set of resources rooted in family relationships and in the social organization of a given community.' He identified it with the feature of a social structure that supports specific actors' actions undertaken within this structure. Putnam (1995) defined social capital through the prism of such features of a society organization as trust, norms and connections that can increase the efficiency of society by facilitating coordinated actions. He believed that the important, though insufficient for its creation, feature of social capital is trust and shared values. It was Putnam's work that gave rise to widespread interest in this term.

In the field of economic sciences, the concept of social capital is part of the institutional framework. From its perspective, social capital means more or less formalized institutional links that are external and constitute the existence of a state. These institutions are a carrier of social knowledge and trust, reduce transaction costs, increase the level of security

when making decisions in conditions of uncertainty, and organize relationships between people (Węziak-Białowolska, 2010).

As noted by Pająk (2001), 'it is not the accumulated material resources that are the decisive reason for success, but people, their entrepreneurship, the tendency to self-organize and cooperate, the ability to select a group of leaders who enjoy recognition and respect. So, human and social capital is really the foundation of local development.' Therefore, commitment is important because it translates into various forms of activity, but also a sense of responsibility for the common good. Tyszkowa (1990) identifies social activity with the personality trait manifested in readiness to deal with social problems and perform tasks for other people and groups, but also with a set of certain behaviours of the individual, serving the purpose of its striving to influence the environment. This indicates a significant impact of involvement in shaping the quality of life of a given community. As Mantey (2015) emphasizes, 'residents are increasingly appearing as experts in matters that directly affect them. They are encouraged to participate in activities initiating cooperation between them, involved in the decision-making process or motivated to be active for the benefit of the public. Being involved translates into a sense of community and overall – more social trust. All this serves to build an authentic local community, concerned about their living environment.' The effects of these activities and the importance of commitment can also be seen on the formal and legal level introducing the category of participatory budget (civic), which essence is the involvement of the local community.

MATERIALS AND METHODS

The results presented in the article present a fragment of broader social capital surveys carried out in 2013 and constitute an attempt to search for determinants of social capital at the local level. Due to the relationship between social capital and socio-economic development indicated in the literature, and its average lower level in rural areas, the research was carried out in rural communes. On the other hand, the specificity of social capital as a poorly perceptible

category in studies of a broad, e.g. national, range, and susceptible to local conditions has led to the limitation of research and focusing them on the local level. The selection of the sample was purposeful and included only the residents of West Pomeranian rural communes, with the overwhelming share of young people due to the long perspective of creating social capital and a large share of respondents with at least secondary education. The research covered all rural communes of the West Pomeranian Voivodeship choosing the number of respondents from each commune so that the sample was representative in terms of the number of inhabitants. The West Pomeranian Voivodeship was selected for research because of the unfavourable situation of rural areas shaped by state-owned farms, which resulted in high local unemployment. Another determinant of the selection of the research space is the low ratio of West Pomeranian social capital in the institutional dimension (Janc, 2009), which in comparison with the results of IPA (Institute of Public Affairs) research showing a negative relationship between the participatory way of management by local authorities and the number of non-governmental organizations in the commune has led to an attempt to verify this relationship (Olech, 2013). The subjective criteria resulting from the place of residence of the person conducting the research are also significant, which has a significant impact on the possibility of obtaining reliable answers.

The results of the analyses presented in this paper come from surveys conducted using a questionnaire survey among residents of rural communes in the West Pomeranian Voivodeship. After rejecting incomplete and/or illogical questionnaires, 2,409 respondents were qualified for the analysis. Most of the respondents were women (57.95%). Almost half of the respondents did not exceed 30 years of age.

Due to the limited volumetric framework of this publication, only involvement and social capital were considered. Commitment was analysed through membership in non-governmental organizations, attempts to exert influence or doing something for the commune and activities for the benefit of the local community, but the respondent was able to act for the implementation of common goals as the initiator, the

main implementer of the project or the active or passive participant.

The aim of the study is to assess the level of involvement of the residents of West Pomeranian rural municipalities and its dependence on the level of education and the possible implications for future social capital. The following descriptive statistics were used in the study:

- to measure the relationship between selected variables, the Pearson's Chi-Square (χ^2), independence test was used, which is the most appropriate for the study of dependencies between qualitative variables;
- to estimate the models with one or more explanatory variables, multiple regression was used, which is the most appropriate for the quantitative approach to the relationship between many independent variables (explanatory) and dependent variable (criterial, explanatory).

RESULTS AND DISCUSSION

The respondents with a minimum level of secondary education noted a positive average level of involvement, which means that they showed more interest in commune matters and willingness to get involved in them (Fig. 1). The highest level of involvement was noted in the group of people with post-secondary education (3.20 with standard deviation 1.96). In the second place, in this respect, there were people with higher education (1.06 with standard deviation 1.70), while the third with secondary education (0.38 with standard deviation 1.99). On the other hand, respondents with basic vocational and elementary and gymnasial education more often showed lack of involvement in the commune's affairs, and thus they recorded negative average results of engagement (–1.02 and –1.09 with standard deviation 0.38 and 0.63, respectively).

Next, a regression model for social capital was developed, taking into account one independent variable, namely commitment. Table 1 shows the results of these tests.

The regression results of the dependent variable estimated the following model:

$$\text{social capital} = -3.5433 + 2.5314 \cdot \text{involvement}$$

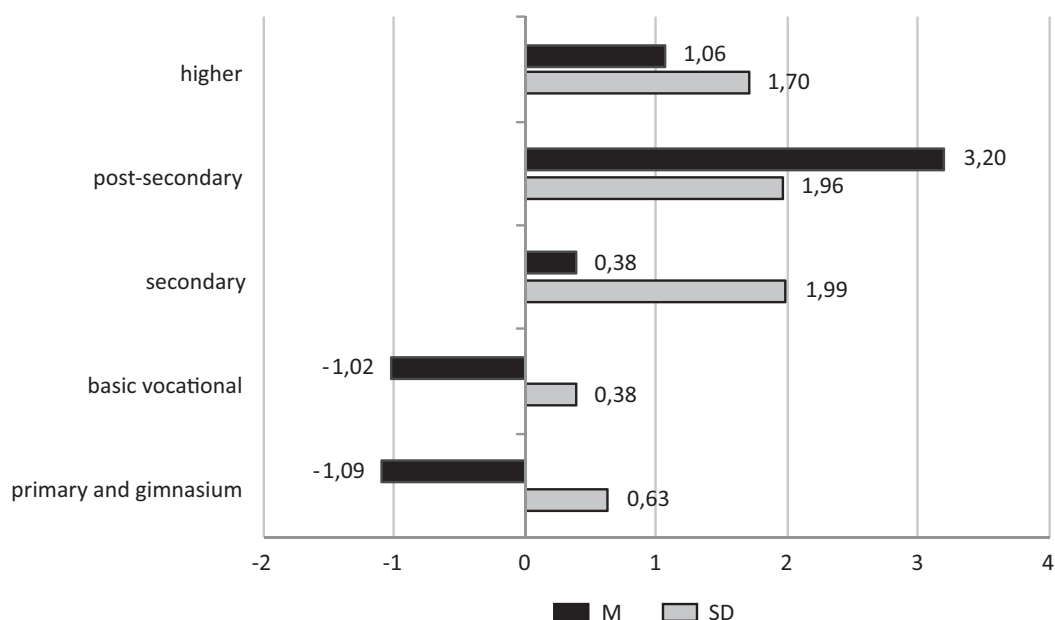


Figure 1. The level of involvement in the division into the education of the respondents (basic descriptive statistics)
Source: author's own research outcomes.

Table 1. The results of social capital regression for variable involvement ($N = 2,409$)

Item	regression summary for dependent variable: <i>social capital</i> $R = 0.78830511$, $R^2 = 0.62142495$, adj. $R^2 = 0.62126766$ $F(1.2407) = 3,951.1$, $p < 0$, estimate SE: 3.6113					
	b*	b* SE	b	b SE	t(2407)	p-value
Intercept	×	×	-3,54334	0.073699	-48.0787	0.00
Involvement	0.788305	0.012541	2.53135	0.040271	62.8574	0.00

Source: author's own research outcomes.

Such a model shape indicates that if the explanatory variable (involvement) assumes a value of zero, then the explained variable (social capital) assumes a value of around -3.5433. The increase in commitment per unit means that the explained variable (social capital) assumes a value of around -1.0119 already (-3.5433 + 2.5314 · 1). This model is good because it explains 62.17% of the volatility of social capital. Figure 2 illustrates the developed model indicating the dependence of social capital on commitment.

Their personal influence on what is happening in the commune, the respondents with higher (39.95%) and post-secondary (48.78%) education most often

assessed as rather small, with secondary (43.20%) and primary education and gymnasium (58.70%) – as no impact, and the respondents with basic vocational education in majority did not have an opinion on the subject (74.38%) – Table 2. The results of the Pearson's Chi-Square test indicate that there was a statistically significant relationship between education and the assessment of personal impact on what is happening in the municipality ($p < 0.001$).

The respondents with higher education were quite divided in terms of making any attempts to make influence and do something for the commune – most often (40.89%) they indicated that they did not un-

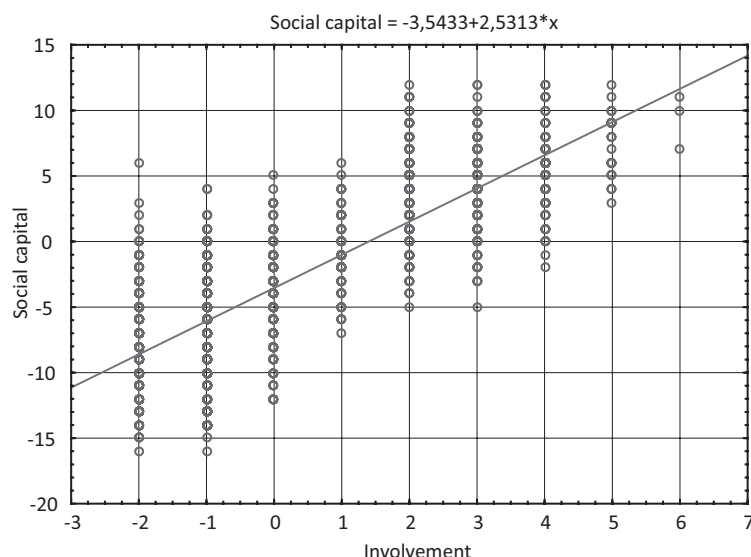


Figure 2. The distribution between commitment and social capital

Source: author's own research outcomes.

Table 2. An assessment of the personal impact on what is happening in the commune, broken down into the education of the respondents (%)

Opinion	Level of education of respondents					Chi-square value
	higher	post-secondary	secondary	basic vocational	primary and gimnasium	
Yes, I have an large impact	5.26	0.00	0.00	0.00	0.00	X ² = 431.66 df = 16 p = 0.000
Yes, I have an impact	5.72	51.22	12.64	0.00	0.00	
Rather small influence	39.95	48.78	24.64	9.09	28.26	
No impact	30.96	0.00	43.20	16.53	58.70	
Don't know	18.11	0.00	19.52	74.38	13.04	
Total	100.00	100.00	100.00	100.00	100.00	

Source: author's own research outcomes.

dertake such activities, but almost as many people from this group (40.07%) undertook such activities (Table 3). Among people with post-secondary education, the overwhelming majority have ever made such attempts (90.24%). In the studied groups with secondary, primary and lower secondary education, it was most often indicated that such attempts never took place (43.52 and 76.09, respectively), whereas people with basic vocational education mostly did not have knowledge on this subject (80.17%). The results of the Pearson's Chi-Square test indicate that there was a statistically significant relationship between

education and making attempts to do something for the municipality ($p < 0.001$).

People with higher and post-secondary education most often played the role of an active participant in activities for the benefit of the local community (42.52 and 56.10%, respectively), while those with secondary and primary education as well as gymnasium – a passive participant (36.16 and 67.39% respectively) – Table 4. Most people with basic vocational education could not unequivocally indicate their role in activities for the benefit of the local community (82.64%). The results of the Pearson's Chi-Square

Table 3. Undertaking any attempts to exert influence and do something for the municipality, broken down into the education of the respondents

Item	Level of education of respondents					Chi-square value
	higher	post-secondary	secondary	basic vocational	primary and gimnasium	
Yes	40.07	90.24	33.44	0.00	0.00	X ² = 312.912 df = 8 p = 0.000
No	40.89	9.76	43.52	19.83	76.09	
Don't know	19.04	0.00	23.04	80.17	23.91	
Total	100.00	100.00	100.00	100.00	100.00	

Source: author's own research outcomes.

Table 4. Role in activities for the benefit of the local community according to the education of the respondents

Role in activities	Level of education of respondents					Chi-square value
	higher	post-secondary	secondary	basic vocational	primary and gymnasium	
Initiator of the project	11.10	14.63	4.64	0.00	0.00	X ² = 576.386 df = 16 p = 0.000
Main project implementer	14.49	19.51	7.84	0.00	0.00	
Active participant	42.52	56.10	27.52	0.00	0.00	
Passive participant	26.40	0.00	36.16	17.36	67.39	
Don't know	5.49	9.76	23.84	82.64	32.61	
Total	100.00	100.00	100.00	100.00	100.00	

Source: author's own research outcomes.

test indicate that there was a statistically significant relationship between education and Role in activities for the benefit of the local community ($p < 0.001$).

CONCLUSIONS

The presented results confirmed the positive relationship between commitment and social capital. They also indicated determination of involvement in the issues of the commune with the level of education. It results, as research shows, from the feeling of less educated respondents, little influence on the environment, which limits their activity in this sphere, and at the same time legitimizes their passivity. This study supports the contention that the level of the education has the potential to meaningfully support development of key element of social capital – involvement of inhabitants in the community affairs – that might, in turn, spur civic and

political engagement, with the consequences for the level of social capital, in the future.

Due to the fact that social capital forms such components as trust, cooperation, civic participation, its effects are most visible at the local level, which implies the necessity to conduct research in the local dimension as well. The presented research results give the opportunity to look at and assess the level of community involvement at the local level. This is an important contribution to expanding knowledge in this area, as commonly available statistical data are usually aggregated and do not capture the specificity of the given environment, which is extremely important in the case of the discussed category, which is affected by local conditions. This research is part of the assessment of an important component of social capital, which is commitment, giving the opportunity to use the results in building local development concepts and strategies.

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CREATIVITY AS A STIMULANT OF SOCIO-ECONOMIC DEVELOPMENT OF THE PODKARPACKIE VOIVODESHIP

Anna Mazurkiewicz, PhD; Katarzyna Szara, PhD²

Faculty of Economics, University of Rzeszów

ABSTRACT

In social and economic development, significance is primarily attributed to endogenous resources. The local conditions should play a key role in it. One of the characteristic features of the region and at the same time a key one is human capital which conditions the occurrence of creative capital. In the paper, creativity – as a resource appropriate to people, a feature of the individual – its potential for creative achievements currently or in the future will be analysed through the prism of creative capital.

The aim of the article is to evaluate the conditions for the development of creative capital of the Podkarpackie municipalities in the context of their social and economic development. The evaluation will be made in regard to human resources. In order to achieve the goal of the study, the literature of the subject was analysed, numerical data published by the Central Statistical Office was used, and empirical studies were carried out in the offices of the Podkarpackie municipalities. The results of the conducted research showed that there are conditions favourable to the development of creative capital in the region. The majority of the inhabitants of the Podkarpackie Voivodeship municipalities saw the importance of creativity for the development of the commune.

Keywords: creativity, region, development

JEL codes: J24, O15, O18, P48, R11

INTRODUCTION

Development is a category that is ambiguous and interpreted in various contexts – above all in terms of changes taking place, both quantitative and qualitative ones (Stec et al., 2014). The development of the region is a consequence of qualitative changes and economic growth (Kosiedowski, 2001). It is connected with changes in production capacities and economic relations, which results in the improvement of production factors and an increase

in the quantity and quality of goods and services. Economic development is also associated with social development, meaning 'a change in the social relations, structure of society, its preferences, social criteria and principles of activity, behaviour patterns, attitudes and awareness aimed at improving co-existence, cooperation of people and their appropriate participation in the effects of economic development' (Marciniak, 2005).

In social and economic development, an important role is attributed to endogenous resources. The local

¹ Corresponding author: al. Rejtana 16c, 35-001 Rzeszów, Poland, annam@ur.edu.pl, +4817 872 16 77

² Corresponding author: al. Rejtana 16c, 35-001 Rzeszów, Poland, 33ksz@wp.pl, +48 609 987 770

conditions should play a key role – it is necessary to create and use local advantages taking into account knowledge, experience, skills and specializations, as well as links between particular entities (Ministerstwo Rozwoju Regionalnego, 2010). One of the characteristic features of the region, and at the same time a key one, is human capital, which favours, among others, generating new technologies, innovativeness of the economy, its ability to absorb new solutions, increase productivity, per capita income growth, political and community participation and social cohesion (OECD, 2001).

Human capital determines the existence of creative capital, interpreted as a resource appropriate to people who act and cooperate with each other using their creativity. Creative capital refers to the conditions (talent, technology, tolerance) that predestine a given area for development. At the same time, it is inseparable from the human factor (Szara, 2015). Through the prism of creative capital, creativity is analysed – as a resource appropriate to people, a characteristic of the individual – its potential for creative achievements at present or in the future, but not necessarily realized creativity (Nęcka, 2012).

Creativity is quite common in the population, it is a characteristic of children, adolescents and adults to the extent that they are characterized by an ability to ask themselves and the world important questions or wonder (Karwowski, 2009). Human creativity leads to different effects but the basic condition for obtaining certain results is to arouse it – despite the egalitarianity of this feature, not every individual uses it.

The observations provided are the basis for stating that the creation of conditions for socio-economic development takes place at the local and regional level – strategic areas for economic development. Creativity should, therefore, be assigned an important role in socio-economic development (UNCTAD, 2008; Rindermann, Sailer and Thompson, 2009; Reid, Albert and Hopkins, 2010). The aim of the paper is to evaluate the conditions for the development of creative capital of the Podkarpackie municipalities in the context of their social and economic development. The evaluation will be made in regard to human resources. In order to achieve the goal of the study, the literature of the subject was analysed, the numerical

data published by the Central Statistical Office (Local Data Bank) was used, and empirical studies were also carried out. The article emphasized the importance of creativity in economic and social life, the results of empirical research were presented and subjected to qualitative analysis.

CREATIVITY IN THE LIFE OF SOCIETY

The issue of creativity in regional development is the subject of interest for many entities, including, among others: local government authorities, non-governmental organizations, entrepreneurs or representatives of science. The implementation of activities that exploit the potential of creativity can have a positive impact on regional development. Creativity fosters innovation – it supports the emergence of new, original and useful solutions, which are a response to the challenges of a dynamically changing environment, which in turn affects the region's development potential, is important for its competitiveness. The transformation of existing structures is, according to Schumpeter, the most important feature of the market and at the same time as a result of implementing innovation, a determinant of economic development (Towse, 2011). Innovation is the result of creativity (Florida, 2010).

The human work products resulting from the implementation of creative solutions become more competitive, enable to meet higher-order needs instead of providing exclusively functional benefits – they offer added value (Raszkowski, 2016). Creativity is one of the factors creating the quality of human capital, which may be more important for regional development than its number. The use of individual knowledge, creativity and talent contributes to many positive phenomena in the economy and society, especially to create innovation, a GDP growth, creation of new jobs, citizens' openness to new solutions and cooperation, through contribution to education – strengthening national and regional identity, and as a result, to improve the residents' quality of life. The results may be negative at the same time, in the form of, for example, of excessive consumption and waste, which affects the natural environment (Knop, 2015).

CHARACTERISTICS OF HUMAN CAPITAL OF THE PODKARPACKIE VOIVODESHIP – SELECTED ELEMENTS

The Polish socio-economic space is characterized by strong diversification in the level of regional development. Taking into account the level of GDP, which is a measure reflecting the economic potential of a given region, the share of the Podkarpackie Voivodeship in the creation of Polish GDP amounted to 3.9% (2016). Quoting from Woźniak, 'about the potential of each economy (...), and especially its quality is determined by the scale of investment in man, so human capital becomes to a certain extent a function of GDP per capita' (Woźniak, 2005), should be pointed to a weak position of the Podkarpackie Voivodeship compared to other regions of the country – GDP per capita was PLN 33,176, which is 70.9% of the average for the country. Such results put the voivodeship on the penultimate place among the others.

A more detailed analysis of the region's human capital is made taking into account the basic attributes of this capital, including among others (Gaczek and Komorowski, 2005): the structure of the population's age and the rate of burden on people of working age by people in pre-working and post-working age, occupational activity of the population, an employment rate, an education level, an occupational structure and population prosperity.

In the Podkarpackie Voivodeship, unfavourable changes in the structure in relations between particular age groups should be emphasized – from 2010 the percentage of post-working age people increased significantly (from 15.89 to 18.76% in 2016), while the share of people in pre-working age (from 20.25 to 18.37%) and a slight decline in the share of people of working age (by about 1 pp to 62.87%). Taking into account demographic forecasts, this trend will deepen. Such a state means decreasing labour resources and, at the same time, the region's potential for creativity – the activity of professionally active people, at the same time affecting private life – achieving per-

sonal goals, using the emerging opportunities. This means that there is a potential presence in this group of units with creative potential.

Education is a factor of crucial importance for the development of a creativity. It is assumed that the better educated population of the region is more creative (Podogrodzka, 2017). The population structure of the Podkarpackie Voivodeship, regarding the education criterion³, was dominated by people with secondary education (general and vocational), accounting for 27.9% of the population. The size of this group increased in comparison with the results of the 2002 census (by 31.7 thousand people), while the share in the population structure remained at a similar level (27.6% in 2002). The share of people with basic vocational education was also significant (21.7%). People with higher education (at least bachelor, engineer, and qualified economist) constituted 14.5% of the population, which means a significant increase compared to the previous census – by more than 6 pp.

An addition to the previous considerations is information on the professional activity of the population – the value of this coefficient for people aged 15 and more in 2016 increased compared to the previous year and amounted to 55.9% compared to 54.2%, which was significantly higher in the group of men than women (amounted to 64.9 and 47.4%, respectively), but there were no differences with regard to the area of residence (55.9%). The differences concerned the employment rate, which increased from 48 to 50.6%, taking into account both the gender criterion (in 2016 it was 58.6% for men, 43% for women) and the place of residence (51.4% in cities and 50.0% in rural areas). The place of residence is an important factor in the analysis of creativity, the quality of human capital. More favourable living conditions in terms of access to infrastructure, leisure activities are provided by cities. Also an access to information seems to be easier in these areas. The population structure due to the place of residence indicates the predominance of the agricultural population (58.8%).

³ Information on the level of education of the population was obtained from the 2011 National Population Census (Urząd Statystyczny Rzeszów, 2012).

The presented information shows the unfavourable development of processes contributing to the creation of human capital, which are characterized by high development opportunities. The main reason is the systematic aging of the inhabitants of the voivodeship (an increase in the median value of the population's age from 36.5 years in 2010 to 39.1 years in 2016). Occupational activity of the population in the Podkarpackie Voivodeship is lower than the average in Poland, which places the region in the second half of the voivodeships. Therefore, it becomes important to stimulate and use the creativity of its inhabitants, which is the basis for the development of the creative capital of the region. An important factor supporting this process is the adequately high level of education of residents.

MATERIALS AND METHODS

In order to evaluate selected conditions for the development of the creative capital of the region, a full study was set up among all 160 offices of the Podkarpackie municipalities. These municipalities constitute 6% of all communes in Poland. The survey carried out using the CAWI method was preceded by a telephone contact informing about the research assumption and the request to complete the questionnaire. The questionnaire regarding the creative capital development in the municipality was completed in July–August 2015. In the offices, the questionnaire was filled in by three randomly selected employees, at various levels of the organizational structure. From the originally assumed population of 480 the researched, 453 questionnaires were returned (94.4%)⁴.

The questionnaire consisted of 28 questions. It included questions regarding the respondents' assessment of the determinants of the development of creative capital in the commune in various areas – in reference to the 3T concept (talent, technology, tolerance). This work uses a part of the research related to the assessment of creativity of human resources in the context of the development of the commune. The use

of selected questions was justified by specific needs resulting from the purpose of the study, as well as the requirements for the volume of the paper.

Respondents evaluated eight statements, assessed in a 5-point Likert scale, from 1 ('I totally disagree') to 5 ('I totally agree'), in which 3 meant a neutral position ('I have no opinion'). These statements were preceded by questions regarding the interpretation by the respondents of the concept of creativity as a characteristic, manifestations of creativity and the possibility of using creativity at work (the commune office).

RESEARCH RESULTS

The results of the conducted research regarding the assessment by the respondents of the commune's creative capital in the tolerance area are presented in Table 1. Table 2 presents the results of respondents' opinions on the importance of creativity for the development of the municipality.

Tolerance means the openness and favour of residents towards people of other races, nationalities, as well as those who choose different ways of life (Podgrodzka, 2017). Creating conditions conducive to the development of creative capital of the region requires offering solutions that meet the diverse needs of particular social groups, also related to lifestyle. Regions that value diversity and tolerance offer stimulating places with high level of cultural interplay (Florida, 2002).

The conducted research proves that according to the vast majority of respondents (almost 79%), the community of the municipality is kind to visitors. A different opinion was less than 4% of respondents, the rest (17.44%) did not have an opinion on this subject. More than half of the persons participating in the survey (55.4%) positively assessed the tolerance of the municipality's inhabitants to national minorities, almost 12% assessed this issue negatively, while almost 1/3 of the respondents did not evaluate the community in this respect. The condition of tolerance was more positively assessed in rural and urban-rural

⁴ Six municipalities (Dynów, Gawłuszkowice, Nowa Szarżyna, Sokołów Małopolski, Strzyżów, and Żołynia) refused to participate in the study. The number of three questionnaires was not obtained from five municipalities.

Table 1. Evaluation of the creative capital of a commune in the area of tolerance

Specification	Likert scale				
	1	2	3	4	5
	%				
The commune community is kind to the people who come here	1.32	2.65	17.44	49.89	28.70
The commune community is tolerant to national minorities	1.77	10.15	32.67	42.38	13.02

Source: authors' own research based on study outcomes.

Table 2. Respondents' opinions regarding the impact of creativity on changes in the municipality

Specification	Likert scale				
	1	2	3	4	5
	%				
People's creativity evokes changes in the commune	3.97	8.39	13.25	42.38	32.01
Creativity of people in the commune most often improves their life situation	3.53	10.15	20.53	45.70	20.09
Creativity determines innovation	3.97	6.84	22.96	39.29	26.93
Creativity allows to develop human capital in the commune	3.09	9.93	17.66	49.23	20.09
Creativity allows to develop social capital in the commune	3.31	8.61	23.62	46.14	18.32
'Using' creativity increases the attractiveness of the commune	3.97	10.38	21.85	42.16	21.63

Source: authors' own research based on study outcomes.

municipalities (55.76 and 56.99% respectively) than in urban ones (48.72% of indications).

The respondents' opinions on the impact of creativity on changes in the municipality (Table 2) prove that most of them (almost 3/4) perceive the role of creativity in this area. A different opinion had more than 12% of respondents, and a little more did not have an opinion. Almost two-thirds of the surveyed participants confirmed that the creativity of people in the municipality most often improves their life situation. Almost 14% of them did not agree with this observation, and 1/5 had no opinion. Similar opinions were presented by the respondents regarding the connection of innovativeness in the commune with creativity. About 70% of respondents were convinced that

creativity allowed for the development of individual human capital in the municipality. As many as 13% commented negatively on the subject, 17.66% did not have an opinion. A slightly smaller percentage of positive answers concerned the belief about the impact of creativity on the development of social capital in the commune (64.5%). In comparison with the previous answer, the percentage of negative responses was lower (almost 12%). The remaining part of the respondents (almost 1/4) could not specify their opinion on the subject. The summary of the opinion on the importance of creativity for the development of the commune was the statement regarding the impact of using the potential of creativity on the attractiveness of the commune – a positive opinion on this issue

was expressed by almost 64% of respondents, and over 14% – negative. The others represented a neutral position (21.85%). It should be emphasized that in relation to each statement, the extreme answers ('I completely disagree' and 'I completely agree') were given by a smaller proportion of respondents assessing negatively and positively particular issues.

CONCLUSIONS

Creativity is an important asset for citizens in a knowledge-based economy – it determines innovation as a key factor in the economic and social development of the region and the country. Human capital is a carrier of the creative potential, at the same time the creativity of individuals determines the quality of this capital, which may turn out to be more significant for the development processes of the region than its size. Supporting individual, bottom-up creativity contributes to the improvement of the quality of human capital, also providing a valuable resource for the creative industries.

The current demographic situation in the Podkarpackie Voivodeship and trends in this respect should be assessed as unfavourable in the context of the state of human capital, as well as the basis for shaping creativity. This is evidenced by the rise of the median of the age and the average life expectancy of the population, which is the consequence of the aging of the inhabitants and, hence, the labour resources. This situation is reflected in the population structure, taking into account the criterion of economic age groups. At the same time, however, positive but slight changes should be positively assessed regarding an increase in the economic activity of the population and the level of employment. The level of measures was higher for men and people living in the countryside. In conclusion, the analysis of objective (statistical) data on human capital in the Podkarpackie region does not provide a positive assessment of the region compared to other voivodeships.

At the same time, there are conditions conducive to the development of creative capital in the region – an important factor supporting this development is a large proportion of people with higher education (at least bachelor degree), although lower than

the national average (17%). In addition, the majority of respondents pointed to the openness and friendliness of residents towards foreign visitors and national minorities. However, a large part of the community presents, in the opinion of respondents, a neutral position in the presented area, which concerns in particular tolerance towards national minorities.

Inhabitants are aware also of the importance of creativity for the development of the municipality, which is important for development processes. Most of them saw the importance of creativity for creating changes at the local level as well as for the residents. Among the respondents, however, there were also people who spoke negatively in the presented field. A large part of the respondents had no opinion on the impact of creativity on the lives of residents and improvement of the situation in their municipality.

Knowledge about the importance of creativity is not in itself sufficient for regional development. However, awareness of the potential benefits of perceiving creativity as a factor stimulating development processes, as well as ways to achieve these benefits, provides an incentive to take actions that will enable the use of available endogenous resources and, as a result, create advantages that form the basis of social and economic development. These advantages can be built, among others, on an educational offer developing human talents, supporting innovative solutions, developing creative industries. The obtained results of the conducted research prove that the Podkarpackie Voivodeship is a source of resources with creative potential, which can be used to stimulate the socio-economic development of the region.

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SOCIAL-DEMOGRAPHIC FACTORS FOR DEVELOPMENT OF AGRICULTURAL TERRITORIES OF POLAND AND UKRAINE

Tsvihun Inna, PhD¹

Faculty of Economics, State Agrarian and Engineering University in Podilya

ABSTRACT

Rural areas are an important component of the national economy and perform the following functions: efficient and competitive production; rational saving and protection of natural resources; assistance to rural population expanded reproduction; insurance of employment, proper level and quality of life as well as the revival of historical and the formation of new cultural traditions. The aim of the study is to assess the socio-demographic development of rural areas of the Ukraine and Poland and to identify common and distinctive features of their development. In order to assess the level of rural area development, the following indicators were used: rural population size and structure, fertility, mortality and expected life expectancy of the rural population. The aim of the study is to assess trends in the development of demographic processes and to develop proposals for the sustainable development of Ukrainian rural areas, taking into account the experience of Poland.

Keywords: rural areas, depopulation, birth rate, mortality, population structure, aging

JEL codes: Q01, J11, J131

INTRODUCTION

Rural areas are an important socio-economic system with significant human, natural and productive resources, which is why their development determines food security and the economic well-being of any country. The development of rural areas requires an integrated approach to addressing all the problems of the rural region – economic, social, environmental and demographic. Besides, they are all interconnected and are formed depending on the national economy of the country and its history.

A reduction in the population and marginalisation of rural areas is widespread across Europe. All rural

areas are suffering from depopulation, and this can undoubtedly be considered the most serious threat to the local economy, not only because this limits opportunities for development, causes important environmental problems and complicates the provision of public services, but also because it may jeopardize the existence of small villages and towns as human settlements (Pinilla, Ayuda and Sáez, 2008). An estimation of the development of demographic processes in rural areas of the Ukraine and Poland, based on a historical heritage assessment and socio-economic development in modern conditions, will reveal the common features and trends of the rural population.

¹ Corresponding author: Shevchenko 13, 32300 Kamyanyets-Podilskyi, Khmelnytsky region, Ukraine, ia_tsvigyn@ukr.net, +38(097) 566 46 41

THEORETICAL BACKGROUND

In research literature, depopulation is used as a main indicator. However, although this indicator is useful for demographic trends, depopulation is rather a symptom than a cause of population decline, which is a result of a complex 'closed circle' of interconnected economic and social factors that highlights the acute problems of regional development and governance (ESPON, 2017). In addition, in different countries, this term is used differently. In Poland, this is a process of population loss and, in the Ukraine, this term characterizes a decrease in population due to low birth rates, surplus deaths and a negative balance of migration (Rink, Haase and Bernt, 2009). Although most scientists define the depopulation process as a negative phenomenon, there are no generally accepted goals or principles regarding the desirable limit of demographic change in the countryside: the goals vary between 'reduction', 'stopping' and 'returning' the depopulation of rural areas (Karcagi-Kovacs and Katona-Kovacs, 2012).

Demographic development is a process of preserving population size as a result of historical progress. When this measure is fundamentally violated due to a decrease in population and a decrease in its quality, there is a demographic crisis, during which demographic development is slowed down; there is "demographic stagnation" that can eventually become a demographic catastrophe. The demographic catastrophe manifests itself in the transformation of the country or its individual regions into areas of demographic disaster (demographic distress), which manifests itself in a massive population outflow, in part or in total depopulation of territories (Steshenko, 2013). In the Ukraine, such areas of demographic disaster are primarily rural areas.

Depopulation occurs directly through the balance of two main phenomena: fertility, which is the result of birth and death number ratios and pure migration. There are many factors influencing the intensity of these phenomena from matters of religion, culture, traditions, systems of values, issues of economic and cultural life to the perception of the surrounding reality. These factors determine the number of children and the choice of place of residence, as well as living

and working conditions and health systems that affect the length of our lives (Rakowska, 2011).

According to (Brown, 2013), demographic challenges in Europe include three components: a decline in population growth, driven mainly by positive immigration, aging and urbanization. At the same time (Skryzhevskaya and Karácsonyi, 2012), the demographic crisis is characterized by depopulation, aging and a decrease in expected life expectancy, as well as low fertility and marriage, deteriorating health and degrading education quality of rural residents, accompanied by a displacement of young and physically active people of the population.

MATERIALS AND METHODS

The article on the study of rural areas was designed on the basis of administrative criteria – the population included in the rural population living in villages and urban-type settlements in the Ukraine and rural areas in urban-rural communities are defined as rural areas. Data published by the Central Statistical Office of Poland and the State Statistics Service of the Ukraine were used to realize the intended research objectives, in the retrospective part, for the period 1959–2016. In the study, according to source material, the rural population number and its population structure divided into 5-year age groups was applied. The analysis of the structure of the age groups of the rural population of both countries in 1959 and 2016 was carried out using estimation of similarities. For the estimation of the demographic situation in the countryside general coefficients of mortality and fertility were used as demographic factors. The depopulation ratio shows the ratio of the deceased population to the born. The dependence coefficient is an indicator that shows the ratio of dependents from zero to 14 and over 65 years of age.

RESULTS AND DISCUSSION

The demographic situation is a manifestation of population reproduction at a specific time and place, which is formed under the influence of various factors that are related to territorial features, the level of national economy and globalization development. Today, in Europe, there is a decrease in the size of the

rural population. Depopulation tendencies are also characteristic of the Ukraine and Poland (Fig. 1). In 2017, the rural population counted 13.1 million people in the Ukraine, and 15.3 million people in Poland. In 1959, it was 22.7 and 15.5 million, respectively. Also, the share of rural population in the total number changed considerably: in Poland from 53 to 40%, and in the Ukraine from 54 to 31%, respectively. In general, for the period 1959–2017, the rural population of the Ukraine decreased by 9.7 million people and, in 2017, it constituted only 57% of the level in 1959. In Poland, during this period, the population decreased slightly – 198 thousand people, although it should be noted that, in the years 1977–2009, the population of rural areas was smaller and ranged from 14.5 to 15 million people. The sharp decline in the rural population of the Ukraine in 2014 was down to military actions in the country and failure to take into account the part of the population of occupied territories.

One of the factors of population formation and its reproduction is the sex-age structure of the population, which, on the one hand, forms the type of reproduction of the population and, on the other hand, is the result of demographic processes. The Polish countryside is constantly undergoing a process of

change. It not only concerns economic phenomena, but also socio-demographic ones. An important role in the formation of demographic processes was played by the systemic transformation that took place in Poland in the 1990s. This led to significant changes in the structure of the rural population (Gierańczyk and Gierańczyk, 2012). The same situation applies to the Ukraine, a significant loss of the rural population considerably deteriorated its structure (Fig. 2). The structure of the rural population of both countries shows narrowed reproduction, since the basis of the pyramid is much narrower. The population of Poland is higher than in the Ukraine, especially in the age range of 15–59 years, while, in the Ukraine, there is a much larger number of women aged 70 and over. The age of balancing, that is, when men and women amount to the same number and then the male population decreases, is much higher in Poland and is 65, whereas in the Ukraine it is 40, which indicates a high mortality rate of men at a young age, which causes a significant number of single women. The analysis of the gender-age pyramid also suggests a significant prevalence of a population of working age (15–50), which is 52% in Poland, and 48% in the Ukraine. This testifies to a 'demographic dividend' existence, since

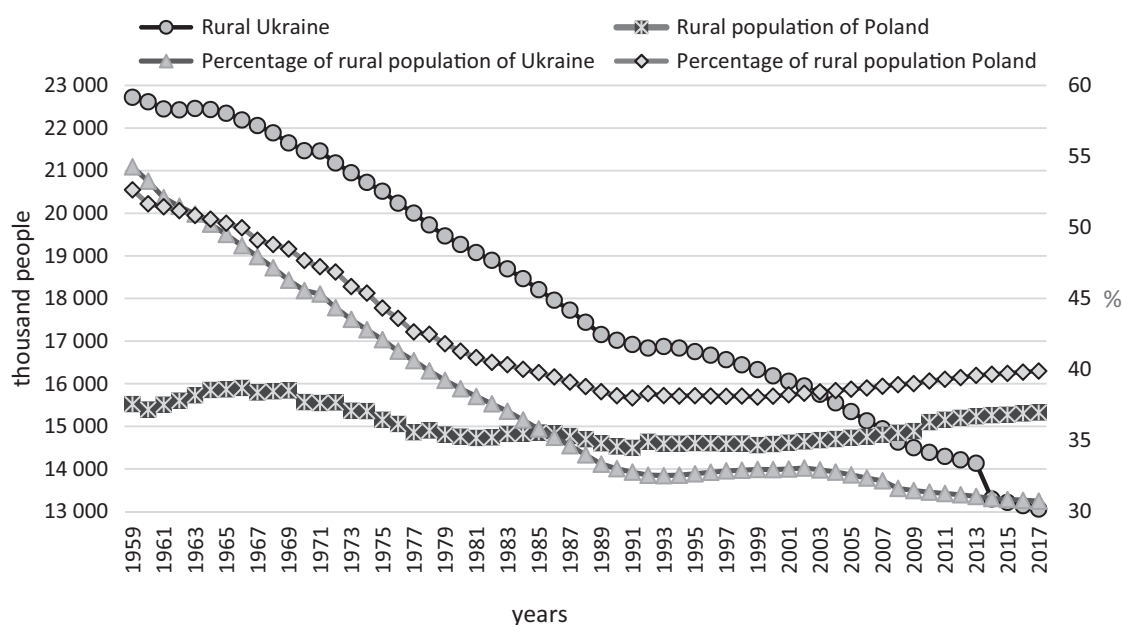


Figure 1. The number and percentage of the rural population of Ukraine and Poland

Source: GUS (2017), data of State Statistics Service of the Ukraine.

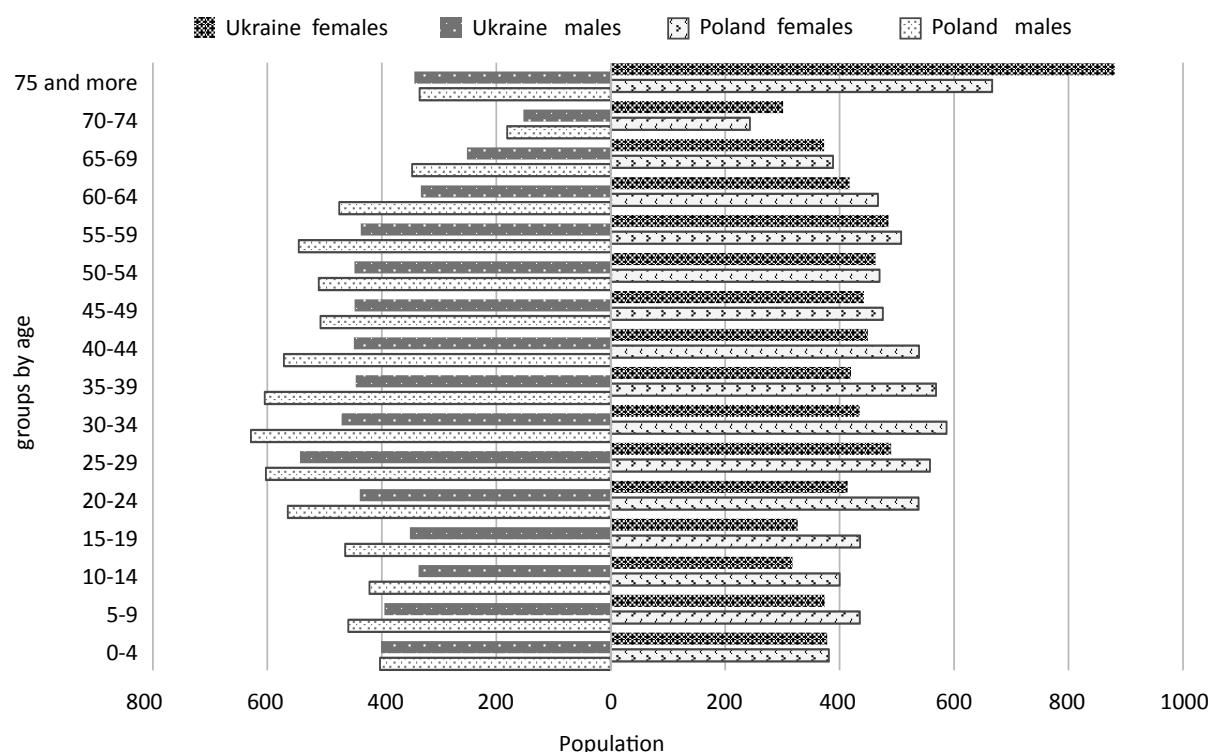


Figure 2. Sex and age structure of rural population of Ukraine and Poland in 2006

Source: GUS (2017), data of State Statistics Service of the Ukraine.

there are many able-bodied people. It is worth noting that in 30–40 years the situation will change and significant aging of the population will take place.

Aging of the population is one of the most important demographic and social trends of the 21st century and affects almost all countries of the world. Increasing life expectancy is truly a great achievement of development and healthcare. However, it also creates obvious challenges. Older people are going to represent a proportionately larger proportion of the total population, presenting social, economic and cultural problems for individuals, families, social welfare systems and society.

Poland, like most OECD countries, is experiencing aging through a combination of high life expectancy, birth rates and emigration (OECD, 2018). The ratio of dependency or replacement of generations, which shows a balance between children and pensioners, is steadily decreasing. If, in 1959, it was 2.2 for the rural population of Poland, and 1.3 for the Ukraine, and in 2016, these figures were 1.15 and 0.96 respectively,

this testifies that in the villages of the Ukraine there is no substitution of generations due to low birth rates and a high aging of the population. In other words, the size of each new generation is smaller than the previous one. The proportion of children and adolescents is steadily declining, which causes structural changes in favour of a proportion of older people.

In 2017, the share of rural population over the age of 65 in Poland was 14.7%, while in the Ukraine it was 17.4%. On a UN scale, if the proportion of people over 65 is over 7%, it is considered old. It is worth noting that the demographic aging of the population is an objective, historical process. Its consequences are irreversible and the only thing that can and must be done is to realize its inevitability and historical nature and take this into account in public practice, in particular in developing demographic policy measures.

In demography, aging from the bottom arises due to a significant increase in life expectancy, and aging from above – due to a significant decline in fertility. While analysing the birth and death rates between

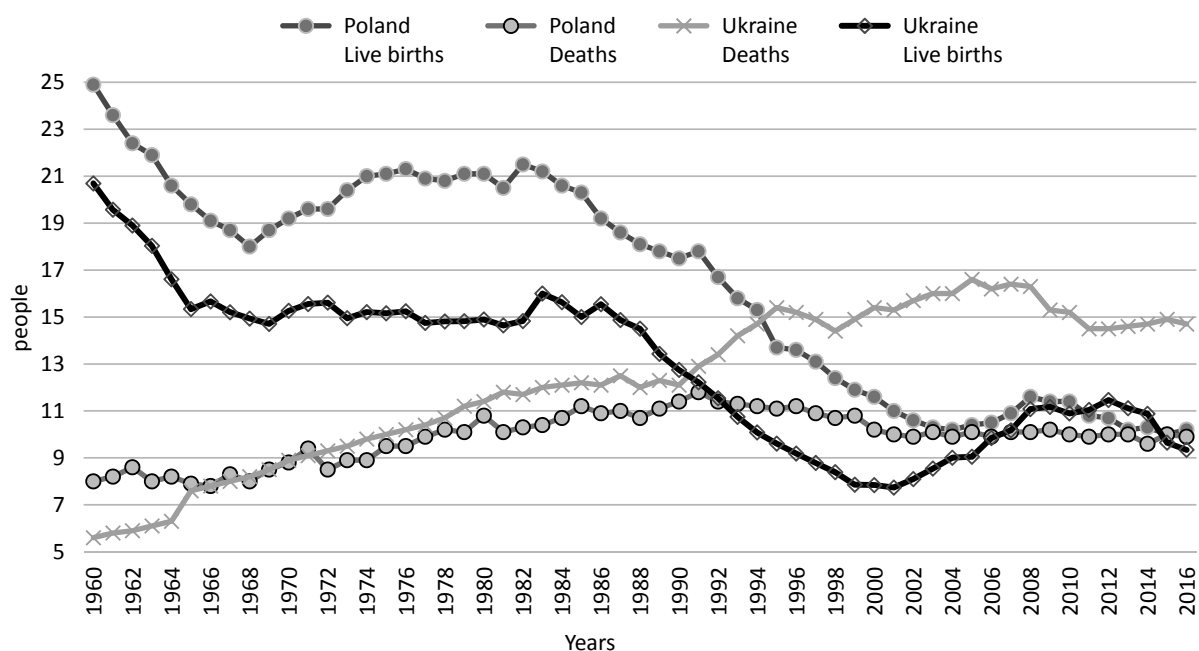


Figure 3. Coefficients of fertility and mortality of rural population in Ukraine and Poland

Source: GUS (2017), data of State Statistics Service of the Ukraine.

1960–2016 (Fig. 3), it was found that both countries experienced an increase in mortality and fertility rates however, in the Ukraine, the mortality rate is much higher: the mortality rate increased 2.6 times in the Ukraine and 1.25 times in Poland. As a result, since 1991, a natural loss in the Ukrainian population, which in the year 2016, amounted to 5.4%, has taken place. At that time, Poland witnessed a natural increase, and, although it is quite small 0.3%, the population did not decrease due to natural losses. The causes of high mortality in the Ukraine are related to

the structure of the population, namely, the significant aging of the population.

Among demographic indicators, there is one more, which is used for the integral assessment of population health – average life expectancy. This indicator is especially influenced by an increase in mortality among children, youth and people of working age. Therefore, it has a more practical significance than the overall mortality rate, which is significantly influenced by the high frequency and specific gravity of the mortality of the working age population (Fig. 4).

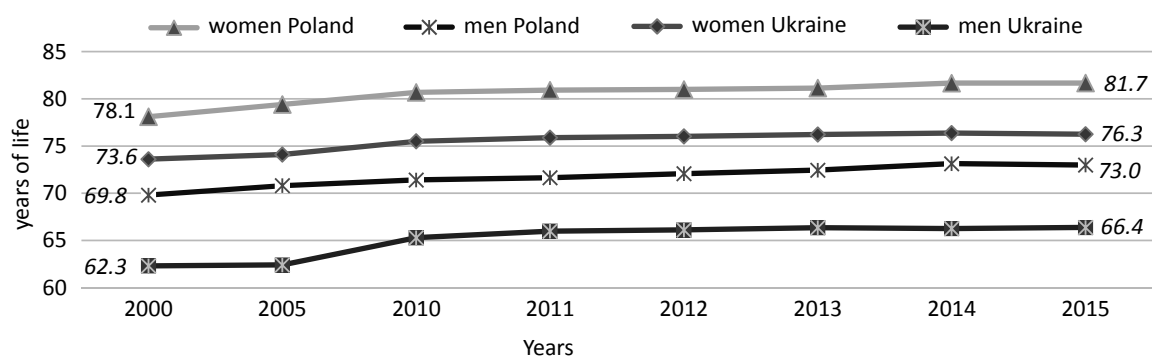


Figure 4. Average life expectancy at birth in Ukraine and Poland

Source: GUS (2017), data of State Statistics Service of the Ukraine.

Figure 4 shows the highest life expectancy at birth, both for men and women in Poland. Women in Poland are expected to live 5.5 years longer, while men will be 6.5 years older. It is worth noting that, in both countries, there is a significant gap between the expected life expectancy of women and men, that is, the Incas live longer, in Poland by 8.7 years, and in the Ukraine – by 9.7 years. WHO believes that life expectancy is influenced by 50% of life span, namely smoking, alcohol, malnutrition, which explains such a significant gap.

CONCLUSIONS

The current demographic, social and economic situation in the countryside indicates that depopulation will continue as a result of further migration and high mortality. This can lead to a reduction in rural settlements and an increasingly aging population, and therefore more dependent. The Ukraine needs to focus on increasing the economic attributes of the countryside. Diversification of agriculture for entrepreneurs, both at agricultural and non-agricultural enterprises, for the creation and preservation of jobs outside agricultural activity, can help reduce rural departures and improve living conditions in rural areas. The development of a rural infrastructure (roads, sewage), which remains limited in some rural areas, and eco-tourism will create new jobs.

That is, creating conditions of work and life of countryside inhabitants in accordance with civilization standards, establishing conditions for sustainable development in rural areas, protecting natural resources and rural cultural heritage and increasing the standard of living of the population will allow depopulation trends to be suspended and facilitate reorganization.

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SOCIAL CAPITAL IN THE COMPANY (MEAT AND VEGETABLE PROCESSING INDUSTRY)

Elżbieta Jędrych, PhD¹; Dariusz Klimek, PhD²

¹ Faculty of Business and International Relations, Vistula University

² Faculty of Management and Production Engineering, Lodz University of Technology

ABSTRACT

This article presents the research results of authors on the structure and value of social capital in the company. The research shows that there is a link between a relatively new level of such capital obtained on the basis of questionnaires among company employees analysed and the low value of this capital in the socio-economic approach. The authors also point out the possible ways of improving this level and increasing its financial value. The research was conducted in the first half of 2018, in Pamapol, a joint-stock company, which is one of the biggest companies from the branch of meat and food processing. In the research, the triangulation method of research methods was used, already known in research practice but in an innovative character, mainly referring to the measurement of capital value.

Key words: social capital, structure of social capital, value of social capital

JEL codes: E22, G32, J24, O34

INTRODUCTION

In recent years social capital has become one of the major issues in social and economic sciences and in the business practice of many countries. It is considered to be a factor which significantly supports social and economic development; its quality explains economic successes and failures, innovativeness and competitiveness. Research conducted in Poland point at a deficit of social capital, both on a macro (society) and micro (economic organisations) scale. On international lists examining the indexes of social capital, Poland is placed at the very end of European countries – such a low level of social capital should be

of concern. Many researchers and economic experts think that, in the last 30 years, human capital and financial capital was the motor for development – it is a feature of poor countries. However, after reaching a certain level of wealth, social capital becomes more and more important. In the opinion of experts, Poland is at the beginning of such a reality in which low social capital will enable quick economic growth. This regularity refers both to the development of society and business (Czapiński and Panek, 2015).

In Poland, social capital on a micro scale (in organisations) is hardly ever analysed. The results of research on the perception of negative consequences of a lack of social capital within companies, which

¹ Corresponding author: 3 Stokłosy, 02-787 Warsaw, Poland, e.jedrych@vistula.edu.pl, +48 602 631 009

² Corresponding author: 266 Piotrkowska, 90-924 Lodz, Poland, dariusz.klimek@p.lodz.pl, +48 602 300 590

have been published recently, show that this problem is slowly but surely being recognised by managers and business leaders (Będzik, 2010; Dobrowolski, 2015). The research which refers to this topic in the food branch are exceptional (Gajowiak, 2013).

The authors of this paper present the results of the newest research in this area, conducted in the first half of 2018, in a few companies of different branches and sizes, taking into consideration the conference topic and length of the article for presentation. The results obtained in the company Pamapol which is a joint-stock company with headquarters in Rusiec were selected.

ESSENCE OF SOCIAL CAPITAL

Social capital is defined as a resource of individuals, groups and societies formed by a network of social relations, norms and values which regulate them and enable to achieve the effects of cooperation. Trust among people forms the basis of social capital. The practical sense of social capital lies in 'catching' the values present in the resources of relations among people leading to an increase in the effectiveness of using different capital (e.g. in the company this constitutes human capital, real capital, structural capital and market capital). Social capital, therefore, is a kind of connection of societies that forms a totality facilitating effective and efficient cooperation based on trust.

Although the term social capital was first used more than a hundred years ago by Hanifan (1916), the first systemic analysis of the notion of social capital was only conducted by Bourdieu. He defined social capital as a sum of resources, both current and potential ones, which should belong to an individual or a group because of possessing a durable, more or less institutionalised network of relations, contacts and mutual recognition (Bourdieu and Wacquant, 2001). Another classic, Coleman is the author of the definition considered to be basic for the total, systematic presentation of social capital defined as an economic perspective (a theory of rational activity). The essence of social capital, according to Coleman, can be put down to capacity of people to cooperate within groups and organisations. Putnam – another classic in this field – defined social capital as the properties

of social life – networks, norms and trust which facilitate cooperation and coordination in order to gain mutual benefits (Putnam, 1997). He considered trust to be the most important element of social capital. However, he understood trust differently than Coleman – not as a feature of individuals meaning 'being trustworthy' but as a non-defined 'climate of cooperation' understood as social trust.

Social capital is considered to be a motor for well developed economies; economists estimate that it determines speed of growth by 53%. The strength of social capital lies in the fact that it is based on trust which facilitates negotiations, decreases transaction costs, is favourable for knowledge flow, increases the engagement and entrepreneurship of people, solidarity among the groups and prevents the abuse of common welfare.

A strong, positive link between social capital and social welfare is very well empirically documented (Halpern, 2005; Bratnicki and Dyduch, 2003; Sztaydinger, Ambroziak and Starosta, 2016).

SUBJECT AND RESEARCH METHODOLOGY

Pamapol, a joint-stock company in Rusiec, is a vice-leader of ready dishes in Poland. Its offer includes products from the category of ready dishes as well as meat conserves, pates, ready soups and canned vegetables sold both in traditional channels through wholesale and big commercial networks.

Pamapol is also a dominant company in the capital group including: Warmińskie Zakłady Przetwórstwa Owocowo-Warzywnego in Kwidzyn, ranked among leading domestic producers in this industry of peas and beans among others and Mitmar Sp. z o.o. with headquarters in Głowno, whose main activity is meat trade and the production of frozen ready dishes as well as providing storage and logistic services for frozen products produced in the Group and confectioning of frozen vegetable and vegetable-meat mixtures.

The aims of the first stage of research (research on the structure of capital) were as follows:

1. A definition of the level of social capital of employees including: employees in managerial positions, employees in administrative positions/ specialists and employees in production positions;

2. A definition of strengths and weaknesses of social capital;
3. A recommendation of activities which aims to strengthen social capital.

Due to the multidimensional and interdisciplinary character of the notion 'social capital', it was of key importance to prepare a model (of elements) of social capital which defined a substantive scope of research and constituted a basis to build a research tool.

It was assumed that social capital of a company can be characterized by means of three dimensions:

1. A structural dimension (structural capital). This dimension describes social capital from the point of view of the organizational perspective of the company; a kind of an organisational structure favourable for cooperation of employees within units and between units, a kind of a communication system – employee access to information, necessary knowledge and attitudes of managers towards activities facilitating cooperation.
2. A relational dimension (relation capital). This dimension describes the quality of contacts between employees and the kind of contacts, trust, reliability as well as eagerness of employees to share knowledge and experience.
3. A cognitive dimension (cognitive capital). This dimension describes coherence between norms and values of employees and of the company; a common understanding of company problems; a usage of vocabulary comprehensive for everybody and so on.

In order to measure social capital, a multi-dimensional psychometric tool was used- a survey questionnaire consisting of 40 questions, including at-

tributes and indicators adopted in the model. Such a construction of the survey allowed for the creation of aggregated indexes of social capital. The psychometric tool is a deliberately constructed scale which analyses attitudes characterised by good psychometric parameters (accuracy, reliability). While creating the scale, the method of summing up evaluations, created by Likert, was used. It meant the evaluation of every 40 statements according to a five-level scale, presenting different levels of acceptance and evaluation of a given statement where: 5 means 'I completely agree', 4 – 'I partially agree', 3 – 'I have no opinion', 2 – 'I do not completely agree', 1 – 'I completely disagree'.

In total, 147 employees participated in the research, that is 72% of all people employed in Pamapol joint-stock company, including 17 people in managerial positions, 49 in administrative positions and 81 in production positions.

The definition of the value of social capital was the aim of the second stage of the research. Two convictions were adopted here. The first one – the value of the company is the sum of the value of 5 capitals: material, financial, structural (organisational) and market, human and social. The second conviction – the value of social capital is the difference between the value of the whole company and four capitals (material, financial, structural, market and human). The second conviction was necessary due to existing ambiguity while defining capital. In this way it is possible to avoid potential accusations that some element of social capital was not included in the evaluation.

The knowledge of valuation methods for the entire company and other capitals is also obvious. How-

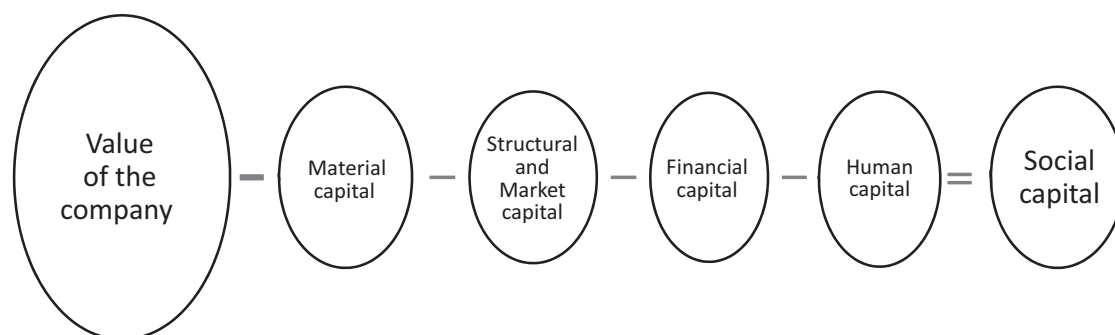


Figure 1. Diagram of the method of measuring the capital value of social capital

Source: own elaboration.

ever, it was not without a modification of valuation methods aimed at taking into account the 'utility' category for the organization and not 'marketability', especially in the evaluation of physical capital and general simplification of methods, that it would be possible to measure capital by company specialists without engaging external experts.

Certain difficulties also took place at the stage of allocating elements of organisations to different capitals, particularly to structural capital (organizational) and market capital.

The basic assumptions adopted for the evaluation of single capitals:

1. The evaluation of the value of the whole company using the DCF method (discounted cash flow) was done at a calculated discount level of 5.00. The estimation of the evaluation for the period 2018–2022 and the estimated money flows in these years formed the basis.
2. The evaluation of real capital was modified in such a way that for calculations the 'usability' coefficient of fixed assets in the company was assumed for calculation and not its 'marketability'.
3. The evaluation of structural capital was conducted on the basis of existing immaterial assets.
4. The evaluation of human capital was significantly simplified in comparison to the one applied in practice. Simplifying it, the value of this capital is expenditure on salaries or other labour costs e.g. trainings in the period necessary to obtain full knowledge and experience in a given position. Obviously, the human capital of a company is the sum of value in reference to all employees.

RESULTS AND CONCLUSIONS

The general overview of the level of social capital divided into groups of employees is presented in Table 1.

The general conclusions are as follows:

1. There is a big number of employees (in different positions) which are characterized by low social capital. This group is a potential reserve of social capital.
2. Simultaneously, there is a big group which possesses high social capital (engaged, with a skill to cooperate, with trust). This is the part of the team that the board can always count on – which constitutes real capital – formed by employees of different positions.
3. The biggest deficit of social capital is among employees in production positions (a frightening phenomenon in such an important group of employees).

The analysis of single dimensions/kinds of social capital shows some regularities presented in Table 2.

In this case:

1. The analysis of single variations of social capital shows a low level of structural capital in all analysed groups (the way of the cooperation organization, access to information, knowledge flow, evaluations of managers according to criteria of organizing cooperation between employees of different departments).
2. The analysis of single indicators of social capital shows that the biggest deficit is visible in:
 - The level of trust (particularly trust to superiors),

Table 1. The level of social capital in Pamapol joint-stock company according to groups of employees

Employees of the company	Level of social capital (%)	
	high (very high, high)	low (very low, low)
Total employees	44.3	55.7
Managers	49.3	50.7
Production employees	40.6	59.4
Administration employees	48.6	51.4

Source: own collaboration.

Table 2. Levels of different kinds of social capital in Pamapol joint-stock company

Dimension of social capital	Level of social capital (%)	
	High (very high, high)	Low (very low, low)
Total employees	44.3	55.7
Relational capital	48.0	52.0
Cognitive capital	43.3	56.7
Structural capital	41.7	58.3

Source: own collaboration.

- The level of relations between employees of different teams/ units/ departments,
- The level of voluntary activities of employees for the company (volunteering),
- The way of passing on values and norms of the company to employees.

The percentage shares of particular Pamapol capitals, including social capital, in the total value of the enterprise are presented in Table 3.

The final conclusions are as follows:

1. It is justified to evaluate the level of social capital in the company using the triangulation of methods referring both to the structure of this capital and its value. Only joint knowledge on structure and value provides the full image of this capital in the company and can constitute a basis for potential investment in this capital.
2. The single examination of the level and the value of social capital in the company in one year can, on the one hand, include mistakes and, on the other hand, does not allow to draw conclusions for the activities of the board to improve its level. Only the second examination conducted a year or two years later using (for comparison's sake) the same methods and convictions on the same or on a similar sample allows to evaluate whether applied recommendations for the increase of social capital were effective. Such research will allow to evaluate the influence of this capital on other capitals of the company.
3. Just as in case of typical economic indicators, practical knowledge on the level and value of social capital in the country and in branches will appear only when a lot of research in this field is conducted, which will create a point of reference and a comparison with the level and value of capital in other companies.

Table 3. The percentage shares of particular capitals in the value of Pamapol joint-stock company, as of March 2018

Capitals	Percentage share in the value of Pamapol joint-stock company (%)
Material capital	40.9
Human capital	27.3
Market capital	17.7
Financial capital	9.6
Social capital	2.4
Structural capital	2.1
Total	100.0

Source: own collaboration.

CONCLUSIONS

In Poland, social capital on a micro scale (in organizations) is hardly ever examined.

The need for such research results, first of all, from the awareness that it is possible to invest in and multiply it. It also has a specific financial dimension. Investment in social capital is as necessary as in real, market or human capital. Managers need suitable tools which allow to define both the structure of this capital and its value.

The research presented here, as one of the first of this kind, and particularly the methodology applied, can be a starting point of critical discussion. The authors are aware of this and perceive the needs for further work in order to develop a research method for such a complicated phenomenon as social capital in the company.

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REGIONAL DIFFERENTIATION OF POLAND IN TERMS OF THE DEGREE OF DIGITAL EXCLUSION OF HOUSEHOLDS IN 2017

Aneta Becker, PhD¹; Jarosław Becker, PhD²

¹ Faculty of Economics, West Pomeranian University of Technology

² Faculty of Technology, Jacob of Paradyz University in Gorzów Wielkopolski

ABSTRACT

Nowadays, the digital economy plays a significant role in economic life. It is determined by the intensive development of modern ICT (Information and Communication Technology). Thus, the importance of the information society using techniques of information communication and processing that arose from the connection of other households is increasing. These households participate and form the basis for the process of creating social capital. Therefore, it seems interesting to examine the socio-economic space of Polish households due to the existence of disproportions in ICT development. The article presents the results of the classification of Polish voivodeships in terms of the degree of digital exclusion understood as lack of access or the ability to use ICT in households in 2017. The research used the ELECTRE TRI method, which is an example of a multicriteria decision support method used to classify decision variants based on a relationship of exceedance. The obtained results allowed for the identification of regions that are characterized by the highest degree of exclusion of digital households (the lowest use of ICT). This group includes the following provinces: Podlasie, Lublin and Lubusz. Into the analyses carried out additionally and deliberately introduced the region of Masovia Province without the capital city and separately the region of Warsaw (the capital city), which clearly different from other units. Thus, it served as a reference point in the study, which represents highly urbanized areas of voivodeships characterized by a low degree of digital exclusion.

Keywords: ICT, digital divide, households, ELECTRE TRI

JEL codes: C38, O35

INTRODUCTION

The importance of information in the modern world is enormous. It is used in all areas of socio-economic life. The Internet plays an important role in the process of acquiring, collecting and transferring information. Access to it and the skilful use of its resources result in the promotion of society to the group of highly developed countries. The inability to use in-

formation and communication technologies can lead to digital exclusion, defined in literature as stratification for those who have access to computers and the Internet and those who do not have this access (van Dijk, 2010). The effect of these activities is unequal access to information and thus exclusion from the group of information societies.

In Poland, research on the information society is conducted within the framework of the Statistical

¹ Corresponding author: Janickiego 31, Szczecin, Poland, abecker@zut.edu.pl, +4891 449 68 61

² Corresponding author: Fryderyka Chopina 52, Gorzów Wielkopolski, Poland, jbecker@ajp.edu.pl, +4895 727 95 36

Research Program of the Public Statistics. It forms the basis for the evaluation of the implementation of the assumptions of the 'Digital Poland Operational Program' for 2014–2020 (Ministry of Investment and Development, 2018). This strategy is aimed at: enabling wider access to fast Internet, cultural heritage and science, as well as increasing interest in communication with state administration and increasing the digital competence of residents. It is worth paying attention to Poland's involvement in digitalization. The latest update of OECD from October 2017 indicates that Poland in 2013–2015 recorded a decrease in total revenues from telecommunications services (OECD, 2018). The accumulated annual growth rate (Compound Annual Growth Rate – CAGR) was at the level of USD –8.45 million. While the total value of investments in telecommunications infrastructure in terms of CAGR amounted to USD –8.5 million. The ICT Development Index (IDI) ranking published in 2017, which is an index of the development of information and communication technologies published by the United Nations Telecommunications Union indicated that Poland advanced by one degree compared to 2016 and took the 49th (out of 176 assessed countries of the world) place with the index at 6.89 (International Telecommunication Union, 2017).

The aim of the article is to classify Polish voivodeships in terms of the level of digital exclusion understood as lack of access or the ability to use Information and Communication Technology (ICT) in households in 2017. In the classification tests, the multi-criteria decision support method ELECTRE TRI was used. The empirical material used in the research came from the resources of the Central Statistical Office (GUS, 2018) and contained information on the use of ICT in Polish households.

THEORETICAL BACKGROUND

Prof. Bernard Roy is considered to be the founder of the European school of decision-making (Dias and Mousseau, 2003). While the representatives of this school developed a new methodology for making decisions and constructed a number of multicriteria methods. Among them, the family of ELECTRE methods can be distinguished, which can be applied

in the decision-making problems, e.g. selection, ordering and grouping (Merad et al., 2004). The extensive review of the applications of these methods and applications related to them was made by Govindan and Jepsen (2016). An interesting item that contains a collection of articles on multi-criteria decision analysis is the work of Figueira et al. (2016).

The ELECTRE method family is based on the S superiority relation. It is a binary relation that says that variant a exceeds variant b (aSb) if, given the available information on the decision-maker's preferences, there are clear indications that variant a is at least as good as variant b and there are no compelling reasons for rejecting this statement (Roy, 1991; La Gauffre et al., 2007; Roy and Słowiński, 2008; Figueira et al., 2009). The ELECTRE TRI is a representative of the ELECTRE method family, which can be used for classification (grouping) issues (Doumpos and Zopounidis, 2002; La Gauffre et al., 2007). Among the latest literature, in which the authors indicate the use of ELECTRE TRI, the following articles deserve attention: Corrente et al. (2016), Sanchez-Lozano et al. (2016), Becker et al. (2017) and Lu et al. (2010).

The main idea of ELECTRE TRI are the so-called profile separating classes from each other. Each decision variant (object) can be described because of its values on the criteria (features). The criteria weights and thresholds are the input data: indistinguishability, preferences and veto. It is required to enter the number of classes and define their boundaries, i.e. separating profiles. The operation of the calculation procedure is based on the performance of a series of tests of compliance and non-compliance (La Gauffre et al., 2007; Roy and Słowiński, 2008). This method compares each decision variant with all class separating profiles. Then you get a series of hypotheses that say if the variant exceeds the thresholds or not. Four situations may emerge from the tests: the variant is preferred over the profile, the variant is worse than the profile, the variant is indistinguishable from the profile or the variant is incomparable with the profile (Doumpos and Zopounidis, 2002; Dias and Mousseau, 2003; Merad et al., 2004). In the ELECTRE TRI method, placement of objects in individual classes follows

two complementary procedures: optimistic and pessimistic (Doumpos and Zopounidis, 2002; La Gauffre et al., 2007).

USE OF ICT IN HOUSEHOLDS (EMPIRICAL MATERIAL)

The empirical material containing information on the use of ICT in households in Poland, in 2017 came from the resources of the Central Statistical Office (GUS, 2018). The participation in a direct interview was voluntary. Participants were people aged 16–74. A two-stage sample selection scheme with stratification on the first stage was used to obtain results with smaller random errors. At first, the drawing of field research points was performed, and then of the apartments. The sample was taken using the Social Research Service. Completeness of the study was improved by using the reserve sample. The sample survey included a small part of the population and was generalized to the entire population as a result of multiplication by appropriately designated weights. In 2017, the response rate in the study of ICT use in households was 71%.

In 2017, the percentage of households (among respondents) that had at least one computer at home was 81.8%. Internet access was declared by 81.9% of households. The Internet users used the network primarily to: read or download the press (60.3%), communication via e-mail (59.8%), search for information about goods or services (58.4%) and use the social networking sites (48%). Communication with offices was less popular. Only 21% of households returned completed official forms, while 20.6% obtained information from public offices and public institutions, and 20.2% downloaded official forms. Only 11.6% of the survey participants marked the use of the network in order to look for work and send applications via the Internet. Factors conducive to greater interest on the Internet were having children and living in a large city (over 100,000 inhabitants) with a high degree of urbanization. As the reason for the lack of Internet access, 18% of respondents mentioned: no need to use the network (68%) and lack of skills (54%), equipment costs (27%) and access costs (19%).

DISCUSSION OF MULTI-CRITERIA GROUPING RESULTS

The study took into account the layout according to NUTS 2013 voivodeships (Eurostat, 2018). In this way, information in ICT in households from sixteen voivodeships was obtained. The unit, which was divided into additional regions, was the Masovia Province. In this way, the list of facilities has been extended to eighteen (, that is, the capital region of Warsaw and the region of the Masovia Province without Warsaw (the capital).

The research used a ten-element set of criteria (features), which included the percentage:

- X_1 – households equipped with a computer ($w_1 = 0.144$),
- X_2 – households with the Internet access ($w_2 = 0.144$),
- X_3 – people using a computer ($w_3 = 0.143$),
- X_4 – people using the Internet ($w_4 = 0.143$),
- X_5 – people using mobile devices to connect with the Internet ($w_5 = 0.071$),
- X_6 – people using the Internet to communicate ($w_6 = 0.12$),
- X_7 – people using cloud services ($w_7 = 0.028$),
- X_8 – people using the Internet in contacts with public administration ($w_8 = 0.054$),
- X_9 – people using the Internet for goods or services for private use ($w_9 = 0.1$),
- X_{10} – people using payments for goods and services purchased or ordered via the Internet for private use ($w_{10} = 0.054$).

The weight values for individual criteria are shown in brackets. The weight vector arose as a result of transforming the vector of mean variable values $[\bar{x}_1, \dots, \bar{x}_n]$ into the scale vector $[\bar{w}_1, \dots, \bar{w}_n]$, where the sum of elements equals one ($n = 10$). A rule was applied, according to which the degree of intensity of features characterizing ICT in the surveyed population corresponds to the priorities (weights) adopted for the assessment of Polish voivodeships. It was assumed that the most common features most strongly express the degree of digital exclusion. Possession or use of a computer or the Internet ($\bar{x}_1, \bar{x}_2, \bar{x}_3, \bar{x}_4$) in Poland, in this period included approximately 81% of the surveyed persons or households (Fig. 1). These

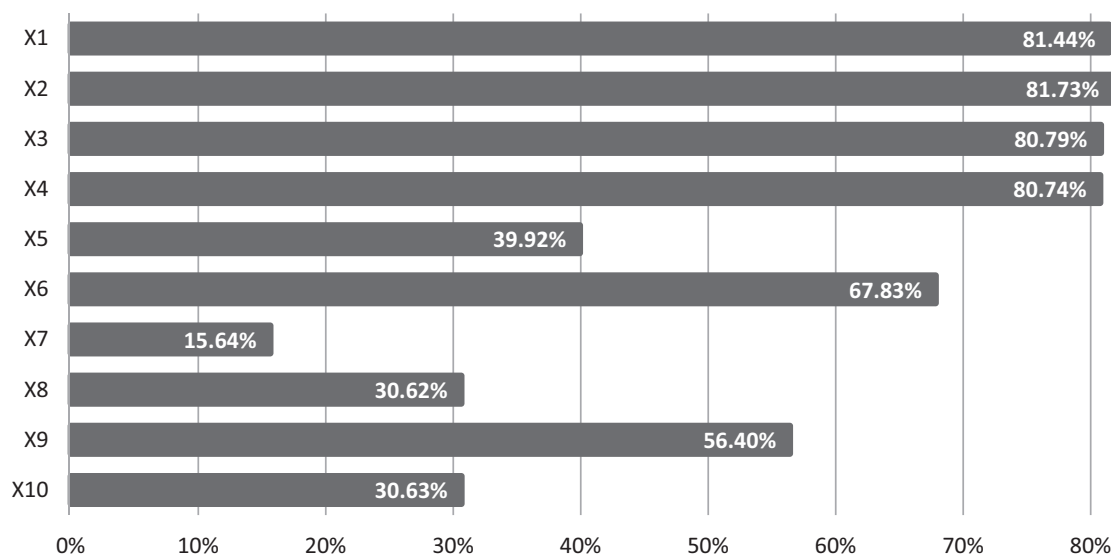


Figure 1. Average values of variables characterizing the percentage of people or households using ICT in Polish voivodeships in 2017

Source: own study based on CSO data (CSO, 2018).

criteria received the highest, over 14% preference level. However, the least popular feature (15.64%), i.e. the use of cloud computing services, determined the digital exclusion to the lowest degree (2.8%).

The ELECTRE TRI 2.0a computer program was used in the classification tests. The grouping into 3 classes was considered a result division. Due to the number of classes $k = 3$, for the decision problem being considered, two profiles defining the class boundaries were defined: and for each i -th criterion ($i = 1, \dots, n$), where j denotes the index of the decision variant ($j = 1, \dots, m$). Profile values divide the space between the minimum and maximum value of each criterion into three equal parts. For each of these profiles, threshold values have been determined on each criterion: vetoes, preferences and indistinguishability, $h = 1, \dots, k-1$. The proportions between the thresholds are proposed in the work of Rogers (2000) and Giannoulis and Ishizaka (2009). It was considered that the surpassing is reliable when the reliability ratio (Roy, 1991) exceeds the cut level $\lambda = 0.76$.

The allocation of individual objects to classes was obtained as a result of two types of procedures: optimistic and pessimistic. The list of received assignments to groups is found in Table 1.

The numbering of the obtained groups was relate to the class's hierarchy of importance (variants from higher classes over the variants from lower classes were preferred). The regions classified as least at risk of digital exclusion were classified in the first group. The second one included average voivodeships. On the other hand, the third class represented the objects most exposed to finding themselves outside the digital community. Classes 1–2 and 2–3 are undefined classes. They contain voivodeships that have been allocated to various classes as part of optimistic and pessimistic procedures. According to the applicable rule, in the ELECTRE TRI method, the allocations obtained by the optimistic procedure cover the higher classes compared to the results of the pessimistic procedure. For example, the Masovia Province according to the optimistic procedure was classified into the second group, while according to the pessimistic procedure, it found itself in the first class. This indicates the occurrence of some ambiguities, which result in the incomparability of the variant with the designated class profile. The final division is done by the decision-maker. In the article, it was proposed to introduce two uncertain classes for such cases.

Table 1. Results of the classification of voivodeships according to the degree of ICT use in households, in 2017

Class 1	Class 1–2	Class 2	Class 2–3	Class 3
Warsaw *	Masovia (mazowieckie)	Lower Silesia (dolnośląskie)	Kuyavia and Pome- rania (kujawsko-pomorskie)	Lublin (lubelskie)
	West Pomerania (zachodnio-pomorskie)	Masovia without Warsaw *	Łódź (łódzkie)	Lubusz (lubuskie)
		Opole (opolskie)	Lesser Poland (małopolskie)	Podlasie (podlaskie)
		Pomeranian (pomorskie)	Subcarpathian (podkarpackie)	
			Silesian (śląskie)	
			Holy Cross (świętokrzyskie)	
			Warmia and Masuria (warmińsko-mazurskie)	
			Greater Poland (wielkopolskie)	

* Sub-regions of the Masovia Province.

Source: own study based on the CSO data (GUS, 2018).

Both in pessimistic and optimistic terms, there are objects that can be described as stable, that is definitely belonging to their groups, regardless of the procedure used. Among them are Warsaw (class 1), provinces: Lower Silesian, Masovia Province without Warsaw, Opole, Pomerania (class 2) and provinces: Lublin, Lubusz and Subcarpathian (class 3).

CONCLUSIONS

The research focused on the application of the ELECTRE TRI multi-criteria method of supporting the decision for grouping voivodeships due to the use of ICT in households in 2017. Based on the results, it can be concluded that there are significant disproportions in terms of individual advancement of ICT between Polish voivodeships. Regions with the highest digital exclusion of households (the lowest use of ICT) included the following voivodeships: Podlasie, Lublin and Lubusz. These regions belong to the group

of voivodeships with lower economic indicators and GDP below the national average. Among the entities least threatened with the occurrence of this phenomenon were: Warsaw, Masovia and West Pomerania. It should be added that the sub-regions of the Masovia Province, Warsaw and Masovia Province without Warsaw were taken into account deliberately in the research. They show the disproportion of digital exclusion between residents of a large agglomeration and the rest of the region.

Factors that significantly affect the size of digital exclusion are, among others: income, education, qualifications and professional skills, place of residence and age. In order to reduce the regional disparities in digital access, one should strive to raise social capital, activate the unemployed and pensioners, and promote the use of ICT in professional and private life.

Nowadays, information, access to it and skilful processing are the main driver of economic growth

and technological advantage. Human capital supported by the latest ICT technologies plays an important role in this process. The implementation of these technologies requires appropriate education, infrastructure and legal solutions. In areas with mental and cultural barriers and low level of knowledge in the use of ICT, there is a threat of digital exclusion. In Poland, the advantage of urban centres over rural areas in the use of ICT is noticeable. It results from infrastructural conditions. Therefore, in highly urbanized areas, higher skills in using modern IT solutions are noticed.

The obtained results of classification tests are an introduction to further work on topics related to digital exclusion. An interesting idea of continuation would be the analysis of this phenomenon in other countries, for example the European Union. In addition, a comparison of experiences related to digital exclusion of Poland and regions of Eastern Europe would allow obtaining information on how to prevent this phenomenon.

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KNOWLEDGE BASED ECONOMY: OPPORTUNITIES AND CHALLENGES

Anna Milewska, PhD¹

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

Nowadays, we can observe in different business and academics environments an ongoing dialog about knowledge – based economy, due to the fact, that economies are increasingly based on knowledge and information. Practically it means, that companies have started looking for answers for plenty important questions – what ‘knowledge’ exactly means and what kind of knowledge is significant from business continuity perspective? What exactly is a driver of productivity and economic growth? Business executives have to face also other challenges: how all this knowledge has to be managed and how to adapt to swiftly changing circumstances? Should it be centralized in shared services centres forms or maybe outsourced based on business process outsourcing strategy? Do companies should establish cooperation with universities or R&D institutes based on the cluster structure? In this article the author will characterized the knowledge as a source of competitiveness, increasing importance of science and try to summarize best practices in that field.

Keywords: knowledge management, shared services centres, business process outsourcing
JEL code: D83

INTRODUCTION

The notion of knowledge based economy has become popular in economic literature quite recently. Nevertheless, within last few years, this phenomenon of economic development connected with broad application of knowledge has gained momentum. Theoretical concept of knowledge based economy has appeared at the beginning of the 1990s. Its basis was seen in increasing importance of globalization and in the development of information technology. OECD report form 1996 became the first complex description of that phenomenon. According to this,

it is a type of economy, which based on production, distribution as well as on usage of knowledge and information (OECD, 1999). The concept of knowledge based economy is also used interchangeably with ‘new economy’. However, in literature, we can find many other examples: Drucker used the words ‘post – capitalistic society’ (Drucker, 1999) and Naisbitt – ‘society of knowledge’ (Naisbitt, 1997). These phrases describe the same reality, nonetheless, they highlight different aspects, e.g.: the meaning of the network in the economy structure or the occurrence of radical changes in technologies connected with digitization.

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, anna_milewska1@sggw.pl, +4822 59 340 69

THEORETICAL BACKGROUND

Creation of knowledge based economy depends on few favourable conditions, like set up and then constant development and growth of companies which based their competitive advantage on knowledge. These conditions are represented by state, local and regional authorities, industries, intellectual and academic environments. The competitive advantage built on knowledge has two conceptualizations: wider and narrower. The wider one, understands the knowledge as every unique and useful information, which the company exclusively has and owns as well as is able to use it to achieve and entrench its competitive advantage. In the narrower understanding, a unique knowledge is also the case, however it does not belong to that company – it is used on daily basis, but was not originally created by the company itself – so that it is not the company property (Kozłowski, 2002). The Institute of the World Bank defined the conditions, which each country should meet to become a part and start participating in the knowledge based economy (OECD, 2000):

1. Free flow of knowledge thanks to economic and institutional conditions, expanding the investments full of new information and communication technologies;
2. The society ought to either have or create necessary skills in the field of knowledge usage;
3. The country itself should dispose dynamic informational structure which helps effectively distribute and process information;
4. The existence of research centres, universities, teams of professional consultants, private investors and social groups able to use, assimilate and create new knowledge.

What is important in that concept, the country can support the development of knowledge based economy applying following initiatives (Orłowski, 2000):

1. Driving adequate macroeconomic and structural policy, focused on decreasing the current level of taxation for industries, increasing economy openness, effective privatization and restructuring;
2. Rationalizing the expenses on research and development;

3. Carrying about the education policy to improve the education quality and adjust the system to current economic needs. Due to this, the knowledge itself can be understood as a product as well as the growth factor. In the same time, it can be an object/subject of market turnover and the economic good. Knowledge is also the set of information necessary to make specified decisions.

MATERIALS AND METHODS

The article presents the overview of scientific literature focused on the subject of knowledge based economy, innovation, development and changes within the society. Meanwhile, the Author has been striving to get to know the specificity of knowledge based economy, the reasons behind its success or whether it is possible to make it grow by well – prepared society and state. Besides the scientific literature, the Author also presented the overview of European Union publications/statements (e.g.: National Strategy of Regional Development 2010–2020), to picture the broader view of the subject and moreover, to show how the countries and industries can become a part of this economic change - beside the obstacles. Polish and international literature were used to create the comprehensive understanding of knowledge based economy phenomenon. Knowledge based economy has 3 faces (Skrzypek, 2009):

1. Methodological: it means searching new ways to identify analyse problems in the area of knowledge management;
2. Empirical: monitoring how the economy has been changing into knowledge based one as well as knowledge diffusion within societies and industries;
3. Pragmatic: what means creating and promoting the systems allow manage the knowledge at all levels of social life.

First of all, the Author focused on the theoretical part and review of literature and EU publications. Secondly, to present how the theory was applied into practise, the Author described 3 business examples of structures which fully meet requirements to be recognized as knowledge based features.

RESULTS

Different scientist present the same concept of knowledge development – it is connected with next phases of development and progress of a mankind. Due to Bell, current era can be called 'post-industrial'. It has begun in the second half of the 21st century and continues till today (Bell, 1973). The crucial role has the knowledge – understood as a specific resource which yields the meaning and forms new economy. Another example of distribution was created by Schumpeter and his continuers, Freeman and Soete (Schumpeter, 1960; Freeman and Soete, 1997). They split the development of humanity for 5 phases, so today, global society exist in the fifth phase. This phase was began by digital network and Internet. New products connected with modern technologies appeared on the market. Thanks to the Internet, time of the information flow as well as the distance ceased to be important. What is more, the new definition of the society occurred: information society, living in the world of growing importance of information, knowledge and innovations, common usage of ICT technologies, increasing number of employees whose intellectual potential is highly connected with economic success. That kind of society is characterised by exponential production growth, high level of media interference and the dependence of various aspects of human life on receiving and producing information (Fic and Fic, 2004). People belong to such society have 3 important attributes: accept competitiveness, require creativity and respect each other successes. It means, that due to the rate of changes, existing knowledge evolves in a very short time. People are forced to constantly develop their skills to adapt to this swiftly changing environment and achieve both – personal and organizational goals. Each person becomes representative of information society, a 'vehicle' of knowledge, wanted on the market – for the companies' such employees are a source of competitive advantage.

However, following Drucker, 'knowledge only' is not enough. Intellectuals need industries as a tools to enable them use their specialized skills. Knowledge – based organizations have a straight, ordered structure, directed at creating the added value thanks to the effective use of knowledge (Drucker, 2001). This

understanding Drucker also presents in his definition of knowledge based economy as an economy based on pillars: innovative systems (creating financial, law and administrative conditions conducive to innovation), informational infrastructure and education and trainings (investment in the human capital, including continuous education).

The key competence for all companies to increase its efficiency is the ability to provide valuable information to its members. Efficient communication became the grates value (Dale, Cooper and Willkinson, 197). According to that, present industries are able to adapt better and quicker to market demands. They can offer their products and services at the lowest price and in the most comfortable way for buyers. Operating activity based on process standardization: supply, production, distribution are possible on the top level, if the whole process in standardised and well-coordinated. To achieve this perfection, proactive company culture needs to be establish: self – discipline of all members, great accuracy, desire to increase the productivity, frugality and matching the offer to individual customers' needs. To achieve the success as a company operating in the conditions of knowledge based economy, it has to understand and implement the following division of knowledge itself (Lundvall and Johnson, 1994): know – what: refers to facts and information, know – why: refers to understanding the rules working within the society and nature, know – how: refers to human abilities to do something – collected in the form of experience, creates experts and know – who: it allows to use expert knowledge during production process.

Based on different metrics, researches and EU started new initiative: Europe Strategy 2020. In April 2011, all member states provided European Commission their National Reform Programs to accomplish the main Strategy goals: increase of the intellectual capital, sustainable development and social capital. Poland prepared the National Strategy of Regional Development 2010–2020: Regions, Cities, Rural Areas. Country decided to press ahead with unlocking development processes within a regions in line with the knowledge based economy bases. Development policy assumed launch of unused labour resources, absorption and creating innovations based on

straightening the sector of research and development as well as activate their cooperation with companies, stimulate the growth of social capital, providing adequate technical and institutional conditions. What is more, this document presents also the changes in the employment sector to increase the number of people employed in the modern business structures. One of that structures is Shared Service Centre. This is a type of transnational way of managing the knowledge and business. Existing business functions, like HR, Administration, Finance, IT, Customer Service, Logistic etc. become concentrated into one place in the world, not necessarily in the country of origin and from that destination they are servicing the whole world. SSC promotes efficiency, cost savings, improve the service, however what is also important – it supports the knowledge transfer, modern management what finally increase the level of innovation and competitiveness. Based on the Poland example and ABSL report (Association of Business Service Leaders in Poland), currently, there are more than 600 SSCs, employing more than 200,000 people (Górecki et al., 2016). Growing number of SSCs means increasing requirement for well-educated and prepared employees. Why Poland is one the most popular location for SSCs in Europe? There is one reason behind – knowledge (the availability of highly educated resources). One of the main strengths of Polish specialists is the knowledge of foreign languages desired by employers. In this sense, Polish employees outperform other European countries and India, which so far was the most frequently chosen location for business processes outsourcing. Following the example, in June 2015, TNS research agency published the results of a survey conducted on 8–13 May 2015 on a representative, nationwide group of Poles aged 15 and more, using the CAPI method (Computer Assisted Personal Interview). According to the results, more than every third Pole declares knowledge of at least one foreign language, while the others can be qualified as polyglots using at least two foreign languages (Krassowska, 2015). Shared Service Centre structure is able to achieve of knowledge based economy goals: being professional, aware of international best practices and best information management methods, implement standardised, better process to complete

the work, improve cross – group learning, constantly increase the quality, discover customers' needs and monitor the satisfaction, become more accessible and accurate.

Knowledge is also one of the main reasons behind creation of BPO structures – Business Process Outsourcing. It is a type of structure, where a third party provider is involved – the company X decides to outsource a chosen part of its business, like HR, IT, Customer Service outside to a company Y which will drive these activities and be responsible for them on daily basis for the company X, e.g.: Accenture is an example of BPO structure. Why it is connected with the knowledge based economy? Beside of the cost reduction, third party service provider, taking some basic, repeating processes and tasks, allows the main company to focus on the core competencies and what is more – on innovations – to achieve further operational excellence. The second advantage is the ability to reassign resources, both employees and space. Company can easily reallocate unleashed resources: people, time, money, office space, for additional improvements, project work, applying updated technologies. Next advantage of outsourcing is the access to the customer feedback: in most cases, BPO employees are in the direct contact with customers, so they are able to receive and gather a 'first – hand' feedback about the product and services. Refer to the customer feedback, companies are able also to improve the other sectors connected with production, like supply planning or logistic. The last example of the structure which meets all the requirements of the knowledge based economy is a cluster structure. Clusters are (mostly regional) concentrations of businesses including their service providers along a value chain. It is type of activity driven by at least 2 businesses, which take profits from cooperation with each other. The benefits are free flow of knowledge, experience, technologies and ideas between the partners. Each partner brings specific strengths to the alliance. Economic and country policies in most cases support cluster formations. According to data from the Catalogue of the Polish Agency for Enterprise Development 'Clusters in Poland', there are 14 Special Economic Zones operating in Poland, which allow entrepreneurs to conduct business activities on pref-

erential terms, e.g.: thanks to tax relief, preparation of specially equipped land, etc. A good example of a cluster structure in Poland is the Nutribiomed cluster in the Lower Silesian Voivodship. The area of interests and activities of the cluster includes advanced technologies in food processing and biotechnology, cosmetics and pharmacy. Currently, the cluster includes six universities, three business environment institutions and more than thirty enterprises from the food, biotechnology and biomedical industry. In the international arena, NUTRIBIOMED cluster cooperates with partners from Italy, Hungary, Austria and the Czech Republic. To sum up, cluster initiatives not only contribute to the growth of enterprises' competitiveness and creation of new workplaces, knowledge, information and technologies flow, but also strengthen the position of a given country on the international arena.

CONCLUSIONS

The fundamentals of the knowledge based economy is a transition from the material economy to the economy which used the potential of the science and information. Intangible assets have gained the importance, especially human capital, knowledge and new technologies. According to that, the development will be more and more impacted by the intellectual potential as well as the latest achievements of the modern science. Growing competition which refers to creating and implementing innovations requires from the people constant development, adequate skillsets and adapting new knowledge.

However, following Toffler (1986), the development of knowledge based economy, may bring also different risks, for example fast technological progress can intensify the gap between poor, backward countries and the technically advanced ones. These countries, which are during the development process might be in danger – if they do not absorb the technological achievements quickly, that can be marginalized and standardization of products and services may increase the danger of market monopolization.

Unfortunately, the role which different solutions have been playing will be understood with time.

Sometimes, innovation can cause the creation of new social order, based on constant changes. Nevertheless, recognizing the benefits of change and agreement to their inevitability gives the chance to enter even more creative economic phase.

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WELL-BEING AS EXPERIENCED IN THE CONTEXT OF AN ORGANISATION AND MOTIVATION TO IMPROVE PROFESSIONAL QUALIFICATIONS

Sylwia Gołąb, PhD¹; **Beata Będzik**, PhD²

Faculty of Economics, West Pomeranian University of Technology

ABSTRACT

The study aims to clarify the relationship between well-being at work and motivation to undertake additional learning activities. It was conducted among 96 professionally active individuals, students of Bachelor's and supplementary Master's degree studies with majors in Economics and Management as well as Master's degree students having an Individual Course of Studies majoring in Psychology. The hypotheses have been verified using: the Well-being in the Workplace Questionnaire by Czerw (2017), the Job Satisfaction questionnaire by Bajcar et al. (2011) and an original questionnaire of activity and motivation in the field of learning. The study results indicate that there is a relationship between certain dimensions of well-being at work and motivation to undertake additional learning activities.

Keywords: well-being at work, job satisfaction, undertaking training

JEL codes: R21, R22

INTRODUCTION

The studies relating to job satisfaction in the context of undertaken training courses are few and far between. So far, the studies that have been carried out in Poland focused mainly on the significance of personality conditioning (Łaguna, 2012a), as well as job and life satisfaction (Łaguna, 2012a), but they did not take into account the factors connected to the context of work³.

It is worthwhile to emphasise that job satisfaction can be both an effect of undertaking training

and a factor that motivates to do it (Łaguna, 2012b). This is particularly important because, as it has been observed, along with the socio-economic development the qualifications and competences of the employees are becoming obsolete, while various forms of further training are conducive to ensuring an appropriate level of knowledge and skills. Therefore, it is important to explain the relations between the well-being at a company and the motivation to undertake additional educational activity. This is the aim of the study.

¹ Corresponding author: Żołnierska 47, Szczecin, Poland, sylwia.golab@zut.pl, +4891 449 69 19

² Corresponding author: Żołnierska 47, Szczecin, Poland, beata.bedzik@zut.pl, +4891 449 69 94

³ An interesting proposition of handling motivation when participating in trainings is the concept presented by M. Łaguna, who says that the participation in self-developing activities is a process connected with the realization of subsequent stages of the established goal.

THEORETICAL FOUNDATIONS

Similarly to general well-being, the well-being at work can be considered in both hedonic and eudaimonic terms (Czerw, 2017). In the hedonic paradigm, the satisfaction with life is mainly caused by the degree of assessments made in the cognitive dimension that concern individuals' own life, and in the emotional dimension – that concerns emotions and moods experienced in their lives (Krok, 2013). It should be added that in the hedonic perspective, in addition to emotions and satisfaction, the declared level of perceived job stress or the level of job burnout are quite often used as indicators of well-being. This approach is not consistent, however, with the assumptions of positive psychology (Czerw, 2017).

An important and generally perceived research perspective of well-being at work is the emotional approach. Many researchers argue that emotions should be studied independently of one another, because they can only be derived from the perception of factors related to cognitive aspects. While considering the emotional approach, it is worthwhile to pay attention, among other things, to the applicable rating scales (cf. Hoppock Job Satisfaction Blank, Minnesota Satisfaction Questionnaire, European Social Survey), which as such can reflect some feelings (Wudarczyński, 2013). Just like in the other contexts of human functioning, work-related emotions are a source of motivation, activation, organisation and maintenance of employees' specific behaviours. These behaviours may be conducive to effective performance of tasks, but may also have a negative dimension – they may decrease efficiency at the workplace (Czerw, 2017).

Apart from emotions, the hedonic perspective of well-being at work also identifies job satisfaction. Being satisfied and the perception of job satisfaction translate not only into effectiveness of an employee but also into broadly defined quality of life. After all people spend a significant portion of their day in the workplace, while thanks the received pay gives them a chance to satisfy their various needs associated with their everyday functioning. The quality of work should, therefore, go hand in hand with the quality of life (Skrzypek, 2001).

It can be assumed that job satisfaction may be conducive to motivation to engage in undertaking activities aimed at improving the qualifications and extending the competences. An important element of division of motivation to achieve success (Elliot, 1996; after Franken, 2013) is the thesis that individuals are capable of self-regulation, thus they try to behave depending on their attitude to success. Individuals who want to strive for perfection and prove themselves undertake difficult tasks, thus developing their skills and the feeling of competence. Individuals who avoid proving themselves, avoid difficult tasks, which induces in them behaviours showing their high level of helplessness.

In the knowledge-based society, training is an effective and efficient method of individual improvement. Various forms of training support the implementation of individuals' own professional plans and tasks. Despite many opportunities for further training and the related benefits, not all professionally active or professionally passive individuals make use of them. Among the determinants of readiness to undertake training and broadly defined education, one can notice factors that determine the activity of individuals in this respect, such as e.g. demographic, motivation and personality variables. With respect to trainings, factors relating to work environment, i.e. those that are directly related to the situation in the workplace capable of determining decisions regarding further education, are gaining in importance as well (Kawecka, Laguna and Tabor, 2010). There are not many studies regarding the role of factors associated with the functioning of people at work, particularly those referring to the motivation to undertake trainings. The studies by Colquitt, LePine and Noe (2000) contributed significantly to the search for the conditions that motivate people to participate in trainings. Despite 20 years of working on this issue, they still point to the need for further analyses.

MATERIALS AND METHODS

Due to the limited volumetric framework of this publication, only one of many aspects of well-being at work were considered. The main purpose of the study is to explain correlation between well-being at

work and motivation to undertake additional learning activities. The following detailed problems have been adopted within the main problem:

1. Is there any correlation between the eudaimonic and hedonic well-being at work and its particular dimensions, and motivation to improve professional qualifications measured by the number of undertaken training courses?
 - H1.1. The higher the level of employees' well-being at work the higher their motivation to improve professional qualifications.
 - H1.2. The higher the level of job satisfaction the higher the level of motivation for improving professional qualifications.
2. Is there any relationship between well-being at work and various types of further training?
 - H2.1. The level of well-being at work positively correlates with undertaking all four types of training activities.
 - H2.2. The level of job satisfaction negatively correlates with undertaking training activities at the request of the superior and positively

correlates with undertaking training activities of employees' own volition.

3. Is there a relationship between satisfaction with the chosen profession and undertaking additional learning activities?
 - H3.1. There is a positive correlation between satisfaction with the chosen profession and undertaking all four types of additional learning activities.

The study⁴ was carried out among 96 professionally active individuals, students of Bachelor's and supplementary Master's degree studies with majors in Economics and Management as well as Master's degree students having an Individual Course of Studies majoring in Psychology. All the respondents were in the process of further learning. The average age of the respondents was 32 years, length of the period of service in the current company was 6 years, while total length was – 10 years. The sample group was dominated by women, individuals with university education, non-managers, administrative employees (Table 1).

Table 1. Characteristics of the study sample

Category		<i>N</i>	%
Sex	Women	77	80.2
	Men	19	19.8
Position	Managerial	17	17.7
	Non-managerial	79	82.3
Education	Secondary	21	21.9
	BA/BSc/Engineer	31	32.3
	University education	44	45.8
Type of position	Administrative employee	29	30.2
	Customer service employee	17	17.7
	Production employee	1	1.0
	Specialist	24	25
	Other	25	26

Source: own work.

⁴ The study was conducted between September 2017 and January 2018.

The following have been used to verify the hypothesis: The Well-Being in the Workplace Questionnaire (KDMP) by Czerw (2017), the Job Satisfaction questionnaire by Bajcar et al. (2011) and an original questionnaire of activity and motivation in the field of further learning.

Statistical analyses required to verify the proposed hypotheses have been conducted using the IBM SPSS Statistics version 23. It has been used to calculate basic descriptive statistics of the analysed quantitative variables, test similarities between normal distribution and empirical distributions, and to conduct Pearson correlation analysis (r). A typical materiality threshold of $p < 0.05$ has been adopted.

RESULTS AND DISCUSSION

The Pearson correlation analysis has been carried out in order to verify the hypothesis concerning correlation between the level of employees' well-being at work and their motivation to improve professional qualifications. The analyses have shown that there is a statistically confirmed correlation between the number of training courses and the total job satisfaction. The higher the level of employees' well-being at work the higher their motivation to improve their professional qualifications. In the course of a detailed analysis, one can notice that there is a correlation between all the dimensions, except for Positive relationships with co-workers (Table 2).

Then the hypothesis concerning correlation between the level of job satisfaction and motivation to improve professional qualifications has been verified. The analysis has shown no correlation between

job satisfaction and the number of undertaken training courses ($r = 0.195$; $p > 0.05$), thus hypothesis 1.2 has not been confirmed.

The Pearson correlation analysis has been carried out in order to verify the hypothesis concerning correlation between the level of well-being at work and taking all four types of activities associated with further learning. The carried out analyses have shown a positive correlation between general level of well-being at work and work-related training courses and negative correlation with training courses not related to the currently held position. In the course of a detailed analysis, one can notice that there is a positive correlation between the dimension Adjustment and development and Positive organisation and undertaking training courses which are associated with the currently held position. There is a negative correlation between the dimension Adjustment and development and undertaking training courses which are not related to the performed work (Table 3).

The Pearson correlation test has been used to verify correlation between the level of job satisfaction and undertaking further learning activities at the request of the superior and of one's own volition. No correlation has been found between the general level of job satisfaction and undertaking activities aimed at improving qualifications, both at the request of the superior and of one's own volition. There is, however, a correlation between some dimensions of satisfaction and the analysed variables. Job satisfaction with reference to professional development is positively correlated with undertaking further learning activities of one's own volition. The second statistically confirmed correlation concerns job satisfaction with

Table 2. Correlation between employees' well-being and their motivation to improve professional qualifications ($N = 96$)

Specification	Positive organisation	Adjustment and development	Positive relationships with co-workers	Contribution to the organisation	Well-being in the Workplace Questionnaire (KDMP)
Training courses number	0.217*	0.228*	0.115	0.185*	0.239*

*Correlation is significant at the 0.05 level (2-tailed).

Source: own studies.

Table 3. Correlation between well-being in the workplace and various types of further learning ($N = 96$)

Specification	Positive organisation	Adjustment and development	Positive relationships with co-workers	Contribution to the organisation	Well-being in the Workplace Questionnaire total (KDMP)
Training at the request of the superior	-0.18	-0.003	-0.019	-0.107	-0.039
Training on a voluntary basis	0.176	0.178	0.129	0.086	0.188
Work-related training	0.216*	0.327**	0.105	0.189	0.272**
Non-work related training	-0.186	-0.247*	-0.119	-0.162	-0.230*

*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

Source: own studies.

Table 4. Correlation between job satisfaction and its dimensions, and the undertaking of further learning activities voluntarily or at the request of the superior ($N = 96$)

Specification	Undertaking training on a voluntary basis	Undertaking training at the request of the superior
Colleagues	0.118	-0.042
Direct superiors	0.074	0.014
Type of tasks performed at work	0.121	0.021
Working conditions	0.131	-0.128
Professional development	0.221*	0.012
Pay	0.129	0.036
Work time	0.092	-0.137
Employment stability	-0.026	-0.267**
Company/institution as a whole	0.067	-0.136
General job satisfaction	0.146	-0.099

*Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

Source: own studies.

reference to employment stability and undertaking training courses at the request of the superior – negative correlation (Table 4).

The Pearson correlation analyses have been carried out in order to verify the hypothesis concerning correlation between satisfaction with the chosen profession and undertaking all four types of additional activities. The carried out analyses have partially confirmed the hypothesis (3.1) concerning positive corre-

lation between satisfaction with the chosen profession and undertaking all four types of additional activities. There is a statistically confirmed positive correlation between satisfaction with the chosen profession and undertaking training courses associated with the held position ($r = 0.246$; $p < 0.05$). There is a negative correlation between satisfaction with pursuing the chosen profession and undertaking activities not related to the currently held job ($r = -0.302$; $p < 0.05$).

CONCLUSIONS

The results of the carried out research have shown that experiencing well-being at work may be connected with motivation to undertake additional learning activities. People who perceive their organisation as trustworthy, convinced that they are a part of this organisation and their activity contributes to its better functioning, more willingly undertake training courses. The results are similar to those achieved by Colquitt, LePine and Noe (2000). According to the researchers, the engagement and support of superiors can be the determining factor in employees' decisions to undertake trainings.

Being aware of one's own competences and predispositions, adequate to the held position and the assigned tasks, is also important. It therefore turns out that experiencing well-being at work can translate into positive attitude to training courses and be expressed in the number of undertaken courses. At the same time, the results of the study have also shown that there is no correlation between undertaking training courses and having friendly relationships with co-workers. This is understandable, because the feeling of trust between employees and having the certainty of getting help when in need concerns major aspects of functioning in the organisation and is not necessarily connected with personal development or improvement.

Of essential importance in the carried out analyses has been assessment of the motivation to improve professional qualifications that takes into account various types of further learning. Training courses are an integral part of any organisation as the importance of knowledge-based organisation is being emphasised more and more often. That is why, the correlations between well-being experienced in the workplace and various types of additionally undertaken learning activities have become interesting. The analyses have shown that people experiencing well-being at work and convinced of being at the right place are more willing to undertake training courses that are related to this work. It should also be emphasised that employees' perception of well-being is important not only from the point of view of themselves, but also the organization, due to the fact that improvement undertaken by the team members contributes to the de-

velopment of their competences, and thus translates into increased efficiency.

In addition, the presented results show that people who are not satisfied with their current work more often choose training courses which are not related to the currently held position or organisation in which they are employed. This may result from their intention to change job or profession. Similar results have been obtained for satisfaction with the chosen profession. People satisfied with the chosen profession more willingly undertake training courses associated with the currently held position, while those dissatisfied – choose training courses not related to the performed work.

An interesting aspect of the carried out studies has been assessment of correlation between job satisfaction and its dimensions, and undertaking further learning activities voluntarily or at the request of the superior. Although no correlation has been observed between general level of job satisfaction and undertaking training courses, but there are correlations between some of its dimensions. On the basis of the results obtained, it can be assumed that people who feel a strong need for professional development, more often undertake training of their own volition. This is understandable as work and professional improvement constitute a natural need for many people. An interesting and statistically confirmed correlation is the one relating to employment stability and undertaking training at the request of the superior. It turns out that people who do not experience the feeling of safety identified with employment stability in a given organisation, more often undertake training at the request of the superior. It may be that those employees, for fear of losing their jobs, agree to any form of further learning proposed by their superiors, alternatively, their behaviour can be a form of pleasing their superiors in order to ensure for themselves a stable position in the company.

An important factor can be the seniority at a given company – employees with less time spent at a workplace may not be sure of their position in the organization and can be afraid to lose their jobs (Wojtczuk-Turek, 2010).

The reasons for the well-being at work should be searched for not only in the sphere of psychological

competences or professional interests, but also in the organization's conditioning. Due to the many aspects of the discussed issue, it is necessary to carry out detailed studies in this field, taking into account both the psychological aspects that refer to the individual, as well as the factors connected to the company in which a given employee is operating. It would be interesting to explain the relation between forming a bond with an organization, the motivation to work, effective working or the organization's culture and the decisions to undertake activities that lead to the increase in professional competences.

It has to be highlighted that the analyses are only a fraction of the studies carried out by the author which focus on the widely understood well-being at work. The presented results, due to the size limitations of this publication, refer only to one of the many aspects of well-being at work, i.e. undertaking additional educational activity. In order to have the full scope of the relations between the well-being at work and the motivation to undertake additional educational activity, it would be necessary to consider other factors associated with trainings, different than the ones analysed in this study, such as the sources of funding, the availability of trainings or the size of the company. Despite these limitations, the results of the studies can be a hint to learn and understand the reasons for undertaking trainings, taking into consideration both personality conditioning as well as the context of work, which could possibly support the work of the company's management.

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SOCIAL CAPITAL AS A STIMULANT FOR THE DEVELOPMENT OF ENTERPRISES IN THE PODKARPACKIE PROVINCE

Bogusław Ślusarczyk, Full Professor¹; **Bernadetta Dziura**, PhD²

¹ Faculty of Economics, University of Rzeszów

² Institute of Economics and Management, State High Technical and Economic School in Jarosław

ABSTRACT

Social capital is one of the essential elements of an enterprise's development. Enterprises with a high level of social capital, due to the smooth flow of information, are predisposed to achieve higher innovation, gaining an advantage over competitors (Przybysz, 2011). The social capital affects the creation of the unique value of an enterprise, mainly through the structures of the connections network, social and cultural norms as well as trust (Dziura, 2016). Nowadays, it is analysed at various levels and in varying degrees, also in relation to territorial systems, including the provincial level. The present paper is an attempt to analyse and describe the impact of social capital on development of selected enterprises in the Podkarpackie province. Authors of the article, due to the conducted surveys, application of statistical methods and analysis of financial reports, aim at presenting the effects of investing in social capital.

Key words: social capital, intellectual capital, enterprise, development

JEL codes: 015, 034

INTRODUCTION

The 21st century, called the era of globalization and knowledge, is a time of intense changes resulting mainly from the growing availability of information. These changes force enterprises to be ready to constantly develop under the dictation of a changing environment, cause the need to develop the adaptive abilities and introduce new solutions adjusted to the emerging threats and opportunities.

Contemporary management concepts direct the interest of enterprises to human resources, treating them as the most important capital necessary for development of the enterprise. To ensure functioning in a changing and competitive environment, each en-

terprise should build the path to success, increasing the value of social capital. The term social capital is interpreted by representatives of particular fields of science (sociology, management, economics) as: social norms, ability to cooperate, trust and credibility, competences and skills, as well as knowledge and experience (Gagaćka, 2008).

Paying attention to social capital results primarily from its significant impact on growth, and in consequence, on the competitive advantage of a company on the regional market. Enterprises that want to develop, survive and generate profits are forced to systematically create social capital and manage it effectively. In the conditions of growing competition, enterprises that are focused on continuous development and improv-

¹ Corresponding author: al. Rejtana 16c, 35-001 Rzeszów, Poland, boguslaw.slusarczyk@gmail.com, +4817 872 17

² Corresponding author: Czarnieckiego 16, 37-700 Jarosław, Poland, benia.dziura@wp.pl, +4816 624 46 40

ing their competitiveness through appropriate management of intellectual capital – especially social capital, have chances for further development and survival.

SOCIAL CAPITAL AS AN ELEMENT OF INTELLECTUAL CAPITAL

The processes of globalization have increased interest and directed the attention of practitioners and scientists to the role of intellectual capital in creating and achieving a competitive position on a market. Intellectual capital has existed in enterprises for a long time, but it is only in recent years that we have experienced the phenomenon of its discovery and use in creating an enterprise value.

Human capital has become a central category among the development factors of modern enterprises. The most important feature of human capital is its inseparable connection with the human person. It is not possible to separate a man from his capital. Therefore, the success of an enterprise depends on the 'knowledge workers' employed in it, on their innovativeness and the ability to identify opportunities, on the speed of action, on the possession of information about clients and business environment. It is very important to create organizational conditions for creating and using the knowledge in the enterprise.

A growing role of intangible values in management prompts to look for factors determining the development of the enterprise, and intangible values inherent in social capital stimulate competition, entrepreneurship and thus the competitiveness of individuals and enterprises (Gagacka, 2008).

Representatives of particular science fields interpret social capital in their own way using language specific to a given field. It is possible to indicate some of the most frequently mentioned elements of it: networks and social structure, social norms, ability to cooperate, cooperation and ability to organize, convince, value – including trust and credibility, competences and skills, as well as knowledge and experience (Gagacka, 2008).

Social capital is a very important resource of an enterprise, enabling the achievement of goals that without its involvement would not even be visible. It follows from the above that social capital increases the willingness to introduce new and develop their

existing activities in enterprises. It becomes important to pay attention to the role of social capital in the enterprise management process, its accumulation allows to use the existing enterprise resources and to establish such combinations that create new dimension of resources, thus creating a new company value. Social capital not only contributes to the creation of new value for enterprises, but also participates in the management of this value by acting as a relay of good practices and corporate behaviour – it affects the enterprise making it more flexible and adapting to the changing environment.

Assets that create intellectual capital have an increasing share in the development and creation of the market value of an enterprise. Knowledge of what constitutes the essence of intellectual capital and how it is used in an enterprise gives managers the opportunity to better manage these assets and increase the attractiveness of the enterprise for potential investors (Dziura, 2016).

It should be emphasized that intellectual capital is always based on human capital. The distinction of constituent elements in the concept of intellectual capital, however, emphasizes that although people (human capital) create knowledge, only through interactions between them (social capital), the scope of knowledge is increased, and as a result, institutionalized knowledge belonging to the enterprise (organizational capital) arises. At the end of this process, knowledge becomes a quasi-public benefit (databases, standards, customs, patterns), recognized in a given enterprise as a standard, the dissemination of which allows employees to improve their individual effectiveness.

Mutual relations between components of intellectual capital should be cared for in the process of social capital management, which will allow for a more effective use of intellectual resources in order to more effectively develop and maintain the enterprise on regional market.

SOCIAL CAPITAL IN SELECTED ENTERPRISES OF PODKARPACKIE PROVINCE – STUDY RESULTS

To assess the extent to which intellectual capital affects the development and competitiveness of selected enterprises in the Podkarpackie province, the

research was carried out in 400 selected enterprises¹. Statistical method was used for the analysis of the obtained data – Pearson's χ^2 (chi square) test for the independence of features.

Statistical processing of data obtained from the survey was carried out with the help of the Statistica 10 software package. The type of questions and categories of answers contained in the questionnaire determined the qualitative nature of the variables analysed. For this reason, results of the interview were presented as numbers and percentages, and the non-parametric χ^2 Pearson's independence test was used to assess the interdependencies between the studied features (Zeliaś, Pawełek and Wanat, 2002). The two-component concept of intellectual capital was adopted for the research, which is proposed, among others, by (Pietruszka-Ortyl, 2007). According to the author, intellectual capital can be divided into two elements: organizational capital and social capital.

Social capital determines the success of the enterprise, because it covers all the capabilities of individual employees of the organization to take advantage of development opportunities. It includes skills of effective interpersonal cooperation within groups and organizations, and also refers to trust between employees. It is formed by:

- a) human capital, understood as knowledge, experience, skills, talents of employees and intellectual efficiency,
- b) interpersonal relationships prevailing in the enterprise, such as attitudes, social roles, behavioural norms, and leadership.

The following measures were used to assess the level of social capital:

1. Human capital: knowledge, knowledge management, barriers in knowledge management, employees' experience and skills, education, investments in employees (training, courses), creativity, developing the employees' skills, solutions enriching the qualification potential of employees.
2. Interpersonal relationships: help of superiors, lack of competition between employees caused by internal unhealthy competition.

The respondents were mostly lower-level employees (regardless of the enterprise's department; they constituted about 40% of the surveyed population), persons with relatively shorter seniority (about 2/3 of respondents work in their company at most 8 years), as well as relatively young people (about 65% of the segment up to the age of 35). Among the respondents, a significant percentage – around 27% – were also those in managerial positions (directors or managers) and people with over 13 years of work experience (over 20% of respondents) and people aged 36–45 (about 1/4 of the surveyed population). In total, 227 women and 173 men took part in the survey.

The research covered the largest number of small enterprises employing 10–49 employees; they constitute 53.0% of the surveyed population. Another 126 enterprises (31.5%) can be classified as medium, employing between 50 and 249 employees. Large enterprises employing 250 people constitute 15.5% of the surveyed population. The smallest group was composed of micro-enterprises employing from 0 to 9 people, which constituted 20.5%.

Over half of the surveyed enterprises operate without the aid of foreign capital. In 37 (9.2%) enterprises, the share of foreign capital is small, not exceeding 25%. A significant percentage – 12% – of the analysed enterprises is based mainly on foreign capital; its share exceeds 75% of the share of foreign capital.

Respondents from the vast majority of surveyed enterprises positively assess the financial condition of their enterprise – 178 (44.5%) evaluate this element at a good level, and 102 enterprises (25.5%) have a very good financial condition. Thirty per cent of respondents consider the financial possibilities of their enterprises as average or weak.

From the research and analyses carried out among 400 respondents from various enterprises of the Podkarpackie province, it results that the components of social capital of strategic importance affecting the development of enterprises are:

¹ Survey carried out in 2014/2015 in 400 selected enterprises of Podkarpackie province.

1. Relations between employees

The research has shown that the majority of employees are satisfied with the employee relations prevailing in the enterprise, which also applies to the relations between employees and enterprise managers. Good relations between employees mean not only more comfortable work, but also measurable profits for the employer. Good communication improves the quality of work, facilitates problem solving and makes everyone more involved in the projects of the whole team and feel greater community with the enterprise.

enterprise – it is the most valuable resource of the enterprise and a key success factor. The aim of investing in human capital in the surveyed enterprises is to provide human resources with the highest competencies, qualifications, skills, deriving job satisfaction and oriented to the implementation of strategic goals of the surveyed enterprises.

Forms of investing in human capital, i.e. employee training, conferences and courses, are carried out especially by medium and large companies; these forms of developing human capital in micro and small enterprises are used to a much lesser extent.

Table 1. Elements supporting employees' involvement in work

Opinions	<i>N</i>	%
I work well with my colleagues and colleagues	340	85.0
I know what accomplishments are expected of me	329	82.2
I like my job	329	82.2
I am proud that I work for this enterprise	270	67.5
My competences/skills are useful for the enterprise	356	89.0
I do not feel discriminated in an enterprise in any respect	295	73.7
The enterprise creates the right working conditions for me	292	73.0

Source: own study based on research

2. Investing in human capital

Training, conferences, enterprise's participation in education costs, employee career plans, rewarding activities aimed at employee development – these are the main factors supporting the qualification potential of employees on the part of the enterprise. Human capital is the driving force of a market-oriented

By far, the most popular form of investing in broadening the knowledge of the enterprise's staff is employee training – 75.5% of responses.

3. Knowledge management supporting

Trainings supporting the development of employee competences, acquiring new entrepreneurial and

Table 2. Forms of investment in human capital

Forms of investment	<i>N</i>	%
Employee training	302	75.5
Conferences	56	16.7
Courses	145	36.2
Financial participation of the enterprise in the costs of employee education	47	11.8

Source: own study based on research

Table 3. Enterprise involvement in knowledge management

Opinions	<i>N</i>	%
Employees know where to look for specific information in the enterprise	209	52.2
Information about employees with specific knowledge is available at any time, anyone can contact them and use their help	146	36.5
There are no barriers to the use and exchange of knowledge between employees	201	50.2
Employees of the enterprise are encouraged to solve problems and share knowledge with other employees	106	26.5
Exchange of knowledge takes place through informal contacts, conferences, meetings, reports and notes	116	29.0
Employee knowledge is constantly developed and updated through training and employee development programs	147	36.7
The knowledge of employees leaving the enterprise is passed on to their successors	85	21.2

Source: own study based on research.

innovative employees as well as videoconferences are the most frequently indicated components of human capital supporting the knowledge management process in the surveyed companies. Knowledge management strategy is a way to improve the products or services provided.

The tool supporting the knowledge management in companies from the trade sector is the use of databases; in the industry and the sales department, it is Internet mail and video conferencing. E-mail is also one of the most important forms of communication with external entities in the industrial production. Industrial enterprises and the sales departments are dominated by employees with secondary education, while in service companies and the financial and insurance sector – they have the highest level of staff with higher education.

Improving the qualification potential of employees – education, knowledge of foreign languages and creativity of employees – this is the potential that the vast majority of employees of the Podkarpackie province enterprises have at their disposal. Therefore, the qualification potential of the employees must be developed and renewed, which in turn builds the organizational learning process. The goal of the surveyed enterprises should be to analyse and assess whether their resources, abilities and competences are a suf-

ficient potential contributing to their more effective development.

Table 4 presents the financial results of economic entities of the Podkarpackie province in the analysed period – in detail, data on the revenues of enterprises, data on export sales, net and gross financial results and current assets of non-financial entities in the Podkarpackie province. The economic results included in the table also refer to financial data of a sample of enterprises in the Podkarpackie province (small, medium and large), participating in the survey, and conducting business in the period 2013–2015.

Good financial situation of the surveyed enterprises is in particular the effect of intellectual capital resources held by Podkarpackie enterprises, mainly social capital. In the majority of surveyed enterprises, the financial condition is assessed positively. Based on the access to financial reports during the conducted surveys, it was found that in the majority of surveyed enterprises, their financial condition has changed during the last years, i.e. the trend is developing. According to specialists working in accounting, this is the result of development of the enterprise, especially the increase in its value due to effective management of intellectual capital – including investing in human capital.

Table 4. The amount of revenues, expenditures, sales and financial results of Podkarpackie province enterprises keeping accounting books in 2013–2015

No	Specification	2013	2014	2015
1	Number of enterprises	2212	2294	2284
2	Revenues from total activity (PLN million)	88 120.3	88 830.5	100 798.8
3	Revenues from the sale of products, materials and goods (PLN million)	84 610.5	85 645.8	98 601.6
4	Sales for export (PLN million)	20 623.7	21 603.4	23 107.6
5	Financial result from the sale of products, materials and goods (PLN million)	3 997.2	3 924.3	4 538.1
6	Net financial result (PLN million)	4 842.2	3 834.1	3 938.4
7	Gross financial result (PLN million)	5 368.7	4 334.5	4 445.4
8	Current assets (PLN million)	29 833.1	29 174.7	32 155.4
9	Total investment expenditure (PLN million)	3 439.0	3 354.2	3 762.0

Source: own study based on GUS (2014–2016).

To sum up, the most developed and used dimension of intellectual capital in the surveyed enterprises of the Podkarpackie province is social capital. Therefore, in the future, managers should look for the main source of success for Podkarpackie enterprises in that. Human capital is an important link in development of an enterprise – the employees who create new technologies, behaviours, norms, principles and values. Competences of the surveyed employees, new challenges faced by people employed in enterprises in various positions, forcing them to have more and more skills, new knowledge and competences, play a special role here.

The conducted research confirms that human capital and relations between employees, i.e. social capital, play a major role in enterprises. Analysing the components of intellectual capital, it can be clearly indicated that the structural capital as well as the capital of external relations are derived from human capital. There is a close causal relationship between the aforementioned capitals, because on the basis of human capital, the structural capital and the capital of external relations are generated in the surveyed enterprises.

In the surveyed enterprises, one of the components of intellectual capital, which enterprises use the most

is knowledge of employees – knowledge is one of the most important sources of competitive advantage, because it determines development of the enterprise. The research shows that managers and employees of Podkarpackie province have large knowledge resources, due to which they help to increase the intellectual capital of enterprises. An example of this are numerous innovative enterprises that have been included in the study, which due to their knowledge are constantly developing, creating new jobs, introducing modern products, technologies, obtaining patents and certificates, as well as gaining new markets around the world.

Empirical verification of the impact of intellectual capital on the development of the surveyed enterprises provided information on the extent to which this hidden potential is used and helped to capture the intangible assets of enterprises that can grow and compete on regional market.

CONCLUSIONS

The Podkarpackie province is becoming more and more attractive economically from year to year for future investors. This is due to entrepreneurs,

created economic zones that attract new enterprises as well as clusters operating in the region – e.g. Aviation Valley Cluster or Eastern Poland IT Company Cluster¹. The survey conducted among 400 enterprise respondents of the Podkarpackie province are the confirmation that these enterprises consequently enhance by systematic development and strengthening their intellectual and producing potential, which in consequence improves their competitiveness and share on market.

The study material obtained from the conducted survey, statistical analysis of empirical data, and dependencies found, allowed for enhancing the view presented in the literature on the influence of the social capital on enterprise development. That information gives an opportunity to thoughts and perceptions about the directions of change that must be made in enterprises so that they can develop more effectively and increase their financial value.

In addition, knowledge about what constitutes the essence of social capital and how it is used in enterprises in the Podkarpackie province can give the opportunity to better manage, allocate resources in enterprises and control their attractiveness on the regional market.

Conclusions resulting from empirical research upon the level of social capital in Podkarpackie enterprises and its impact on the development of surveyed enterprises, may especially help future investors who want to invest their capital in Podkarpackie enterprises in the future – not only from the high chance sectors, but also into other sectors, that have been operating in Podkarpackie province for many years and are known all over the world.

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¹ The TNS Polska study shows that economic attractiveness of the Podkarpackie province increased by 10% compared to the situation from 5 years ago. Data on 30 December 2015.

PART 4

**LOGISTICS AS A FACTOR
IN ECONOMIC DEVELOPMENT**

A STUDY OF TOURISTS' SAFETY IN THE AHANTA WEST DISTRICT IN GHANA

Nicholas Imbeah, MSc, PhD student¹

Faculty of Economics & Social Sciences, Szent Istvan University

ABSTRACT

Issues of tourists' safety are gaining grounds in Ghana especially in the Ahanta West District in the Western Region where Ghana discovered commercial crude oil in Cape Three Points in 2007 and started drilling in 2010. Using purposive sampling method, observation, interviews and questionnaires, this study sought to examine the extent to which tourists perceive their own safety in this destination which is old but now renewed tourist destination due to the oil find in Ghana. Welcoming and friendly atmosphere to tourists was indicative of a safe and a secured destination for tourists. The display of globalization showed in the form of 'glocalization' in this destination. There is a conflict between land use for agricultural purposes and tourist facilities since the predominant cash crop in this area is oil palm, hence a threat to agricultural sustainability. It is recommended that the security agents should as a matter of urgency put in place the appropriate structures in this tourist destination and farming area for safety.

Keywords: glocalization, Ahanta, Ghana

JEL code: Z32

INTRODUCTION

Personal safety of tourists at the destination is relevant to tourists and destination managers and therefore the perceived and actual risk associated with travel and tourism has made safety and security very critical in the promotion of tourism (Mopeli, 2009). The subject of safety and security has become more imperative not only for the host-community, but also for the tourist who is a guest (Cavlek, 2002) in a new environment. As Mansfeld and Pizam (2006) opined, peace, safety and security are the three prerequisites for thriving tourism development in every destination.

The tourism sector in Ghana has remained as a steady contributor to economic growth and development. According to Institute of Statistical, Social & Economic Research – ISSER (2017), tourism has been a major source of foreign exchange, employment and government revenue in Ghana. In the report of World Travel and Tourism Council (WTTC), in 2016, travel and tourism generated a lot more of tourist receipts which was 10.2% of global GDP and 292 million jobs, equivalent to 1 in 10 jobs in the global economy. The contribution of the tourism sector in 2016 to total employment, both direct and indirect was 5.9%, representing 693,000 jobs. In the assessment of ISSER (2017), tourism arrivals were

¹ Corresponding author: Pater Karoly 1, SZIE Hostel, H-2100 Gödöllő, Hungary, nicholas.imbeah@tpoly.edu.gh, +3670 222 97 73

Table 1. Tourism indicators in Ghana in 2009–2016

Indicator	2009	2010	2011	2012	2013	2014	2015	2016
Arrivals (in thous.)	802.8	931.2	1 080.20	903.30	993.60	1 093.0	1 202.2	1 322.5
Receipts (USD million)	1 615.20	1 875.00	2 178.9	1 704.7	1 876.9	2 066.5	2 275.2	2 505.5
Gross contribution to GDP								
GDP	2012	2013	2014	2015	Tourism is now either the 3rd or 4th foreign exchange earner in Ghana			
	4.8%	4.7%	4.7%	4.8%				

Source: Ghanaian Ministry of Tourism, Arts and Culture (2012); Ghana Tourism Authority (2016).

estimated at 1,322,500 in 2016 representing a 10% increase from 2015 as shown in the TABLE 1 below. Also, as shown in Table 1, revenue from tourism also went up by approximately 10% from USD 2,275.2 million in 2015 to USD 2,505.5 million in 2016.

THEORETICAL BACKGROUND

Appaw-Agbola and Dehlor (2011) propose that tourism has emerged as one of the fastest growing industries, averaging about 4% per annum worldwide. They proposed that though there are major destinations in the developed countries, a number of developing countries have also become major points of destination. In Africa, such major destinations include Kenya, Mauritius, Zimbabwe, South Africa and Ghana (Appaw-Agbola and Dehlor, 2011). Tourism in Ghana has become a major socio-economic activity and one of the most important and fastest growing sectors of the Ghanaian economy (Dorkenoo, 2013). The perceived risk associated with travel and tourism has made safety issues come to the lime light in many studies in tourism promotion (Boakye, 2011) especially in the developing countries after the September, 11 disaster in USA where safety was supposed to be the best. This study sought to identify the perceptions tourists have about safety in the Ahanta West District which houses the recently oil find area at the west of Cape Three Points. For this purpose both primary and secondary data are used in the discussion. The adopted and modified model attempts to show how safety at the tourist destination has become integral

among tourism components termed by the research as shown below in Figure 1 as '4-DPC' (Four destination product components) namely: physical products, programmes, people and packages.

Destination management

In the opinion of Morrison (2012), destination management can be defined as the coordination and integration of all the elements of the tourist destination mix (physical products, programmes, people and packages) in a particular geographic area based upon a defined tourism strategy and plan.

Physical products include items like attractions, facilities, transportation and other infrastructure at the tourist destination and these attractions play the central role of pulling and drawing tourists to the destination (Vengesayi, 2003) and one of the reasons of visiting a place (Kamra and Chand, 2006). Events and festivals are put together for tourists and well designed and promoted programmes share the same role with the physical products and their safety conditions can determine the numbers of tourists.

The local people provide the hospitality resources as the hosts and providers of personal services. Hospitality of the residents is an asset to tourism development and this has been the bedrock for tourism development in Ghana especially when it comes to host-guest interaction (Boakye, 2011; Imbeah, Hodibert and Amankwa, 2016). It is also observed in Ghana that hospitality can be classified as both tourist product and safety measure since the personnel who offer the tourist services display the nature, values and

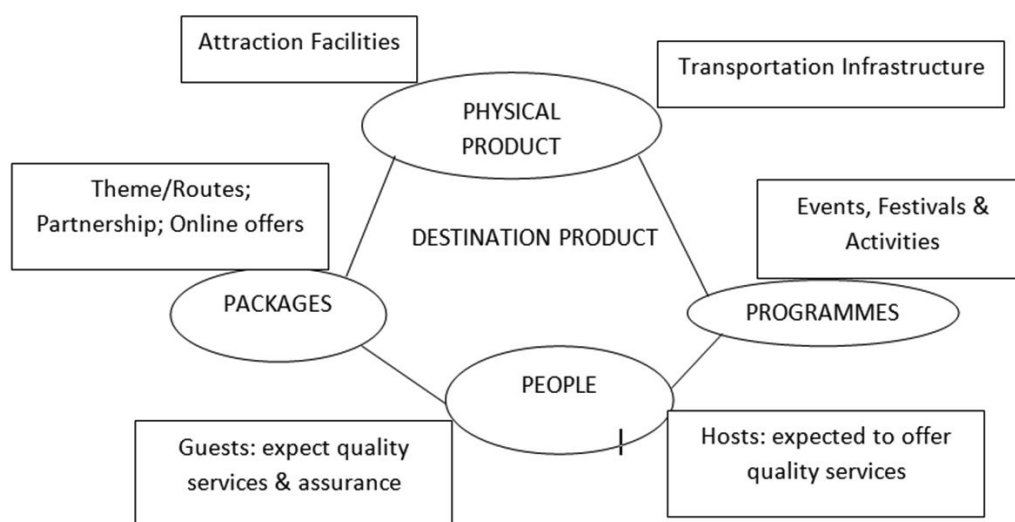


Figure 1. Four destination product components (4-DPC)

Source: adopted and modified from Morrison (2012).

hospitality of the host community. Packages are put together by tour operators, travel agencies and other related agencies, and merge many elements of the total travel experience and satisfaction and these draw tourists to destinations as proposed by Imbeah (2011) and Imbeah and Odoom (2016). In all this, safety is crucial in the operator's motive to make profit and the tourists' motivation to travel.

Figure 1 which is termed '4-DPC' summarizes the components under 2.1.1 and 2.1.2; that destination product is made of physical product, programmes, people and packages which are accessed by tourists at a destination. Each of these destination products has various and viable elements which are either enjoyed or offered for sale by the tour operators to the tourists.

MATERIALS AND METHODS

A survey, involving a sample of tourists to Ahanta District tourist destination namely, namely Busua Beach, Egyambra Crocodile Pond, Cape Three Points, Dixcove, Akwidaa and Princess Town rendezvous sessions were undertaken. Also, interview with the Ghana Police Service and some literature retrieval from Ghana Tourism Authority (GTA) in Takoradi were conducted. The data collection was done on

1 July 2015 during the peak tourist season in Ghana from June to early September. A purposive sampling technique which was non probability sampling procedure was adopted because the target population was made of tourists. Purposive sampling was used to select these areas because they are possible sites most tourists could be intercepted easily. Research instruments used were: questionnaire was used for the tourists and interview guide was used for the Ghana Police Service. Observation was also keenly applied during the data collection. Research assistants were recruited and trained to help in the questionnaire administration. Meetings were arranged with the management of Ghana Police Service for interview at their offices.

RESULTS AND DISCUSSION

Origin of respondents

The study also showed that Europeans were the majority (17 respondents representing 42.5%) of the sampled respondents. This was followed by Americans who were 10 representing 25% of the total sampled respondents. Australians were the least recorded with only one respondent. The number of Asians and Africans except Ghanaians were the same, 6 respondents (representing 15%) each. This might confirm the

observation made by Frimpong-Bonsu (2015) that Europeans are the most generating tourists to Ghana. However, the study indicated that, there was a downturn in the arrivals from Africa and Asia while arrivals from Europe and America are still high as per the arrivals at least in this particular district.

Discussion of tourists' perception about safety

As revealed in Table 2, 45% of the respondents strongly agreed and 50% agreed that uncontrolled unemployment is a major cause of tourism offenses and has the propensity to create unsafe ambience for recreational activities and the remaining 5% disagreed with that notion. Though there was an evidence of uncontrolled offenses situation in this destination, it was not a cause for bother for tourist safety. As shown in Table 2, some of the reasons for feeling unsafe are: overcrowding in facilities, lack of good policing practice, very high cost of living, poor publicity about tourism crime and poor management of tourism facilities.

Ghana Tourism Authority official in Takoradi, said that, 'at the beaches in the District, you always find foreigners mainly Afro-Americans dressed like the natives and even eating the food of the locals while on vacation. You see them freely enjoying the beach facilities without any safety problem and this is manifestation of globalization'. The popular beach is Busua Beach Resort. However, as a result

of the presence of serene ambience for vacation in the District, 'glocalization' an aspect of globalization is real. Reisinger (2009) proposed that 'glocalization' is the result of the relationships between the global 'tourists' and the local 'residents'. In the interaction with the Ghana Police Service boss, DSP, it was revealed that, the district is 'fairly a friendly and secured destination'. The days during which the beaches are highly patronized are: Independence Day – 6th of March; Republic Day – 1st of July; Workers' Day – 1st of May; Easter Mondays; and New Year Day – 1st of January. The police intensify patrols at the beaches during holidays to provide adequate security for holiday makers. Majority of the respondents proposed that the presence of police personnel in tourists' areas indicated and enhanced a safe and a secured destination for tourists and where there was a provision of a welcoming and friendly atmosphere to visitors, tourists also felt safe and secure.

Recommendations

From the foregoing, it is recommended that the GTA should quickly take opportunity of calm tourist destination to establish the necessary structures such as engaging the immediate tourism agencies like the local tour guides and form a team made of guides, Ghana Police Service and Ghana Fire Service should help educate and maintain safety in this destination. It is again recommended that, service providers should be

Table 2. Unsafe conditions-distribution of tourists' reasons

Reasons	SA (strongly agree)	A (agree)	N (neutral)	D (disagree)	SD (strongly disagree)
Uncontrolled unemployment	45	50	0	5	0
Overcrowding in facilities	10	17.5	0	52.5	20
Lack of good policing practice	0	5	0	82.5	12.5
Very high cost of living	15	27.5	30	15	12.5
Poor publicity about tourism crime	0	10	42.5	20	27.5
Poor management of the facilities	2.5	15	27.5	50	5
Uncontrolled crime situation	0	0	2.5	7.5	90

Source: fieldwork and Results of Tourists' Perception about Safety (2015).

advised by the GTA on how to treat their clients as far as harassment and security of tourists are concerned. Most tourists become victims of behaviour intended to disturb or upset or make them insecure because they are unaware of such issues and some have little knowledge about them in the country. Finally, the Ghana Tourism Authority needs to organize seminars and training programmes for service providers and the general public to make them understand what they may lose if security and harassment of tourists are not managed properly and to encourage friendly behaviour.

CONCLUSIONS

The research revealed that tourists generally perceive Ghana to be safe even though few of them were once victims to crime situations; they would still recommend the destination for others and would even want to visit again. Agriculture is the major economic activity in the District and the predominant cash crop is oil palm. However, one notable challenge is the competition between the use of land for rubber plantations and use of land for cultivation of food crop. Also, there is also an increasing demand for land for other non-agricultural activities like tourism and hotel facilities in the district especially in the wake of the oil find in the region and its subsequent drilling in 2010.

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COMPARATIVE LIFECYCLE ASSESSMENT OF APPLE PACKAGING

Janusz Majewski, Eng PhD¹; Agnieszka Sobolewska, Eng PhD²

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

In the paper was presented a comparative analysis of the impact on the environment of the life cycle assessment of boxes made of polypropylene, re-HDPE and cardboard, which are used to transport of dessert apples. For this purpose, the SimaPro 7.1 computer program and attached databases were used. The calculations were made for 48 trading circulations. The obtained results indicate that the biggest negative impact on the environment among the analysed packaging was caused by cardboard boxes. Also packaging from recycled material (re-HDPE) is less friendly to environment than boxes made from new polypropylene. The estimated environmental impact of polypropylene boxes was 4.42 Pt (eco-indicator point), for re-HDPE and cardboard packaging it was 7.5 and 19.7% higher, respectively. The most important factor for the differences between the boxes was the durability of the packaging and the eventual need for multiple repeats of production phase, which include the acquisition of raw materials and processes related to the manufacturing of products.

Keywords: environment, packaging, life cycle assessment (LCA)

JEL codes: Q53, Q56

INTRODUCTION

Every human activity causes social, economic and/or ecological effects. In production and service spheres impacts to environment play an increasingly role, which can be associated with deteriorating its quality in the world. This situation indicates the need to analyse and assess the ecological effects of the production (or service) process, taking into account the entire life cycle of the produced thing (service). In many cases, it is also justified to analyse and evaluate only the production process itself or only its individual phases. This type of research is used to identify the processes or phases of product

exploitation that have the greatest negative impact on the natural environment. Their identification allows for implementation of innovative changes to reduce pressure on the natural environment. Thanks to this, it is possible to use more renewable and non-renewable resources and in this way to implemented sustainable production and consumption of goods and services.

The Life Cycle Assessment (LCA) is a tool for analysing, assessing and comparing the impact on the natural environment of production and use of goods (and services). The study presents results regarding the LCA for three types of packaging used in wholesale trade in apples in Poland. The choice

¹ Corresponding author: Nowoursynowska 166, 02-787 Warszawa, Poland, janusz_majewski@sggw.pl, +4822 593 41 12

² Corresponding author: Nowoursynowska 166, 02-787 Warszawa, Poland, Agnieszka_Sobolewska@sggw.pl, +4822 593 41 08

of apple packaging was due to the importance of these fruits. Apple production in Poland increased from over 2.1 million tons annually average in 2006–2010 to over 3.5 million tons in 2016. Their share in the volume of fruit tree production was at that time 85–89% (GUS, 2007). Poland at the end of the first decade of the 21st century became the largest producer of apples in the EU (Kracinski, 2015). In 2016, Poland's share in apples production in the EU was almost 30%. Poland is the largest apple exporter in the EU (Kowalska, 2016). It caused that problem of apple packaging is important from Polish point of view.

LIFE CYCLE ASSESSMENT

Life cycle assessment is a technique used to analyse the environmental hazard associated with a product throughout its lifetime, that is, from obtaining the raw material for production, through distribution, use, until final liquidation, that is 'from the cradle to the grave'. The LCA consists of four stages: definition of goal and scope, life cycle inventory analysis, life cycle impact assessment and interpretation of results (Saraiva et al., 2016; Sala et al., 2017).

The LCA method for the first time was used in the 1960s to assess energy production. The study was continued in the following years. One of the first research using LCA concerned the assessment of direct and indirect emissions of waste generated during production processes (Ayres, 1995). The method development in subsequent years meant that it was used in many fields (Accorsi, Versari and Manzini, 2015; Saleh, 2016). As a result of the need to integrate the life cycle assessment with social aspects, a social life cycle assessment (SLCA) was developed in the first decade of the 21st century. It was a way of assessing the social and socio-economic aspects of products and their positive and negative impacts in the full life cycle (Petti, Serreli and Di Cesare, 2018).

The importance of LCA is related to both: macro and micro analyses. On the macro scale, it allows to define a concept aimed at sustainable production and consumption, because these patterns are factors that have a significant impact on the environment.

Assessment and improvement of supply chains allows minimizing the negative effects on the environment (Notarnicola et al., 2017). It is a process without end. On the other hand, on the micro scale, LCA allows the assessment of technologies used, and thus facilitates their selection, so that the negative impact on the environment is as small as possible (Walker et al., 2018).

In order to assess the impact on the natural environment during the life cycle assessment of a specific product or service, specialized programs may be used. There are two computer programs commonly used in the world: SimaPro and GaBi (Herrmann and Moltesen, 2015; Starostka-Patyk, 2015). Also in the LCA research published in the years 2010–2013, the above-mentioned programs were mainly used. The frequency use of SimaPro program was about 4 times more in published research works than the GaBi program (Speck et al., 2015).

The scientific research on the impact of the life cycle assessment regarding the production and distribution of apples have not been conducted on a larger scale. In the literature, we found a publication on the environmental impact of apple orchards used in three systems: conventional, integrated and ecological (Goossens et al., 2017) and the paper were the environmental impact of apple supply chain and apple waste was evaluated Romanians (Ghinea, 2017). In another paper, a study was carried out on the environmental impact of packaging used in the apple trade in Poland. Two types of packaging were used for comparisons, i.e. a plastic and cardboard box (Manteuffel-Szeoge and Sobolewska, 2009).

The flow pattern of raw materials, intake and emission of substances into the environment in the life cycle assessment of the box used for transporting apples was shown in Figure 1. The raw materials taken from the environment are processed into materials that are used for the production of packaging. New boxes are transported to the warehouse where the use phase begins. Mostly used products are recycled, they are utilized to a small extent. The raw material obtained from recycling can be re-used for the production of boxes. At each of the described phases there is a collection and emission of substances to the environment.

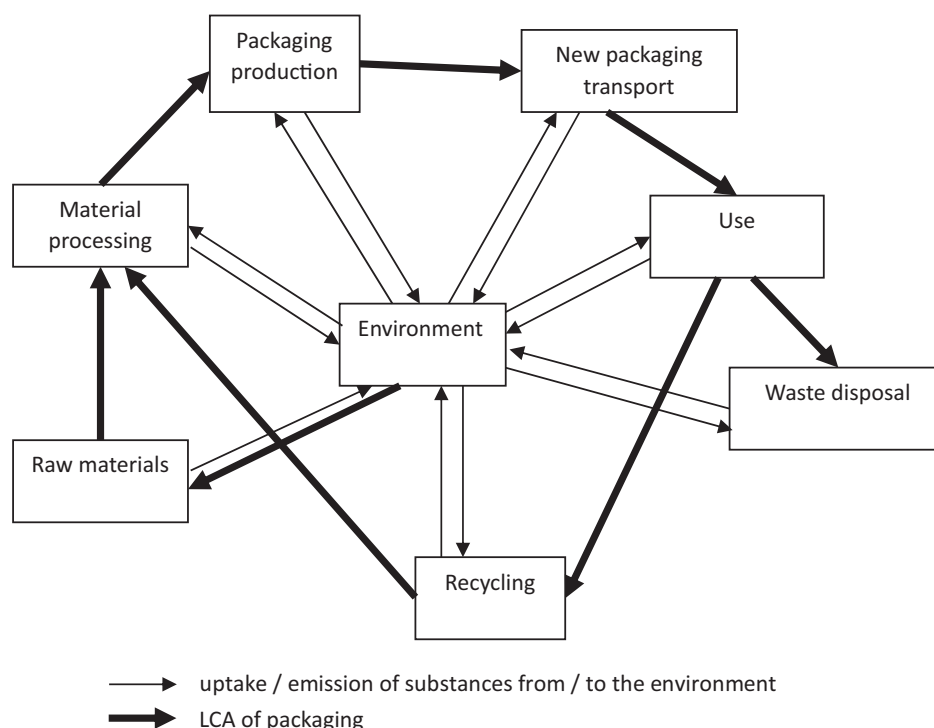


Figure 1. Phases of the boxes life cycle assessment and their impact on the environment
 Source: own elaboration based on Ciambrone (1997), Ganczewski et al. (2014).

MATERIALS AND MATERIALS

The aim of the work is a comparative assessment of the impact on the environment of the life cycle assessment of various types of packaging used in wholesale trade in dessert apples. The tests included boxes made of polypropylene (polypropylene), HDPE recycled (re-HDPE) and cardboard with alkyd varnish (cardboard). The capacity of the analysed boxes was 12 kg of apples. Due to the properties of the material from which researched boxes were made, there were characterized by different durability. In the tests, it was assumed that the cardboard box is one-off, with re-HDPE performing 16 commercial turnovers, and polypropylene 48 turnovers.

A life cycle model was built for each of the boxes. It includes the phase of production, use and disposal scenario. In the first phase, the quantities of individual raw materials necessary to make boxes were determined. It was 1.5 kg of polypropylene, 1.4 kg of re-HDPE and 0.61 kg of cardboard and 0.01 of alkyd

varnish for a cardboard box. Then, the production processes of individual packages were defined. In the use phase, the distances between the individual links of the logistic chain, modes of transport and forklifts on the premises of the warehouse and logistic platform were taken into account. It was assumed that after using the analysed products they will mostly be recycled, only a small part will go to households (Table 1).

In addition, the life cycle assessment of each box was related to the life cycle of polypropylene spacers securing apples in boxes and packaging film made of LDPE wrapping the box during transport on trays.

The calculations were made in the SimaPro 7.1 program using the databases attached to it. In order to determine a single synthetic indicator of the environmental impact of the life cycle assessment of boxes made of polypropylene, re-HDPE and cardboard, the Eco-indicator 99 Europe E/E methodology was used. The obtained results are expressed in impact points (Pt) appointed in accordance with the

Table 1. Disposal scenarios of compared boxes

Disposal scenario	The material used to the box's production		
	polypropylene	re-HDPE	cardboard
Recycling (%)	99	99	90
Household waste (%)	1	1	10

Source: own study.

adopted method (Eco-indicator 99 Europe E/E). This is a commonly used method, the description of which can be found in the works of Vogtlander, Brezet and Hendriks (2001), Dreyer, Niemann and Hauschild (2003) and Bovea and Gallardo (2006).

RESULTS AND DISCUSSION

The analysis shows that the use of cardboard boxes for the transport of dessert apples will have a greater negative impact on the environment than in the case of plastic boxes (Fig. 2). Also, packaging made of recycled plastic (re-HDPE) in the analysed case turned out to be more harmful to the environment in relation to the new polypropylene. Due to the different durability of the material from which the packages covered by the tests were made, one life cycle of the polypropylene box was compared with 3 cycles of re-HDPE box and 48 cardboard boxes. Finally, for packaging made of cardboard, 5.29 Pt of environmental

impact was obtained, while for a box of re-HDPE 4.75 Pt and polypropylene 4.42 Pt.

Considering the various phases of the life cycle assessment of plastic (polypropylene and re-HDPE boxes) and cardboard packaging, we can conclude that more than 50% share of the negative environmental impact was appeared in the production phase (Figs. 2 and 3). The production of one polypropylene box had an impact of 2.33 Pt, while for a re-HDPE box it was 0.9 Pt and for cardboard box 0.06 Pt. After taking into account the durability of individual packaging for the production of a box with a re-HDPE obtained 2.73 Pt, and for the cardboard box 2.96 Pt. At the same time, the obtained results show that the main factor affecting the differences in the environmental impact of the analysed life cycles assessment is the process of obtaining raw materials and producing products. Although the production of 1 box of re-HDPE or cardboard causes a much smaller negative impact on the environment than in the case of

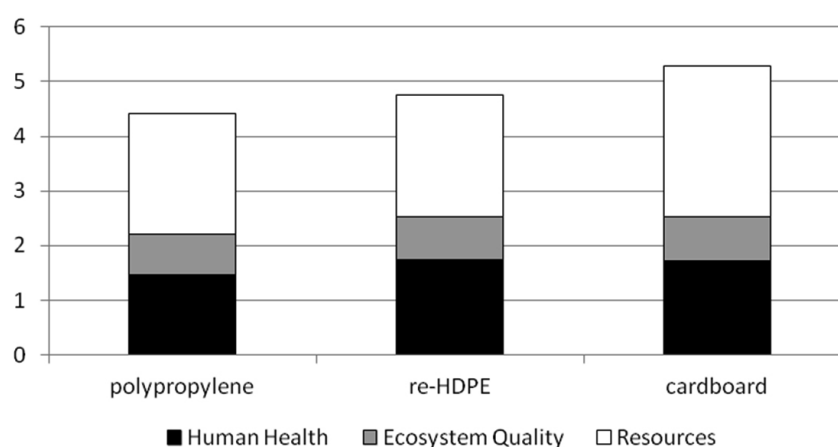


Figure 2. The environmental impact of the life cycle of compared boxes used to apples' transport

Source: own study.

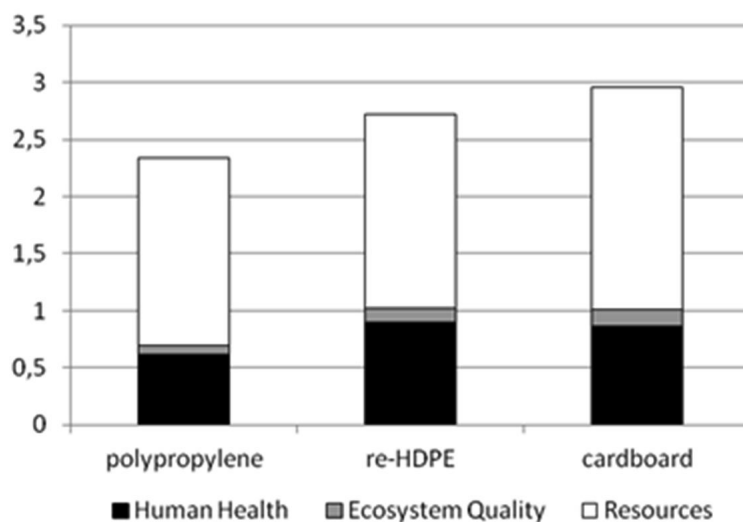


Figure 3. The environmental impact of the LCA production phase of boxes used to apples' transport
Source: own study.

polypropylene, the necessity of repeated repetition of this process causes that these packaging have a greater negative impact on the environment.

Among the three categories of impact (human health, raw materials and ecosystem quality), the largest (about 50%) of the raw materials (mainly fossil fuels) taken from the environment are essential, both

in the production process and during transport during the exploitation phase. The analysed life cycles assessment in the smallest degree (about 16%) affect the quality of ecosystems contributing to the destruction of the ozone layer, radioactive background growth, terrain occupancy, climate change, acidification and environmental eutrophication (Fig. 4).

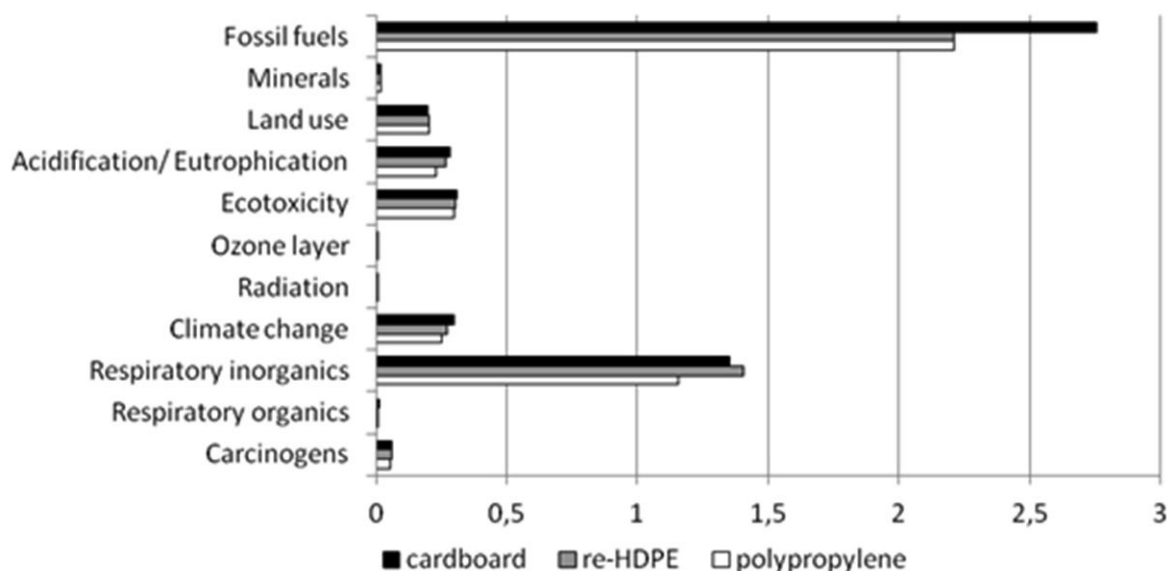


Figure 4. Impact on the natural environment by categories of the LCA of boxes used for apples' transport
Source: own study.

There is a clear increase in the impact in the category of ecosystem quality in the entire life cycle of the boxes compared to the production phase. This is a consequence of the need to build roads and road infrastructure necessary for transporting boxes during their use. In the human health category, the issue of respirators inorganics has the greatest impact. Regardless of the type of material used for the production of boxes, the percentage share of individual categories in the total environmental impact is similar.

CONCLUSIONS

The conducted research has shown that the use of the LCA method in relation to packaging made of various materials allows to indicate the most environmental friendly solutions and to determine the factors affecting the obtained results. From the analysed packages made of cardboard, re-HDPE and polypropylene, the greatest negative impact on the environment is caused by the use of cardboard boxes for the apple transport. Boxes made of recycled material, due to their lower durability, were also less environmentally friendly than polyethylene boxes. The durability of packaging and the possible need to repeat the production phase, including obtaining raw materials and processes related to the production of boxes, are of the greatest importance for the differences between the boxes. If the cardboard boxes were used to transport apples twice, their impact on the environment would decrease by about 25%. In this case, these boxes would have the least negative impact on the environment.

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THE ORGANISATION OF TRANSPORT IN THE AGRIBUSINESS SECTOR IN THE RESEARCH OF THE FACULTY OF ECONOMIC SCIENCES OF WULS-SGGW IN THE 21ST CENTURY

Tomasz Rokicki, PhD¹

Faculty of Economic Sciences, Warsaw University of Life Sciences – SGGW

ABSTRACT

Transport is a very important branch of the economy. It was quite well recognized in the case of industry services, however, there have been few studies on transport services provided in the agribusiness sector. This gap was filled by employees of the Faculty of Economic Sciences at WULS-SGGW. The subjects of interest were entities dealing in food processing. The study reviewed research and publications of the Faculty's employees that were created in the 21st century. The majority of enterprises did not have a separate department dealing with transport. Apart from own transportation, small and micro enterprises also combined their own and external transport means. Forwarding services were used to a small extent in the shipping process organisation. The results of the research at WULS-SGGW and other studies were quite similar.

Keywords: transport cost, agribusiness, food processing, own and external transport

JEL codes: D22, L91, Q10, R40

INTRODUCTION

Transport is a very important sector, one of the most important factors of economic progress and an important tool of production (Łacny, 2009). A thriving economy depends on the efficient functioning of transport and logistics. On the other hand, the development of transport depends on economic growth and increasing trade exchange (Klepacki and Rokicki, 2008). It should be added that transport needs are continuously evolving and changing along with social and economic development (Rydzkowski and Wojewódzka-Król, 2009).

THEORETIC BASES

Transport is defined as a combination of activities consisting in the movement of tangible goods in space, using appropriate technical means (Baran et al., 2008). Within an enterprise, transport is an integral part of the company's logistic system. It enables the ensurance of deliveries of goods at the right time, in good condition and at an acceptable cost (Coyle, Bardi and Langley Jr, 2007). Transport management should be one of the fundamental activities within any enterprise or transport system (Kisperska-Moroń and Krzyżaniak, 2009).

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, tomasz_rokicki@sggw.pl, +4822 593 42 59

Agribusiness, as a field of economic activity, is defined as a system of fostering the development of entrepreneurship. By applying necessary resources, an entrepreneur boosts the productive potential of a company by maximizing profit through their efficient use and adapts to changing market conditions. The majority of companies operating in the field of agribusiness are fragmented individual farms, and small and medium-sized companies using local resources. At the other end are agribusiness companies representing a rather industrial-style agriculture in the sense that these farms are often very large, highly specialized, and run like factories with a large input of fossil fuels, pesticides and other chemicals, and synthetic fertilizers derived from oil (Larsen, 2007). Agribusiness can also be defined as a system which creates the food production chain. In this situation companies are perceived as units creating the food supply chain in which transport is a very significant issue. The transport system in the company is a component of many elements (Fijałkowski, 2003; Lasek et al., 2008). In order to obtain an appropriate, well designed, effective and optimal level of transport, managers are obliged to treat it as an important, even fundamental activity in the production system (Rokicki, 2011).

MATERIALS AND METHODS

The article presents the most important results of research on transport in the agribusiness sector conducted at the Faculty of Economic Sciences at WULS-SGGW, in Warsaw. An analysis of articles and studies written by employees of the Faculty of Economic Sciences was used. Data for research concern the years 2000–2017. The work uses a descriptive, tabular and graphic method.

RESULTS AND DISCUSSION

Transport in agribusiness is a fairly new topic, undertaken in research at the Faculty of Economic Sciences at WULS-SGGW, in Warsaw. The first thorough research is related to the emergence of the field of study – logistics. The manual entitled 'Logistics. Selected issues' (Baran et al., 2008) is worth mention-

ing here as it presents the organisation and conditions regarding logistics, including transport. Klepacki and Rokicki (2010), in the article entitled 'The situation and perspectives for the development of transport in Poland', described transport in Poland. Another important work was the publication of Rokicki and Wickiego (2010) entitled 'Transport and storage in agriculture as an element of logistics'. The authors referred to the rarely discussed problem of logistics on farms.

A breakthrough took place when the Faculty obtained a research grant entitled 'Logistic processes in the functioning of agri-food processing enterprises'. At that time, based on empirical research, a lot of studies were made. Only selected ones are presented in this study. All studies were based on a given number of enterprises. Enterprises were assigned to an industry in compliance with their declaration pursuant to their PKD (Polish Classification of Activity), whereas company size was determined based on the number of employees. The following enterprise sizes were distinguished according to number of employees: microbusinesses (0–9 employees), small enterprises (10–49 employees), medium-sized enterprises (50–249 employees) and large enterprises (250 and more employees). Data used in the analysis come from surveys conducted from December 2009 until March 2010. Survey questionnaires were mailed to all enterprises of the agricultural and food production sector contained in the REGON database. Altogether there were 8,498 survey questionnaires. 508 questionnaires (6%) were sent back. After rejecting questionnaires containing significant deficiencies preventing further analysis, 504 entities remained for further analysis (Table 1).

The majority were small enterprises (62.6%), followed by medium-sized enterprises (19.6%) and microbusinesses (12.1%), with the lowest number constituting large enterprises (5.7%). The analysed sample was dominated by enterprises from the bakery industry (42%) and meat industry (23%), whereas companies from the tobacco sector represented the smallest group (0.2%) as well as those dealing with oil processing (1.18%).

In the article of Rokicki (2011), it was shown that transport plays an important role within all

Table 1. Number of researched enterprises by sector

Agribusiness sector	Number of enterprises by size				
	micro	small	medium	large	total
Meat	9	59	38	11	117
Fruit and vegetable	2	18	11	2	33
Oil	0	5	1	0	6
Milk	2	8	8	6	24
Cereals	13	15	7	2	37
Bakery industry	25	164	24	1	214
Other food industry	5	29	5	6	45
Fodder	2	11	1	0	14
Beverage producers	3	6	4	0	13
Tobacco	0	0	0	1	1
Total	61	315	99	29	504

Source: results of own research.

production enterprises. An appropriate transport policy may contribute to a reduction in the enterprise's costs of logistics. No research is available covering logistic solutions, including those related to transport, applied by agribusiness enterprises. The majority of enterprises did not have a separate department dealing with transport (Fig. 1). The best situation was observed in the dairy industry, where 67% of companies had a transport department, whereas the worst situation was observed in the fodder and bakery industries (21 and 23% entities, respectively).

In the work of Górecka and Rokicki (2014), further regularities regarding transport were demonstrated. Agribusiness companies mainly used their own transport, or a combination of own and third party transport. Only 8% of entities used third party transport only. Differences were found between particular sectors. The highest number of companies using only own means of transport was found in the bakery industry (76% entities). If enterprises used transport services at all, these were mainly services of individual carriers, and less frequently – forwarding

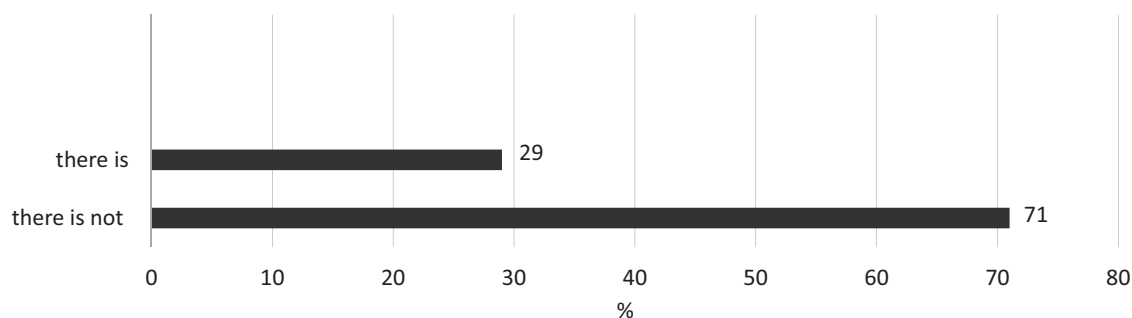


Figure 1. Existence of a separate department dealing with transport in agribusiness firms

Source: results of own research.

services. The perception of transport management by agribusiness enterprises against the background of the competition is similar. Most enterprises considered themselves similar in this respect to the industry average. Enterprises more frequently planned to purchase own means of transport than to outsource transport services. The purchase of new vehicles in the future was mostly planned in the dairy industry (75%), whereas outsourcing of transport services – in the oil industry (33%).

Rokicki and Wicki (2011a) identified solutions supporting logistics processes in grain processing enterprises. In the transport field, most enterprises transported goods by their own means. Only one company, constituting a medium-sized company with regard to employment, used only external transportation. Large enterprises mainly used their own transport. Apart from own transportation, small and micro enterprises also combined their own and external transport means. Forwarding services were used to a small extent in the shipping process organisation. Typically, businesses preferred own transportation (without transport services 51%), or just the provision of transport services alone.

In the next paper, solutions used in logistics systems in milk processing companies were compared (Wicki and Rokicki, 2011). The authors claimed that particular areas of logistics have been assessed differently. The highest assessment was given to applied solutions in the stock and transport management area. The lowest assessment was given to information management and utilization of IT solutions. Rokicki (2012a) presents the results of research on the organisation of logistics in meat processing companies. Few companies had a separate department dealing with logistics management. Transport and storage were most frequently supported logistically. Few companies in this industry also declared the use of one comprehensive IT system supporting logistics. The presented data show that, in the researched companies, logistics activities were not of considerable importance. The aim of the next article (Rokicki and Wicki, 2011b) was to evaluate the organisation of procurement and logistics costs in food processing firms. The average logistics costs amounted to 8.1% of total costs and depended significantly on the size

of business or the type of processing industry. Business plans were mainly related to investment in the development of own storage facilities and transport. The aim of Klepacki's and Rokicki's (2011) article was to evaluate the level of logistics in fruit and vegetable processing firms. Research shows that the degree of logistics organisation was low. Enterprises used various means of transport in the transport of finished products. To the greatest extent firms made use of foreign transport solely (27%) and own transport solely (25%).

In the next article Rokicki (2012b) presents the relationship between the scale of operations and logistics solutions used in agribusiness enterprises. Research confirms the great influence of scale on the organisation of logistics, stock management methods, the choice of means of transport and methods of information flow in agribusiness companies. Small enterprises mainly based on their own means of transport. The larger the company, the more often it used external transport. There was a relationship between the scale of operation and the use of comprehensive transport services of shippers ($\chi^2_{emp.} = 45.01$, $\chi^2_{0.05} = 7.82$, p-value = 0.000, df = 3). A similar strong dependency existed when using the services of individual carriers. Rokicki (2013) presents the results of research on the organisation of transport in agribusiness companies. This article presents the relationship between the scale of operations, agribusiness sector and transport organisation in enterprises. The enterprises surveyed mainly used their own transport or a combination of own and third party transport. Use of third party transport services alone was not a frequent choice. If such services were used at all, they related mainly to transportation and less frequently to forwarding. A high differentiation between particular industries was found. Research confirms the great influence of scale of operation on the organisation of transport. In the following years after the end of project, the subject of transport in agribusiness was discussed less frequently.

The subject of transport in agribusiness was discussed by researchers from other countries. Holl (2004), in his paper, explored the role of transport in the spatial organisation of food processing firms in

Spain. Empirical evidence from interviews suggests that, with modern logistic strategies, transport is becoming more important. Huang (2011) presented the future of Chinese agriculture in vertical integration. Then, low transport costs in the supply processing of food will be possible. Caixeta Filho (2008) discussed the shape of the Brazilian transportation system as a crucial sector for the competitive success of the entire agricultural sector. Main factors influencing agricultural road transport were type of cargo, seasonality and regional peculiarities. Alvim, de Oliveira and da Silveira (2011) proved that the transport system in Brazil was inefficient. The increase in soy production caused problems and, as a result, increased transport costs. High transportation costs were one of the problems, among others, faced by agribusiness (Oliver, ed., 2003). Stanković (2014) suggested, if transport costs are very high, agricultural firms will choose to integrate with companies that are located in their immediate vicinity. Companies then use external transport. In small and medium enterprises, the level of utilization of transportation means is significantly higher than in large enterprises, since the entrepreneur is constantly looking for new businesses to activate existing equipment (Maletić and Ceranić, 2010).

CONCLUSIONS

The article presents an overview of the most important research on transport in agribusiness carried out at the Faculty of Economic Sciences at WULS-SGGW in Warsaw. The subject has been discussed more intensively with the creation of logistics studies at the Faculty. A large intensification of research and analysis was related to obtaining a large research grant by the Faculty. At that time, many studies were made by the Faculty's employees. They referred to the uncharted logistics area, including transport in agribusiness. The research allowed to determine regularities related to transport depending on the scale of operation, sector and many other aspects. The majority of enterprises did not have a separate department dealing with transport. The highest number of companies using own means of transport alone was found in the bakery industry. Large enter-

prises mainly used their own transport. Apart from own transportation, small and micro enterprises also combined their own and external transport means. Forwarding services were used to a small extent in the shipping process organisation. When comparing the results of the research of employees of the Departments of Economic Sciences at WULS-SGGW with other studies, it was concluded that results were quite similar. However, the author did not find such detailed research concerning a large population of agribusiness companies in other countries. There is a need to submit applications for further studies of transport in agribusiness.

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THE ROLE OF LOGISTIC FOR POLISH ECONOMY DEVELOPMENT

Bogdan Klepacki, Full Professor¹

Faculty of Economic Science, Warsaw University of Life Science – SGGW

ABSTRACT

One of the most important sectors currently determining the economic situation of countries, regions, including rural areas and enterprises is logistics. The study presents the directions of the impact of logistics on the economy and changes in equipping Poland with more important elements of the logistics infrastructure, namely transport and storage infrastructure. The place of the logistics sector in the national economy was presented, measured by the share of transport, storage, information and communication, against the background of industry, trade and construction, in the creation of the Net Domestic Product. The logistic competitive position of Poland against the background of neighbouring countries was also determined. It was found that it is high, and logistics can be an important factor in the development of the country. The development of logistics at the Faculty of Economic Sciences at SGGW was also presented.

Keywords: logistics, transport infrastructure, storage, Logistic Performance Index (LPI)

JEL codes: O11, O18

INTRODUCTION

One of the most dynamically developing segments of the national economy is currently logistics. The scale of human travel, freight transport, the flow of financial capital and information is increasing. This requires the development of point and continuous infrastructure elements. This is of great importance for the creation of open logistic chains and lowering their operating costs. It contributes to the development of entire countries, including rural areas.

The aim of the study was to determine the directions of impact of logistics on the Polish economy, changes in the equipment in the more important elements of logistics infrastructure, as well as its participation in the creation of Gross Domestic Product and determining the competitive position of the country against the background of neighbouring countries.

The research used materials from the reports of the Statistics Poland, data from Eurostat, the World Bank and research results available in specialist literature. Analysis uses both a vertical dynamic (changes over time) and horizontal (international comparisons) methods.

REASONS FOR THE DEVELOPMENT OF LOGISTICS

Logistics is usually defined as a method of supply chain management, which includes planning, implementation and control of efficient, effective flow of raw materials and materials for production, finished products as well as transmission of relevant information from the point of origin to the point of consumption in order to meet customer requirements. It is also referred to as managing the processes of moving goods and people

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, bogdan_klepacki@sggw.pl, +48 604 466 569

and activities supporting these processes in the systems in which they occur (Fertsch, 2006). Its main goal is to minimize the cost of flow of products in the supply chain, while increasing the profit in each company while maintaining the expected level of customer service.

Logistics as an element of human activity has been functioning since ancient times. However, it had a mainly local dimension. Today, there are many reasons for this phenomenon, but the following can be mentioned as the most important (Klepacki, 2014, 2018):

- reserves of cost savings in the field of techniques and production technology have already been largely exhausted, they can be more obtained as a result of optimization of transport, forwarding, storage, or streamlining of flows;
- offer for customers is constantly expanded, both as to the range of products and the consideration of customer requirements;
- manufacturers and retailers want the shortest and the least products store;
- traditional, low-efficient distribution systems have become too expensive, businesses cannot afford to use not full means of transport;
- IT development has enabled optimization of logistic operations in technical, organizational and economic terms;
- the importance of precision in the delivery of raw materials, semi-finished products and final products increases; in mass or standard production, the 'just in time' technique is widely used, and in the individualized production 'just in sequence';
- globalization of enterprises activities takes place, which is connected with the increasing flow of capital, goods, technologies and information on the scale of the entire planet.

DIRECTIONS OF LOGISTICS IMPACT ON THE NATIONAL ECONOMY

The impact of logistics on the economy can be considered from different points of view. An attempt to systematize this impact is presented in Table 1.

The presented summary does not exhaust the whole issue, but gives an overview of the scale and multidirectional impact of logistics on the state and directions of changes in the economy and society.

IMPORTANCE OF TRANSPORT INFRASTRUCTURE IN SOCIO-ECONOMIC DEVELOPMENT

Transport infrastructure is the roads of all branches, transport points, which include airports, ports, etc. and a number of auxiliary devices. Transport infrastructure creates convenient conditions for moving cargoes and transporting people. The most important functions fulfilled by the transport system are consumption, production and integration (Rydzkowski and Wojewódzka- Król, 1997).

The largest increase in demand for transport infrastructure was recorded in the period of accelerated industrialization. Also today, there is a strong correlation between economic growth and the development of transport infrastructure, which results, among others, from globalization processes, opening of foreign markets, liberalization of trade between countries from different continents. The main reason for the increase in passenger transport is the need to commute to work, as well as the improvement of household incomes.

Ensuring access to transport infrastructure and the proper level of its capacity facilitates the so-called diffusion of economic growth between regions (from regions better to those more slowly developing, especially from agglomerations to rural and agricultural areas) (Zimny, 2016).

The construction of new infrastructure elements has both advantages and disadvantages. The advantages include fast and safe traveling, overcoming long distances. The area with developed infrastructure is attractive for investors and tourists. New jobs are created and residents have the opportunity to work outside their place of residence. Infrastructure, however, may have a negative impact on the natural environment. Road construction is connected with the necessity of designating large areas under it, soils lose their production usefulness and the areas degrade. Dust from means of transport is a threat, irreversible changes occur in fauna and flora. Animals lose their natural living conditions due to felling of forests, plant complexes are damaged. The shape of the terrain, landscape and water conditions change, they take place. In the social sphere, for example roadside accidents are a negative effect (Chrabąszcz, 2012).

Table 1. Important directions of the impact of logistics on socio-economic development

No	Directions of impact	More important impact
I	economical	GDP production place of employment source of income of the population source of state income source of income of local governments increasing investors' interest modern solutions in management and technology inducing development of other sectors of the economy
II	technical	technical and technological similarity on a global scale standardization of packaging and means of transport development of specialized means of transport development of IT systems innovations in warehouse construction and transport
III	social	stimulus for building infrastructure serving the society improving people-to-people contacts in macroeconomic terms point increase in congestion separation of hitherto compact local societies
IV	political	increased strength and position of the country political stabilization
V	legal	unification of legal regulations increase transport safety reducing international crime
VI	environmental	modernization of communication routes, including environmental requirements reducing the area of forests and agricultural land contamination by exhaust fumes
VII	military	increasing the mobility of military units improvement of communication and transport of people, goods and means of defense development of communication systems between individuals preparation of civil solutions for defense purposes
VIII	academically	a new area of education a large, undisclosed research area

Source: own study.

In Poland, according to Statistics Poland (Local Data Bank) data, in 2016 there were 420.2 thousand km of public roads. Most were municipal roads – 58.8%, district ones accounted for 29.7%, voivodship 6.9%, and domestic 4.6%. The saturation of motorways is often recognized as an element of modern transport infrastructure. In terms of their density compared to EU countries, Poland is weak. In 2016, there were 5.2 km of highways per 1,000

km², while in the Netherlands, for example, 66 km (13 times more) and Luxembourg (58 km) (Eurostat, 2018).

Generally, it can be concluded that in terms of transport infrastructure, Poland is less advanced than Western European countries, but there is a decisive progress and after completing planned road and rail investments it will not be a barrier limiting the development of logistics and other economic activities.

CHANGES IN THE WAREHOUSE MANAGEMENT

Warehousing is the second most important element of logistics. In Poland, the warehouse market is dynamically developing both on the demand and supply sides. At the end of 2017, the area of almost 13.4 million m² was available, while in 2007 there were 4.7 million m² (Mierzwiak and Klepacki, 2018). Last year, the area increased by over 14%, and the warehouse market increased by over one million m².

The demand side is also showing an upward trend, e.g. in 2015 it increased by over 5% (JLL, 2016). This is due to the good economic situation, the growing demand for space from the e-commerce sector and the increase in the outsourcing of logistic services by retail chains or production companies. The most modern warehouses are rented by logistics operators and retail chains. In the regional cross-section, the highest demand for warehouse space occurs in central Poland, in the Warsaw area, in Upper Silesia, in Poznań and in Wrocław. Investors locate warehouse space at the junctions of highways and expressways. It can be stated that tenants who are opting for the local market choose the central one, while on the in-

ternational scale – the southern part of the country (Fechner and Szyszka, 2014).

Operated stores have a different degree of technological advancement. Modern warehouses play an especially important role, by which we mean surfaces in buildings with a storage height of at least 9 m, minimum one gate per 1,000 m², free floor, minimum 5 tonnes/m² durability, fire protection system in the form of sprinklers and smoke dampers, and 5–8% of office space [Logistics ... 2009]. Modern warehouse space in mid-end of 2017 in Poland covered almost 12 million m² (Fig. 1).

In terms of modern warehouse space, there has been significant progress. Over a period of 16 years, it has increased over 10 times. This means that the attractiveness of Poland as a location for investments related to logistics has been increasing.

ECONOMIC IMPORTANCE OF LOGISTICS IN POLAND'S NATIONAL ECONOMY

The importance of individual sectors in the national economy can be measured, among others by their contribution to the creation of Gross Domestic Prod-

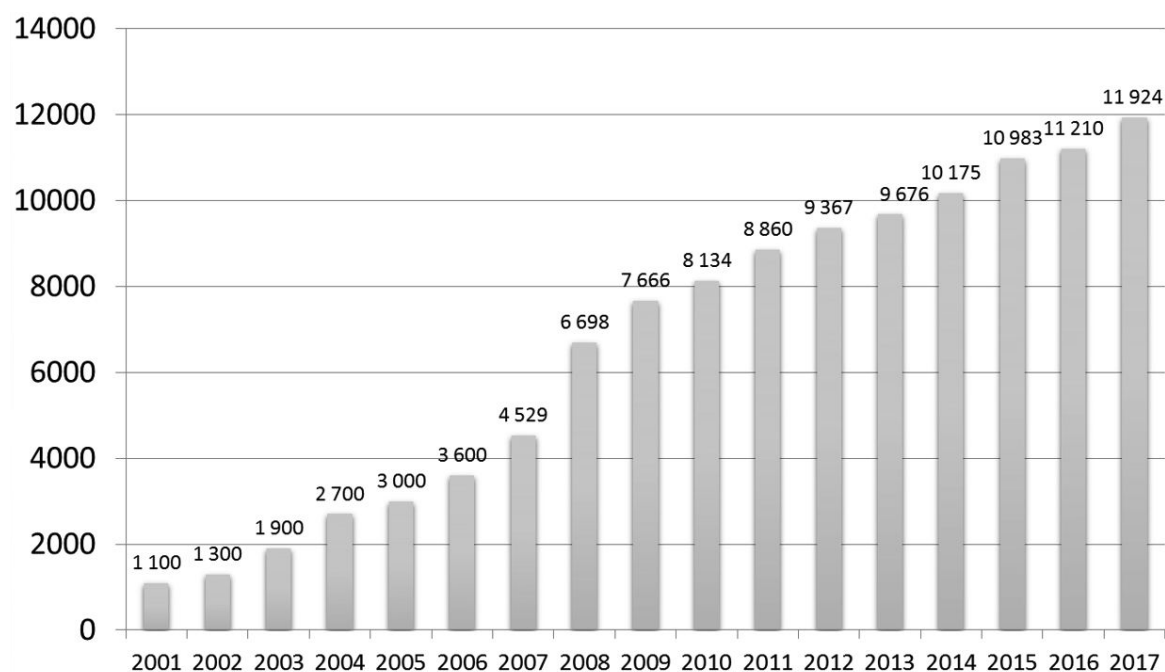


Figure 1. Area of modern warehouses in years 2001–2017 (thousand m²)

Source: Fechner and Szyszka (2009, 2010); GUS (2006, 2010, 2016).

uct (GDP). In 2015, the share in the GDP structure of selected sectors was as follows²:

- industry – 23.5%;
- car sales and repair – 15.4%;
- building industry – 6.3%;
- transport and storage economy – 5.8%;
- IT and communication – 3.6%;
- water supply, sewage and waste collection – 1.3%.

Including strictly logistic sectors in logistics (transport and storage, information and communication, water management and waste), we state that 10.7% of GDP was generated in them, however, logistics is not fully included in the statistics. It constitutes a significant part of commercial and industrial activities, etc. By adding to the above-mentioned value of trade and repair of cars, we obtain over 25%. Therefore, it can be stated that logistic and related activities, without industry, bring the national economy at least one quarter of GDP.

For general employment in the country amounting to 15.4 million people in transport and storage economy in 2015, 5.3% was employed, and in the information and communication a further 2.2%. Logistics also involved 15.5% of total fixed assets. GDP per employee in transport and storage was 110.5%, and in information and communication,

163.8% of the average value in the entire national economy.

COMPETITIVE POSITION OF POLISH LOGISTICS IN RELATION TO SELECTED NEIGHBOURING COUNTRIES

The level of competitiveness of logistic enterprises can be measured in many ways. Logistic Performance Index (LPI) is the most widespread. It is calculated for 163 countries³ and determined taking into account six characteristics, namely:

- efficiency of the clearance process by order control agencies, including customs;
- quality of trade and transport related infrastructure (e.g. ports, traction, roads, IT),
- easy of arranging competitively priced shipments;
- competence and quality of logistic services;
- ability to track and trace consignments;
- timelessness of shipments in reaching destination within a schedule or expected delivery time.

Poland is relatively well prepared to provide logistics services (Table 2). Although it has a worse rating than Germany, which is a world leader, however, on a regional scale it ranks at a similar level to its neighbours. Compared to the situation in 2007,

Table 2. Competitive position of Polish logistics against the background of selected Central European countries in 2007–2016

Country	LPI					Place in the world ranking in 2016
	2007	2010	2012	2014	2016	
Poland	3.04	3.44	3.43	3.49	3.43	33
Germany	4.10	4.11	4.03	4.12	4.23	1
Czech Republic	3.13	3.51	3.14	3.49	3.67	26
Slovakia	2.92	3.24	3.03	3.25	3.34	41
Ukraine	2.55	2.57	2.85	2.98	2.74	80
Lithuania	2.78	3.13	2.95	3.18	3.63	29
Hungary	3.15	2.99	3.17	3.46	3.43	31
Latvia	3.02	3.25	2.78	3.40	3.33	43

Source: Arvis et al. (2016).

² Own calculations based on: Statistical Yearbook of Poland 2017, pp. 699–700.

³ So far LPI has been calculated for years 2007, 2010, 2012, 2014 and 2016.

all areas have made good progress, and Poland has moved from 40 to 33 in the world ranking.

PLACE OF THE FACULTY OF ECONOMIC SCIENCES WULS-SGGW IN THE DEVELOPMENT OF LOGISTICS

Observation of the situation in the national economy and the labour market prompted the Faculty authorities to meet the challenges and launch the 'logistics' direction. On 18 December 2006, the Senate of the Warsaw University of Life Sciences WULS-SGGW appointed him as a first-cycle program (the first in public non-military universities in Poland), in 2012 the second-degree studies were created. In total, in the period leading the logistics, that is, from 2007 to the present, the university graduated 589 on full-time studies and 855 on part-time studies, which totally give us a number of 1,444 graduates.

The changes also concerned the organizational structure. In 2008 was created Division of Economics of Production and Logistics. In 2012 Division of Economics and Engineering of Logistics was founded, and in 2017 was appointed the Department of Logistics, in which currently is employed eleven people and three PhD students perform the dissertation.

The research and development area of the Department includes, among others, defining the directions of logistics development and its impact on the economics and organization of enterprises, with particular emphasis on production processes, transport and storage of agricultural production, optimization of logistics business costs, storage and transport of dangerous goods, air and service logistics. Other areas are determining the place of logistics in the economic development of the country and the region, shaping the theory and practice of logistics used in agribusiness enterprises, shaping effective logistics chains in agribusiness, information systems and IT in domestic and international logistics.

CONCLUSIONS

1. Poland is an important place to provide logistics services, including due to its central location in Europe, which is increasingly making internation-

al exchanges. After joining the European Union, many infrastructural investments were made in Poland, which made it possible to achieve a level of logistics development comparable to that in other EU countries. This means that Polish logistics will not be a limitation, but rather an important factor for the development of the country at the macroeconomic and local level.

2. Polish logistics companies are growing rapidly, the area of modern warehouses is growing, they are improving their offer, hence their international competitiveness is growing. Logistics is becoming a Polish specialty that is increasingly shaping the level of GDP and the state of the national economy.
3. The Faculty of Economic Sciences WULS-SGGW adjusts its didactic offer as well as conducts scientific research in accordance with the prospective development directions of the Polish and world economy. It also develops contacts with logistics companies that are important on the Polish and global market.

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ECONOMIC PERSPECTIVE OF SHORT SUPPLY CHAINS

Sebastian Jarzębowski, Eng PhD¹

Faculty of Applied Informatics and Mathematics, Warsaw University of Life Sciences – SGGW

ABSTRACT

Within the framework of the paper, the author introduces issues connected to short food supply chains. There are many different forms of short food supply chains (SFSC), but they share a common characteristic of reduced numbers of intermediaries between the farmer or food producer, and the consumer. The growing interest in SFSCs is shown in the paper – this reflects mainly the consumer demand for quality and traceability, given the alarming health crises in food markets. From a customers' point of view, SFSCs transfer more complete information about the origin of the food and, for producers, SFSCs retain a higher share of added value. The overview on the impact of short supply chains is provided in the paper. The results of the analysis show that the supply chain may have some beneficial economic effects. It is noticed that the SFSCs have potential to increase farm value added (profit allocation), promote sustainable farming systems, diversify production and contribute to local economic development.

Keywords: short food supply chain, supply chain management, sustainable development

JEL codes: Q01, Q13, Q18

INTRODUCTION

Agribusiness and food supply chains are transforming from the commodity system into a coordinated food system (Jarzębowski, 2013). This leads to competition between various supply chains and networks, and not only to competition between individual companies (Christopher, 1998; Lambert and Cooper, 2000). However, these trends of change require research to adapt old or to develop new models of food business and food markets. Primarily due to the instability of products and the need to improve product flow tracking on the food market, representatives of science recognized the importance of the supply chain management process in the agri-food sector (Hobbs and Young, 2000). In addition, consumers

continuously increase their demand on food safety and its functionality, product diversity, packaging quality, and the quality of services and products (van der Vorst, 2000). The issue of environmental protection and the economy of sustainable development is also now more important. Sustainable development is a resource and society dependent (World Commission on Environment and Development, 1987). In the literature dealing with the issues of sustainable development, more and more attention is paid to the relationship between supply chains and sustainable development of the economy. For example, Kashmanian, Keenan and Wells (2010) found that leading companies are systematically increasing their activities in the field of environmental protection (Kashmanian, Keenan and Wells, 2010).

¹ Corresponding author: Nowoursynowska 166, 02-787 Warsaw, Poland, sebastian_jarzebowski@sggw.pl, +4822 593 72 88

One should notice, that an increasing number of consumers are looking for alternative sources of food produced near their place of residence (Cicia, Cembalo and Del Giudice 2010; Nie and Zepeda, 2015). This dissemination of new forms of food distribution organization in recent years, called short supply chains, can be linked to the increasingly important role played by credibility-based goods in shaping consumer preferences. Indeed, the growing popularity of short supply chains should be attributed to the distribution model, which allows consumers to support local agriculture while adding fresh products to their diet (Uribe, Winham and Wharton 2012). The SFSCs can also be seen as a means to restructure food chains in order to support sustainable and healthy farming methods, generate resilient farm-based livelihoods (in rural, peri-urban and urban areas) and re-localize control of food economies (EIP-AGRI, 2015).

The goal of the paper is addressed to short food supply chains. In the paper, the author attempts to characterize the form of the SFSC and to give the overview on the economic impact of short supply chains. In the literature, one can notice a lack of research on the SFSCs, thus the paper fits in with current scientific trends. The research is granted by European Commission in form of research project 'Short supply chain Knowledge and Innovation Network – SKIN' (Horizon 2020 Programme). In the paper, the first step of the research is presented.

SHORT SUPPLY CHAINS – THEORY AND PRACTICE

Various definitions of SFSC are presented in the literature. The 'Short Supply Chain' is often used as an umbrella concept (Marsden, Banks and Bristow, 2000), assuming context dependent economic, socio-cultural, policy, organisational characteristics, and having different impacts on local economies. The definitions of short supply chain are formulated under different criteria as: number of intermediaries, physical distance, social relations, knowledge exchange, locality and governance involvement. According to the European rural development regulation (1305/2013) a short supply chain means a supply chain involving a

limited number of economic operators, committed to co-operation, local economic development, and close geographical and social relations between producers, processors and consumers. This definition is used in the further analysis in the paper. The number of intermediaries is often used as a discriminating factor to define SFSCs. Parker (2005) for instance, characterizes SFSCs by the very small number (or even the absence of) intermediaries between the producer and the consumer, as well as by the short geographical distance between the two.

On the base of the criteria outlined above, a great variety of SFSCs can be identified and various classifications or typologies developed. Such classifications are useful for a more systematic exploration of SFSCs and development and implementation of necessary support measures (Galli and Brunori, 2013). The EC IMPACT project (Marsden, Banks and Bristow, 2000; Renting, Marsden and Banks, 2003) proposed three main types of short food chains on the basis of the number of intermediaries, physical distance and organisational arrangements: Face-to-face, proximate and spatially extended SFSCs. According to Mundubat (2012) SFSC can be classified on the basis of the level of compromise (low, medium and high) that may be adopted either by consumers or producers into nine categories (Fig. 1).

The CROC project (Chaffotte and Chiffolleau, 2007) found it useful to distinguish between individual and collective, direct and indirect (with one intermediary) SFSCs. Whereas, the European Network for Rural Development in their report on SFSCs have identified three types of SFSCs on the basis of their individual or collective organisation and initiators (consumers and producers): direct sales by individuals, collective direct sales, partnerships of producers and consumers (Peters, 2012).

Short supply chain practices are becoming increasingly common across Europe as well as around the world. Currently in Europe there are many examples and types of short food supply chains. Usually these are small enterprises with limited local impact. However, these small initiatives indicate that these enterprises are able to provide solutions to improve the profitability and stability of agricultural producers. Therefore, there is a great need to identify, syn-

Consumers	high	Cooperative of consumers managed by consumers Producers are not involved in distribution	Cooperative of consumers managed by consumers The producers plan the production together with consumers	Cooperative of consumers managed by consumers and producers Shared responsibility
	medium	Cooperative of consumers	Cooperative of consumers with direct relationship with producers	Cooperative of consumers in which production is collectivized and coordinated
	low	Supermarkets with organic food Distributors	Shops purchasing directly from producers The producers plan the production collectively	On farm sales Farmer's shop
		low	medium	high
	Level of compromise	Producers		

Figure 1. SFSC classification based on level of compromise between producers and consumers
 Source: own work based on Mundubat (2012).

thesize, exchange and present good practices² in the short food supply chains management with focus on small enterprises. These arguments were the basis for identifying examples of such chains in Europe. For this purpose, good practices regarding short chains in 15 European Union countries were analysed within the framework of the referred SKIN project. As part of the study, over 100 examples of initiatives were described and classified in specific sectors (Fig. 2).

The majority of good practices for short chains have been identified in Austria, Ireland, the United Kingdom and Hungary. In the analysed examples, there is a tendency to include more than one agri-food sector within a single enterprise. These practices include, for example, distribution solutions for

agri-food products, such as on-line sales with home delivery or collection at designated places, or inviting consumers to farms to make a purchase. In Poland, the most practices related to the fruit and vegetable sector have been identified, while in Ireland – within the meat sector.

The concept of short supply chains concerns many of its participants who can benefit from shortening the path to the consumer. Almost all identified (within the framework of the referred SKIN project) good practices include a link of producers. In the case of one third of the analysed examples, there are processors of agri-food products and retailers. Labs, farm stores, tourism providers and wholesalers play a marginal role in the case of short chains.

² A good practice is not only a practice that is good, but a practice that has been proven to work well and produce good results, and is therefore recommended as a model. It is a successful experience, which has been tested and validated, in the broad sense, which has been repeated and deserves to be shared so that a greater number of people can adopt it (FAO, 2018).

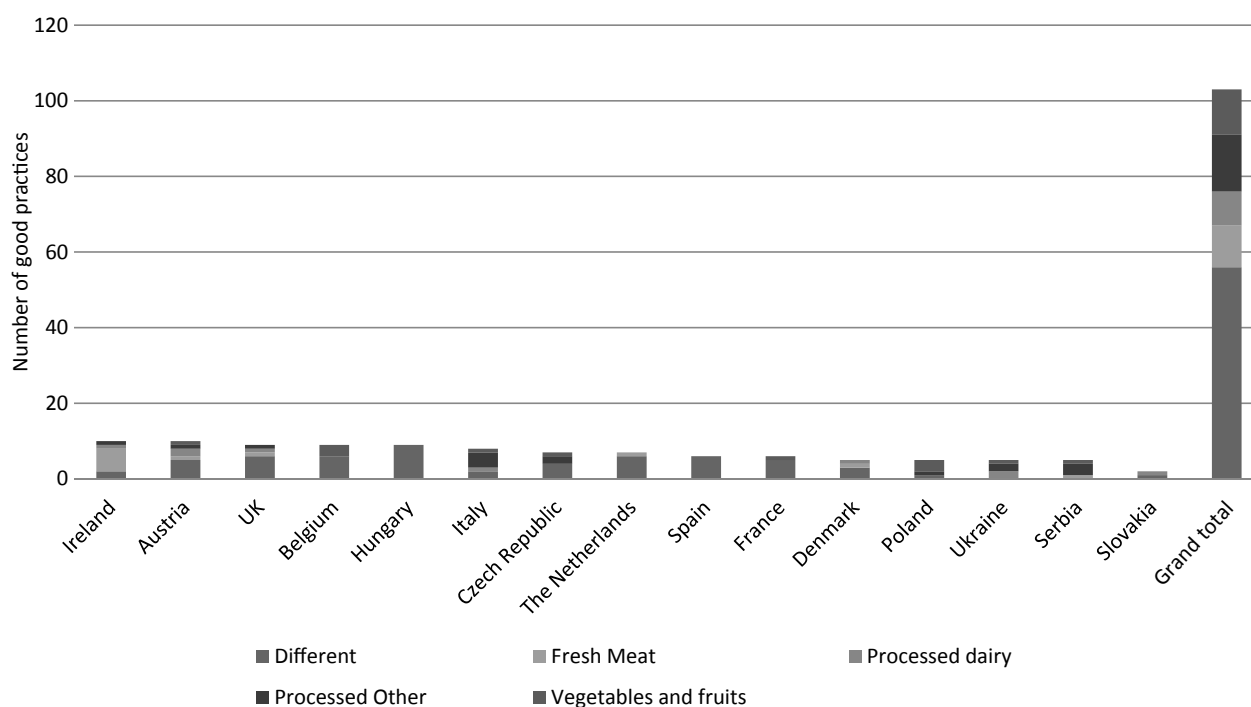


Figure 2. Good practices of SFSC in EU by sector

Source: own work based on results of project SKIN, Horizon 2020.

Within the framework of the SKIN project, topics that emerged in the researched good practices were classified into 4 main groups (products, organizational/institutional/systems, governance and sales). The first group concerns topics connected with product and is divided into following areas: Branding & Labelling, Valorisation, Value (e.g. taste, healthiness), values, as social, economic and environmental sustainability. Social sustainability emphasis: trust, sense of community, connection between producers and consumers, community education, consumer empowerment, recognition of producers. The economic sustainability includes: profitability, synergies with other sectors, generating local employment, training and coaching initiatives. The environmental sustainability takes into account: food waste, GHG emissions, energy use and carbon footprint, food miles.

The first results of the analysis conducted within the project show that shortening the supply chain may have some beneficial effects on the environment, economy and society. However, it should be noted that the way in which the supply chain is shortened is

important. Not necessarily all short chains will bring the expected benefits. For example, if production and distribution systems in the supply chain are not geared to sustainable development, the short supply chain will not bring the expected economic, social and environmental benefits.

ECONOMIC BENEFITS OF SHORT FOOD SUPPLY CHAINS

In the paper, the economic impact of SFSCs was in focus, thus the further part refers only to that area of influence. The research was conducted within the framework of the referred European project.

One of the most commonly reported economic benefits associated with LFS/SFSCs, is that of increased income for the producer, it is possible to obtain higher margins by farmers with lower overheads compared to the longer supply chains. It has been suggested that producers are able to add a price premium when selling through SFSCs (Pearson et al., 2011), that the elimination of the 'middleman' enables farmers to receive

a greater share of the profits (Sage, 2003). Due to the implementation of short supply chains, there are more opportunities to negotiate contracts, ensure fair contract terms and to expand on a larger scale and enter new markets. An important role in this context is played by the use of modern distribution channels, i.e. dynamically developing e-commerce (e-shopping). The range of products can be varied and / or increased, so one can involve more producers and create more jobs.

In addition, SFSCs provide growers with an opportunity to diversify and add value to their produce that would not usually be marketed (Alonso, 2011). Despite these claims, which are numerous in the literature, few are supported by empirical research.

Of the studies which do present supporting evidence, the majority of evidence is qualitative, and based on perceptions and experiences. For example, when traders at a farmers' market in New Zealand were asked, in an unprompted way, to supply their reasons for using the market, the main motivation identified was for the 'economic' benefits (Lawson et al., 2008). Specifically, the perceived economic benefits were, 'the desire to obtain a fair price, the wish to avoid middlemen and to obtain a supplementary income' (Lawson et al., 2008).

Economically speaking, benefits can be found in rural development and economic regeneration. There is evidence that local farming systems and short chains do have a higher multiplier effect on local economies than long chains, with impacts also on maintaining local employment, particularly in rural areas. The synergies with the tourism sectors are also well acknowledged. At producer and farm level, they seem to allow a higher share of value added to be retained locally, although quantitative evidence of such impacts is poorly documented.

Another advantage of short supply chains is that producers can share resources, i.e. equipment or logistics services to improve efficiency and share costs. Knowledge and skills can also be shared (using the strengths of different participants in short supply chains). Cooperation within short chains can help to integrate new actors in the chain with the agri-food sector. In addition, the maintenance or restoration of local processing plants, such as slaughterhouses or agricultural stores, becomes more real.

In addition, the requirement for higher labour input with different skills (production, processing, marketing, promoting) is a difficulty at farm level, particularly for small scale producers. The small scale of the schemes at stake and possible higher costs of production as a consequence can also be a threat for their longevity. Also, there are many examples of farmers using a mix of SFSCs, or combining them with longer chains in order to build resilient routes to market and reduce risks from market volatility.

CONCLUSIONS

Short Food Supply Chains (SFSCs) have established in parallel to conventional food chains, playing a key role in the emerging food networks that are continuously arising as an alternative to the globalized agri-food model. Due to the benefits of SFSCs, an increase in the number of initiatives supporting the development of such activities in the agri-food sector is noticeable. These models have become an alternative to the globalized structure of the agri-food sector, enabling 'bringing together' the two extreme links of the supply chain and satisfying the needs of both the consumption and production side, while affecting the well-established concept of sustainable development. Within the framework of economic perspective it can be concluded that short supply chains support achieving benefits as: higher margins/lower overheads (the often high costs charged by distributors can be split fairly between producers and consumers), improved product range (the product range can be diversified and/or increased so that more producers can be involved and more jobs can be created through retaining the added value in each territory), resource sharing (knowledge and skills, equipment, tools, processing facilities, transport and logistics can be shared in order to improve efficiency and share costs. can also be shared), improving local food chain infrastructure (retaining or reinstating local processing facilities such as abattoirs or farmers' shop), increased negotiating power (more weight in contract negotiations, ensuring fair terms and conditions, gaining access to public and larger scale markets), reduced competition (between many small uncoordinated SFCs in a region), mutual support: collaboration can combat isolation felt by small-scale producers.

Concluding, it is required for small farms and agricultural producers to cooperate within integrated short chains in order to increase farm value added (profit allocation), promote sustainable farming systems, diversify production and contribute to local economic development.

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